An Introduction into Trademarks and Patents

with endoscope example

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Colophon

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The source can be found on Github.

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Chapter 1

Introduction

1.1 To the audience

This reader presents an introduction on the use of know-how and intellectual properties (IP) and its benefits for students in science, engineering, medical and business courses. The basic concepts and definitions of IP will be treated and also their use and purpose will be described.

The different topics of IP are explained with an example relevant to your background.

Those interested will find additional information in the appendix appendix B by following the links.

1.2 Every day IP

Chances are that you are using products or services appropriated by a variety of intellectual property rights (IPR) on a daily basis, eg. brands, designs, patents, copyrights.

Many of the products that you will buy or use daily are from a certain brand. Such a brand makes you recognize the product and the manufacturer. For example the brand Coca-Cola for cola. On the other hand manufacturers and organisations use their brands to market their products and services.

Next to brands, organisations have their tradenames registered at the Chamber of Commerce.

The book you are reading or the music you are listening to are works made by an author or musician. These makers would like to be rewarded for the efforts put into the making of their work. You are therefore not allowed to copy this work without their permission since it is copyrighted.

In the development and production of bicycles and cars there are many proprietary technologies. Manufacturers of these product would like to earn back their investments in research and development by using patents.

When you are already developing products yourself now or in the future and when involved as entrepreneur or manager you will have to work with different kinds of IP. As a student it is therefore useful to acquire sufficient knowledge of IP for your future career. Even during studies you it can be worthwhile to use them for many reasons, for example for design assignments.

1.3 Why do IP rights exist?

Several hundred years ago the use of intellectual property rights was hardly known. At the beginning of the book printing technology it became possible to copy and disseminate works of literature far more easily. From that moment authors and publishers started to feel the need to appropriate the rights for the production and distribution of these works. With new technologies during the Industrial Revolution mass production in large quantities became feasible for products and devices. This gave rise to a growing interest by manufacturing companies to appropriate trademarks, logos and patents for their products and inventions.

The modern patent in Venice

During the fifteenth century, Venice was a rich and flourishing city. One of the reasons for this prosperity was the stained glass produced on the island of Murano.

This was a rare and expensive product that became an important economical asset for the city.

However, the formula for making coloured glass was known only to a few people: the glassmakers of Murano.

The Senate of Venice began to worry about the possibility that the glassmakers might die or flee to other countries, thus losing this precious secret.

To avoid such hypothesis, Venice offered the glassmakers to train some apprentices sent by the city. However, the glassmakers refused because accepting the offer would have meant that they loose their monopoly and create potential competitors.

Understanding Murano's concern, Venice offered, in exchange for the secret, an exclusive right for a limited time to guarantee

the glassmakers monopoly. The document granting this right was called a “patent”, from the Latin verb “patere”, meaning to make known.

Thanks to this, the craftsmen accepted the offer and Venice managed to keep the secret, so that we can still enjoy the beautiful coloured glass of Murano today.

In 1474, Venice published the first patent statue in history, to regulate the matter. See figure 1.1.

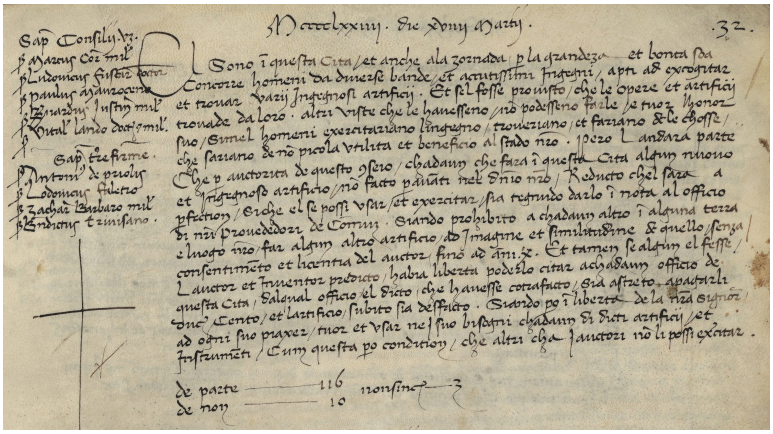


Figure 1.1: The Venetian Patent Statute, enacted by the Senate of Venice in 1474, is widely accepted to be the basis for the earliest patent system in the world.

The general concept behind the use of intellectual property rights is that the creator or manufacturer can apply for a temporary exclusive right hence appropriating their (often intangible) assets and stopping competitors. By doing so the IP owner acquires the possibility to exploit the production of these assets which are otherwise easily copied or manufactured by competitors. So, on the one hand intellectual property rights incentivize persons and innovators who invested both time and money to develop a new product. While on the other hand competitors cannot copy the product and sell it at a cheaper prices without making such investments.

Consumers of those products which have been appropriated with intellectual property rights may have to pay a higher price. Without these intellectual property rights competitors would have been able to sell the products at a lower price. For society at large the introduction of IPR is not only to have all products available at the lowest prices, but to have access to new products and innovations. While using IPR innovative companies are temporarily in a position to charge higher prices thus enabling a return on (earlier made) investments. This is shown in figure 1.2.

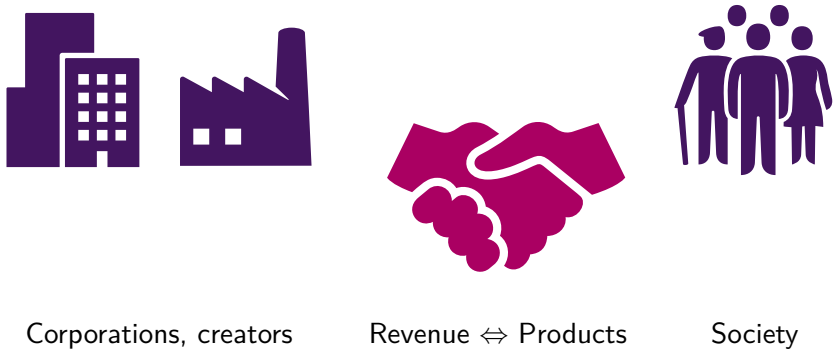


Figure 1.2: Use for business and society

1.4 Well known IP

Companies, entrepreneurs, authors, engineers, developers, scientists and inventors can use a variety of IPRs like copyrights, trademarks, patents, trade names, logos, designs, databases, plant breeders, integrated circuit layout and trade secrets.

Some of the well known IP rights are:

Copyright Will give the creator (author) at the end of the creation automatically global protection for original works like text, music and images. Copyrights limit free distribution of the work.

Trademarks After registration, the trademark owner receives the exclusive right to use the trademark for certain goods and services. A trademark right can be used to take action against competitors who want to exploit the same or similar trademark in the same market.

Patents After the application, registration and examination of a patent, others can be excluded from the commercial exploitation of the patented invention.

Tradenames Trade and company names are used to make a company known to customers in the market and ensure a reputation and thus customer loyalty. Another company may not cause confusion with its trade name by using a trade name that is too similar to a previously registered trade name.

Designs After registration, the design holder receives the exclusive right to use the design. A design right can be used to take legal action against competitors who wish to exploit a similar design.

1.5 Frequently used IP for innovations

This document will not describe the legal aspects of IP. See the links to several articles of different laws in appendix D. We will describe how to use IP, and more specifically for innovations. An overview of the importance of the different IP rights for innovations can be seen in the following table.

Table 1.1: Effectiveness of appropriability mechanisms for product innovations; % product innovations for which deemed effective.

Sector	n	Secrecy	Patents	Other IPRs	Lead time	Complementary sales services	Complementary manufacturing
Food	89	59	18	21	53	40	51
Petroleum	15	62	33	6	49	40	36
Basic chemicals	35	48	39	12	38	46	45
Drugs	49	54	50	21	50	33	49
Machinery tools	10	62	36	9	61	43	35
Computers	25	44	41	27	61	40	38
Electrical equipment	22	39	35	15	33	32	32
Semiconductors	18	60	27	23	53	42	48
Medical equipment	67	51	55	29	58	52	49
Autoparts	30	51	44	16	64	45	53
All	1118	51	35	21	53	43	46

From: Scotchmer [Sco04] Table 9.1, page 260.

Source: Cohen, Nelson, and Walsh [CNW00], table 1. Note: Each number is a mean response, representing the percentage of product innovations in the row category for which the type of protection in the column is deemed "effective". The response categories are <10%, 10%–40%, 41%–60%, 61%–90%, >90%.

In general we can see that secrecy (including what we call know-how) is one

of the most frequently used appropriability mechanisms. At the same time patents are important in the sectors drugs and medical equipment.

Other IPRs (for example trademarks or designs) are less frequently used for innovations, but are of course very important for sales and marketing.

1.6 The endoscope example

In this section we introduce the example which will be elaborated in next chapters.

Here, the main example is an instrument for minimally invasive surgery. Figure 1.3 shows an image of a minimally invasive surgery in the abdominal cavity.

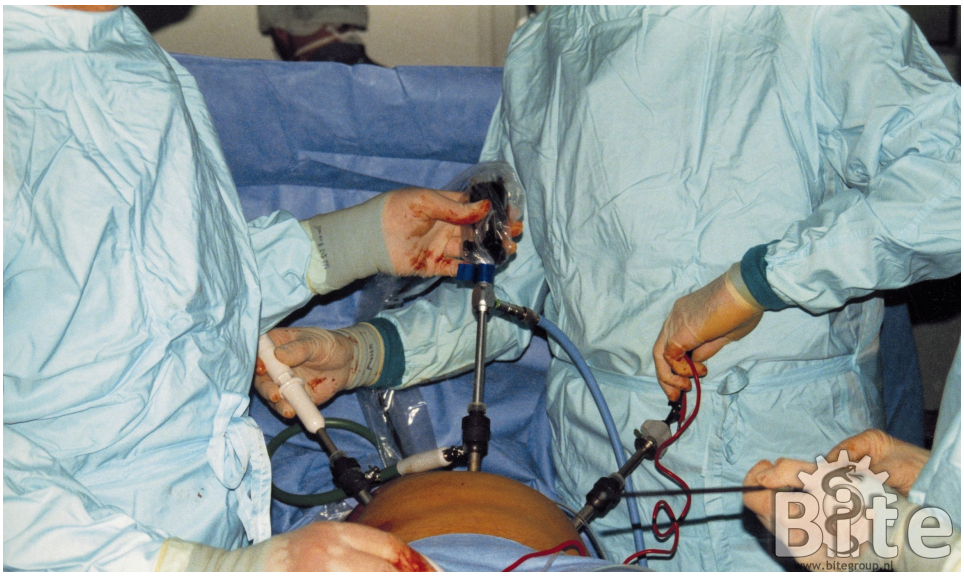


Figure 1.3: Laparoscopic surgery in the abdominal cavity

The development of this instrument was started at TU Delft by Paul Breedveld. Development started with a solution for an endoscope with a flexible head. This endoscope with a flexible head gives a better spatial perception of the instruments and the area of surgery during the surgery (see figure 1.4 for illustration).

A first patent has been applied for an at that time alternative mechanism of the flexible head. After several years of research and improvements, a second patent (see section F.1) on a mechanism for the flexible head of the endoscope has been filed. Paul Breedveld and Jules Scheltes are named as inventors on this patent application. Jules Scheltes developed the inven-

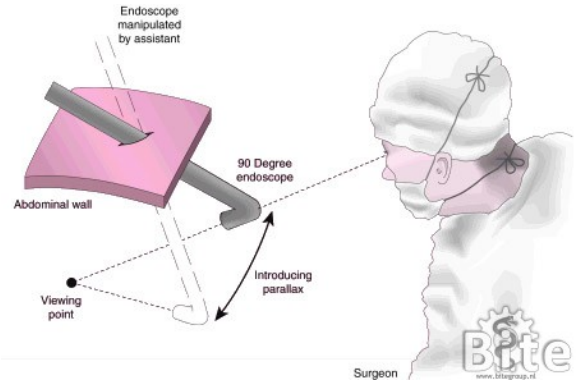


Figure 1.4: Improved spatial perception during minimally invasive surgery

tion in the patent together with Paul Breedveld and has also started its commercialization. He founded the company DEAM.

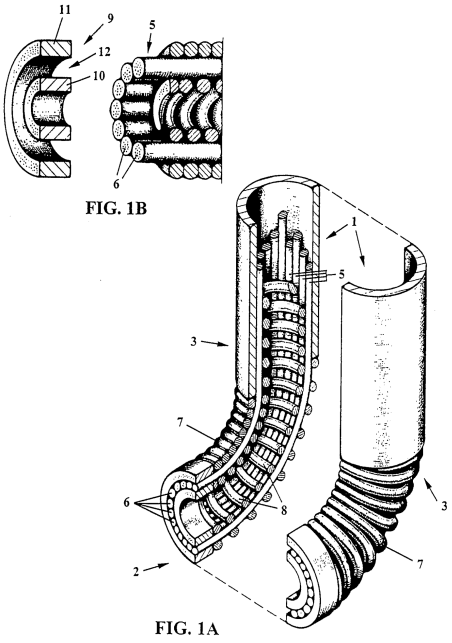
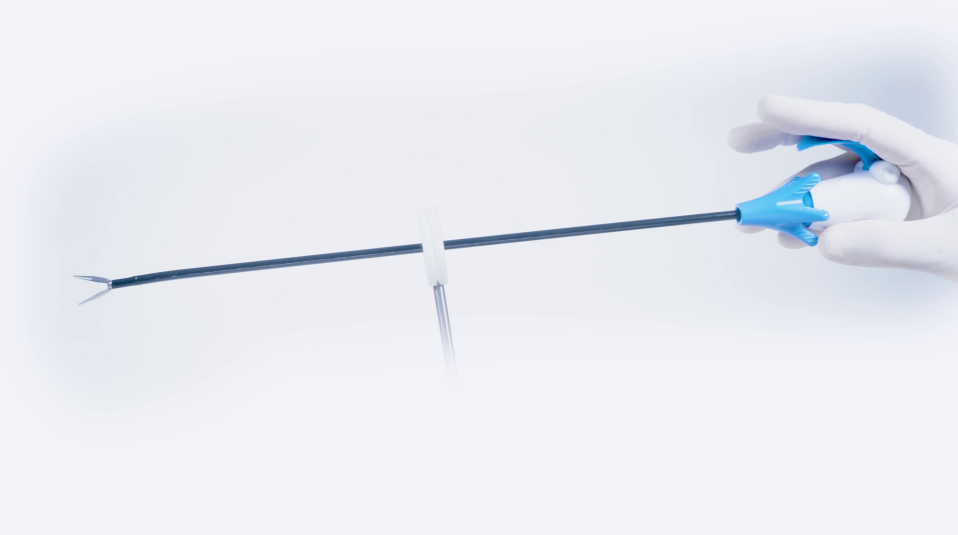


Figure 1.5: Flexible head of endoscope

Figure 1.5 shows the invention. The flexible head of the endoscope consists of a bundle of wires (parts 6 in Figure 1.5) held together by a coil spring on the inside (part 8 in Figure 1.5) and a coil spring on the outside (part 7 in figure 1.5). There is a similar mechanism on the other side, so that control by movement of a hand is copied to the head .

The company DEAM has recently launched the first products based on this

invention. These products are instruments used during minimal invasive surgery for grasping and cutting. Video 1.1 shows the movement of the flexible head.



Video 1.1: Laproflex

The second patent application for the endoscope as shown in figure 1.5 can be read in section F.1. This patent application will be used in chapter 4 for further elaboration and explanation about patents.

Chapter 2

Know-how and trade secrets

2.1 Introduction

Know-how and trade secrets are important assets for companies and public research institutes.

Many entrepreneurs consider know-how as one of the most valuable assets of their company. Hence and although know-how is not a IP right as such we will go into know-how in this chapter.

2.2 What is know-how?

> Know-how is defined by certain knowledge and skill set obtained by a limited number of specific persons involved in manufacturing, marketing and sales processes of an organisation. By its very nature know-how is not accessible freely or without certain limitations to third parties and persons.

General knowledge in textbooks available to everybody is not considered know-how. See for an example of this definition of know-how Nieuwenhoven Helbach, Huydecoper, and Nispen [NHN02] chapter 5 (in Dutch).

In this context, third parties can be defined as organisations or persons who do not have access to certain know-how. In general very few persons within an organisation have access to specific know-how. Third parties and outsiders will always have to invest considerable time and resources to build up comparable know-how. As such, we conclude that know-how in an organisation is kept secret from third parties.

It is evident that persons must possess certain kills and knowledge in order to fulfill certain processes and tasks, for example the design and assembly

of a product, the draft of an algorithm, the acquisition and analysis of data. Therefore know-how consists of the combination of technical skills, the processing of information thereby using technical knowledge. Besides, non-technical knowledge like market data, marketing techniques, information about rules and regulations within a political context, data about relations and networks are also part of the know-how of organisations.

Investments in research and development contribute to the formation of valuable know-how, as well as working experience of and technical courses for personnel. In this case the acquisition and storage of information like technical data, equations, standards, specifications, processes, methods, recipes, drawings and their use by professional personnel.

2.3 Using know-how

Many corporations, public research institutes and multinationals have a division with IP specialists or in house council. They make sure that procedures, certain rules and codes of conduct concerning IP and know-how are in place and will be followed upon. Such procedures and conduct are often mentioned explicitly in labor contracts. An example of this is a non-disclosure clause.

But also at small and medium sized enterprises or startup companies without in house IP specialists or council it is important to implement internal procedures and codes of conduct to deal with IP and know-how. For those companies which supply parts, products or processes in a supply chain these procedures and codes of conduct are even more important. Without them such companies may run the risk that employees share too much essential know-how with customers or clients.

2.3.1 Using know-how by the company itself

The use of IP rights enable companies to have a positive return on investment in their research, development, marketing and manufacturing with a healthy commercial margin. On top of this, it is important to realise that the combined use of know-how and patents contribute to the successful introduction of technical innovations in the marketplace. In this process know-how of specialists is essential to deliver products and services to customers and clients. In the economic domain the concepts and use of know-how and patents show a striking number of resemblance. Both are a source of (technical) knowledge enabling the owner and user to use technical capacities and developments and thereby a head start or lead advantage which is not available to competitors. The owner of the know-how can exploit this

technological advantage in the marketplace, for example in certain manufacturing processes.

2.3.2 Using know-how by third parties

Many companies do not have manufacturing plants in all countries over the globe. In those countries where there is an outlet for their products or services but where they are not operational themselves in terms of manufacturing, marketing and sales it may be profitable to act as a licensor and work with license agreements. These license agreements are often struck for both patents as well as for know-how. The temporary, exclusive nature of patents provide either the patentee or the patent licensee protection against infringement by competitors. On the other hand, license agreements between the licensor and licensee determine the scope and field of use, geographical area, region or country, time frame in years and royalties or milestones to be paid.

2.4 Rules and regulations

Rules and regulations for know-how can be found in the EU directive 2016/943 and in the Dutch Act of Trade secret protection.

> This act rules the protection against unlawful public use of know-how and business information. This combination of know-how and business information is often defined as trade secrets.

According to the act and the directive a company or organisation must comply to certain conditions with regard to the information which:

a. is kept secret because it is not common knowledge or accessible by third parties,
b. has value in relationship with the trade or transactions of the company or organisation, and
c. is kept secret by the company or organisation by means of certain measures (for example a registration system and limited accessible for persons only on a need to know basis).

All in all it must be clear that know-how is a personalized asset. At the end of a labor contract the know-how does not automatically disappear (see figure 2.1). This situation raises the question if know-how can be claimed by the employer at all?

Figure 2.1: Know-how: There it is and there it goes.

Chapter 3

Trademarks

3.1 Introduction

A trademark is a sign that is used to distinguish the products or services of a company. Entrepreneurs and companies use trademarks to show the origin, quality or image of their products and services. A trademark can be a colour, name, word, logo, shape, number, pattern or sound. It is important that people can recognize a trademark as a sign of a certain company.

It is obligatory that trademarks must be registered for specific products ans services. A trademark to be used in the Benelux countries can be registered at the Benelux Office for Intellectual Property (BOIP). For companies operating in the European market trademark registration at the European Union Intellectual Property Office (EUIPO) can be more appropriate, since an EU trademark is valid in all EU member states. Multinational firms can require a globally recognized trademark at the World Intellectual Property Organisation (WIPO) based upon a Benelux or EU trademark. A trademark for the Netherlands only does not exist.

A trademark is valid for 10 years and can be extended indefinitely by paying renewal fees. A trademark can be used to act against other companies that use an identical or similar sign in the same market. It is however important that a trademark is normally used. If a trademark is not used in the market, the trademark right can be cancelled after a certain period.

3.2 Trademark law

Rules and regulations for Benelux trademarks are described in the Benelux Convention on Intellectual Property (BCIP). A number of articles that will be further elaborated can be found in section D.1.

For EU trademarks rules and regulations are described in the EU trademark directive (EUTMR). A number of articles that will be further elaborated can be found in section D.2.

3.3 What is a trademark?

Trademarks exist since ancient times. The English word for trademarks is branding and originates from branding cattle thus enabling identification and differentiation from other flocks of cattle. Thereby enabling the source of origin of the cattle. As such this function of origin still is regarded as an important function of trademarks.

Nowadays trademarks also have other functions. A trademark can be used for advertisement to inform the public and customers about the quality or image of the products or services. A trademark is also used as a means to communicate with consumers in the market place.

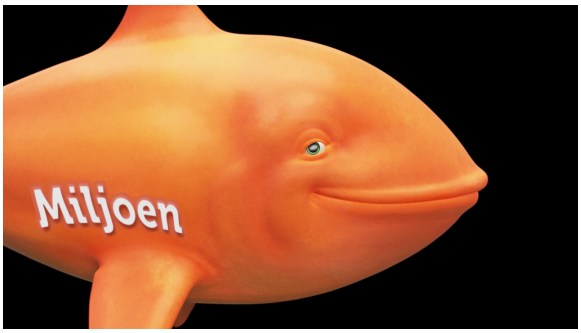
Following Article 2.1 BCIP or Article 4 EUTMR trademarks can be composed by any signs, in particular by words. For example names of persons or drawings, letters, numbers, colors, shapes or packages of products, or sounds on the condition that these trademarks:

a. distinguish the companies products or services from those of other companies,
b. can be shown in the trademark register in such a way that it will allow competent authorities and the general public to determine the protection of the object granted to the trademark holder clearly and accurately.

Everyday we see traditional trademarks like word marks and figurative marks containing word elements used by companies. For example the logos and brands of Coca Cola, Apple, Google and Deam (see figure 3.1). But different sizes of trademarks are on the rise, like a:

- position trademark, for example the red sole of a pump,
- shape trademark, for example the Toblerone chocolate packages,
- sound trademark, like the lions roar of film studio Metro-Goldwyn-Mayer
- motion trademark, like the swimming orange fish in the Dutch National lottery, see video 3.1
- multimedia trademark, like soccer club Feyenoord which is made both from pictures and sounds, see video 3.2

Figure 3.1: Trademark sign of Deam



Video 3.1: Motion trademark Staatsloterij

3.4 Requirements of a trademark

There are some basic requirements to register a trademark application. These requirements can be found in Article 2.1 BCIP or Article 4 EUTMR. The most important requirement is that a novel trademark has distictive character. Besides, trademarks must be registered in a national or international trademark database in a clear and concise way. This will enable legal certainty. In such a way trademark registers will guarantee that third parties can browse through these databases and obtain a clear view about what the trademark protection refers to.

A trademark has to be registered for specific products or services. You can read more in subsection 3.4.2.

There are some basic principles to refuse the registration of trademarks which are mentioned in Article 2.2bis BCIP or Article 7 EUTMR; for example descriptive signs or signs and figures which are against good morals or undermine the public order can not be registered. During the trademark

Video 3.2: Multimedia trademark

application procedure the office, where the trademark is applied for, will review these principles. If one of the grounds for refusal applies, the trademark will be refused.

3.4.1 Distinctive character of a trademark

The most important requirement for a trademark is to enable customers to distinguish trademarked products and services from one company versus products and services from a different company, for example a competitor. A trademark is actually a name for a product or service, just as people have a name. This is referred to as distinctive character.

This distinctive character can vary and change in time. A sign that was originally too descriptive and as such not distinctive can become so due to repetitive use over time. We refer to this process as acquired distinctiveness. As an example see Booking.com or Thuisbezorgd.nl. Both names initially have been too descriptive to pass the requirements for trademark registration, but over time people have come to get to know them as a trademark. This process of acquired distinctiveness will eventually enable the registering of these particular trademarks.

The opposite also applies. A distinctive sign can lose its distinctiveness when people start using it as generic or name for a certain species. This process is called becoming a generic name. In the Netherlands Hagelslag was a trademarked product for a specific spread on bread, however the general public does not regard this product originating from a particular company anymore but as a generic name. Other examples are the bikini or trampoline.

In order to prevent that a trademark will become a generic name it is important that the trademark holder will stop third parties using their trademark as a generic name. We will discuss such possibilities in section 3.6.

3.4.2 Registration of trademarks for products or services

At the time of application the trademark will be registered for specific products or services using the so-called Nice classification system. This classification system has 45 classes, whereby class 1 till 34 are related to products and class 35 till 45 are related to services. During the process of the application for a trademark a company can apply for one or more classes. Payment of trademark fees depends on number of classes, so a company will pay an additional fee once they apply for an additional classification. Each Nice classification describes a group of products or services for a trademark registration. You can have a look at these Nice classifications in appendix E.

Since a trademark can be registered for specific products or services it is possible that one trademark can be used by different companies operating in different niche markets or regions. For example Ajax is a trademark for fire extinguisher equipment, but also for a soccer company and cleaning materials. So, although the name Ajax is literary the same, used signs of the respective trademarks vary much and contain enough distinctiveness amongst themselves.

3.4.3 Absolute grounds for refusal

With every application for a trademark registration, the sign that will be registered is tested on the basis of a number of legal refusal and exception grounds, also called absolute grounds for refusal (see Article 2.2bis BCIP or Article 7 EUTMR). A sign is refused for registration as a trademark, if the sign:

- is descriptive;
- lacks distinctive character;
- is misleading;
- contains the emblem of a state or international organisation protected by article 6ter of the Paris Treaty;
- should be protected by design or patent rights;
- is contrary to morality or public order;
- refers to a protected geographical indication or protected designation of origin;
- refers to or resembles closely a protected plant variety name.

Most common ground for trademark refusal is when the sign is too descriptive. A sign is descriptive when it merely consists of signs and names serving and promoting the characteristics of products or services for which the trademark protection has been applied for. The common ground for refusal is that such too descriptive indications have to be able to be used

freely. A trademark application for Apple cannot be granted for apples as a category of fruits or a trademark application for Sugar-free can not be granted for soft drinks.

In general, the combination of descriptive signs is also regarded as being descriptive. So, trademark registration for Biomild cannot be granted for yoghurt. Here, there is one exception when a sign will acquire an certain degree of an extra dimension when it is composed by a combination of signs. For example in the Netherlands the application of Blikvanger (Can catcher) can be registered as a trademark due to the fact that it has a different meaning than 'catching empty cans'.

3.5 Publication trademark application

During the procedure to obtain a trademark it will be officially registered in the trademark register after formal requirements, including payment of fees, have been taken care of. The trademark register is freely accessible to the public via websites of BOIP, EUIPO and database TMView,

Trademark holders of earlier trademarks who are of the opinion that a new trademark application conflicts their existing rights can start an opposition procedure. During such a procedure you can object against the new trademark application. An opposition against a Benelux trademark application must be started at the BOIP within a time frame of two months after publication of the trademark application. An opposition procedure against an EU community trademark must start at the EUIPO within three months after publication.

3.5.1 Opposition procedure

An opposition procedure is a procedure giving an earlier trademark holder the possibility to object against the registration of a new trademark which conflicts with their existing right. Often such procedures are based upon earlier registered trademarks indicating that the registration of a new trademark could lead to potential confusion amongst consumers.

When the opposition procedure succeeds the registration of the trademark will be refused. If the opposition procedure fails the new trademark will be registered.

3.5.2 Use of a trademark

It is important that a registered trademark is in use in the market place for those products or services for which it is registered. If a trademark holder

fails to do so he will run the risk that he cannot invoke his trademark in an opposition procedure or that the trademark will be lost and cancelled in the trademark register.

The use of the trademark must be directed towards finding or maintaining real commercial sales of products or services for which the trademark has been registered. Symbolic use by itself does not suffice. The trademark does not need precise use according to its registration as minor variations also indicates its use (see Article 2.23bis part 5 BCIP). In this manner the trademark holder has the possibility to bring minor variations into the commercial use of its trademark.

3.5.3 Trademark registration of the DEAM trademark

In the trademark register several sources of information about the trademark can be found like the trademark holder, the type and sign of the trademark, validity and the products or services for which the trademark has been registered. In section F.3 you can see the registration of the word trademark DEAM for products in class 10 and for services in class 42.

3.5.4 Cancellation or nullity procedure

When a trademark has been registered in the trademark register it is still possible that a different party can claim its cancellation or nullity due to the fact that the trademark is not used, or that the trademark is too descriptive or infringes with an earlier granted trademark. In case of a Benelux trademark such a cancellation or nullity procedure can be conducted at the BOIP or the Court. Cancellation or nullity procedures of an EU community trademark have to be executed at the level of the EUIPO.

3.6 Trademark enforcement

The owner of the trademark, also named trademark holder has to monitor the market to observe if a company or person uses a sign or applies for a trademark that looks too much like their own trademark, hence infringing the rights of the trademark holder. If you find a sign or trademark that looks like your own trademark you will have to take action in order to nullify the other trademark. On the other hand it is also possible to leave the other trademark as is.

3.6.1 The rights of the trademark holder

The rights of the trademark holder can be found in Article 2.20 part 2 BCIP or Article 9 EUTMR. A trademark holder can act against other parties in the market place who without formal permission are using:

a. A same trademark for similar products or services,
b. A same trademark or a trademark that looks much alike for similar products or services, where there may be a risk that consumers will be confused

Looking into the case of Deam the company can act based upon her trademark registration in class 10 (e.g. surgical equipment) against the trademark of DREAMM for surgical equipment, since consumers maybe confused by these two trademarks for products used by competing companies in the same market niche.

In addition, holders of well-known trademarks can take action against parties who 'free ride' on a well-known trademark without permission and without valid reason or when the distinctive character or reputation of the well-known trademark is harmed.

If the DREAMM sign would not used for surgical equipment, but for dental material, for example, Deam could possibly rely on the extra protection that exists for holders of well-known trademarks. In that case, Deam would have to substantiate that DEAM is a well-known trademark and that its trademark is being used without valid reason.

3.6.2 Trademark limitations

In some situations trademark holders cannot act based upon their exclusive trademark right. Such limitations are mentioned and addressed in Article 2.23 BCIP or Article 14 EUTMR. A trademark holder cannot act against the sales of trademarked products if these have been delivered or sold by the company itself or with its permission in the EU (European Economic Area). At the moment of the sales the holder has received revenues and has used the trademark. This is referred to as exhaustion of the trademark, see Article 2.23 part 3 BCIP or Article 15 EUTMR.

Chapter 4

Patents

4.1 Introduction

With a patent you become the owner of your invention.

Thus a patent is property which you can use:

a. preventing others to use your invention, or
b. giving permission to others to use your invention.

The concept of property is defined under (inter) national law and regulations. This is also true for patents since patents are part of industrial property rights. Using a patent in a specific country will always depend on the framework of laws and legislation in that country.

Since the use of an invention is often not limited to a particular country only, it can be profitable to use it in other countries as well.

The world of inventions is therefore multinational or worldwide.

Since patents are used on a globally there are several international treaties for patents next to national patent laws. An introduction into the most important international treaties can be found in section 4.2.

Most relevant features of patents are elaborated in following sections.

From section 4.6, the contents of a patent will be described using the main example (see section 1.6).

4.2 Patent laws and treaties

Every country has its own patent law. In addition, there are often regional or international cooperations through treaties. An example of such a regional cooperation is the European Patent Convention. This European cooperation has ensured that the patent laws in the 38 member states are harmonised. There is also a global treaty for a central worldwide patent application through the World Intellectual Property Organization (WIPO) (193 member states).

- The Dutch Patent Act is determined in the Rijksoctrooiwet 1995 (ROW). The Netherlands Patent Office (Octrooicentrum Nederland) grants Dutch patents.
- The patent law for European patents is determined in the European Patent Convention (EPC). A European patent is granted by the European Patent Office (EPO). Next they are registered by the applicant in the countries of interest.
- The route a worldwide patent application is determined in the Patent Cooperation Treaty (PCT). However, no patent will be granted in this procedure. After this central application, the patent application is continued in the countries or regions of interest.

4.3 Patent rights

Patent law excludes others from commercially:

- making,
- using,
- selling, or
- stocking

the invention.

Such exclusivity lasts for a maximum period of 20 years after the filing date of the patent application.

The restrictions that a patent exerts are determined by the legislation of a country in question. These restrictions can therefore differ greatly from country to country. It should be noted that the Treaty of Paris (1883) guarantees a minimum harmonisation.

In Europe, a patent generally restricts the commercial making, use, sale and stocking of the invention, but it does allow to use the invention for one's own non-commercial use.

> So you can build a Ferrari for yourself, but don't sell it to your neighbour, because that would be a commercial act.

Under certain conditions, it is also permitted to use the invention for scientific and research purposes, without being able to be prosecuted for infringement.

For a precise description of the legal consequences of a patent in the Netherlands, see article 53 ROW (in Dutch).

The patent right can no longer be used if the patent holder, or someone else with the consent of the patent holder, has sold the patented product. You can then do whatever you want with the patented product. This is called exhaustion. This is described in article 53 paragraph 5 ROW.

4.4 Inventions

Most people have a general idea about inventions and inventors. For example, it is:

- a new development,
- often with a technical background and
- an improvement over existing technologies.

More formally, an invention is often described as a technical solution to a problem.

> However, an invention is not defined in patent law!

In patent law, the definition of an invention has been avoided by defining accurately what is not considered an invention. For example, theories and mathematical methods are not regarded as inventions hence they cannot be patented.

Furthermore, an invention must be industrially applicable. This requirement of industrial applicability separates patent law from the other intellectual property rights.

The requirements for novelty and inventive step ensure that certain technical developments and inventions are only considered to be patentable inventions, if their subject-matter is not already known by (or disclosed to) the public and is also not obvious.

For a more accurate description of the exceptions on patentability and the basic requirements, see article 52 EPC or article 33(1) PCT.

4.5 Requirements for a patent

There are many requirements that a patent must meet. In addition to formal requirements, there are substantive requirements. Formal requirements are necessary for the proper processing of the application. For example, it is necessary that the patent office can contact the applicant and that the application is written in the correct language.

To obtain a granted patent, the most important substantive requirements are that the invention is:

- new,
- inventive,
- must be sufficiently clear disclosed.

The invention must be new and inventive, otherwise the patent would not contribute to the general knowledge and improvement of technology. It must therefore also be described clearly enough.

4.5.1 Novelty

Novelty means that the invention has not been disclosed. All information that is publicly accessible to the person skilled in the art can be used to determine this. It is an objective criterion, whereby the person skilled in the art is supposed to know all state of the art.

For the assessment of novelty (and inventive step) all information before the filing date of the application is taken into consideration. This is the date of the first filing: 'first to file'.

Until recently, the United States had a different system: 'first to invent'. The moment when the inventor conceived the invention was the moment for the assessment of the requirements. Although fundamentally correct, this brings with it all sorts of problems of proof when conflicts arise. That is why in 2011 the United States also switched to the 'first to file' principle.

Documents with a later publication date than the filing date can not be detrimental to novelty, nor can they take away inventiveness.

So if not all features of the invention are already known, the invention is new:

> An invention shall be considered to be new if it does not form part of the state of the art (see also article 54 (1) EPC or article 33(2) PCT).

4.5.2 State of the art

The state of the art is accurately defined in the patent law:

> The state of the art shall be held to comprise everything made available to the public by means of a written or oral description, by use, or in any other way, before the date of filing of the patent application (see also article 54 (2) EPC or Rule 64 PCT).

This definition stipulates that all information that is publicly accessible in the world is regarded as state of the art. This also includes the documents in a small library in a Chinese mountain village. An important limitation is that the information must be *publicly* accessible. Documentation, such as technical drawings used in a company, is normally not publicly accessible (due to confidentiality). These documents can therefore not be used to assess novelty.

The filing date is an important date. Anything that has become available public after this date will not affect the patent application. If the same invention is applied for on different dates, the person who applied first has the right to the invention.

Each patent application is published 18 months after the first filing. Thereby it also becomes part of the state of the art.

4.5.3 Inventive step

Inventive step means that it is not obvious for the person skilled in the art to carry out the improvement or modification, for which protection is requested, in the particular solution:

> An invention shall be considered as involving an inventive step if, having regard to the state of the art, it is not obvious to a person skilled in the art (see also article 56 EPC or article 33(3) PCT).

In the practice of patent examination, this means that all claimed properties are known from a combination of two embodiments, described in one or two documents. The person skilled in the art is thereby also hinted to combine the features of the two embodiments.

or

If the only difference with a known embodiment is an alternative that is obvious to the person skilled in the art, which he knows on the basis of his general knowledge, then the invention is considered to lack an inventive step. For example: To attach something on a wall, a screw is a well-known alternative to a nail.

4.5.4 Clear and sufficiently disclosed

In a patent, the invention must be made public. This must be done in such a way that it can be performed by the person skilled in the art. It is therefore not possible to obtain a patent and keep your invention secret. See also article 83 and 84 EPC and article 5 PCT.

> A perpetuum mobile is therefore by definition not patentable.[1]

Features that are well known by the person skilled in the art do not need to be described. For example: It is not necessary to describe how something should be fastened, if it is clear to the person skilled in the art that it can be either welded or glued.

The person skilled in the art is defined in patent law as skilled in the field of the invention with broad professional knowledge. The skilled person only knows obvious solutions to problems, but cannot become inventive himself.

4.6 Contents patent application

A patent application consists of the following parts:

Description The description consists of an introduction and a section containing at least one complete embodiment of the invention. The introduction briefly describes what is known in the state of the art, what problem still exists in this known state of the art and a short description of the solution (the invention) to this problem.

Claims The claims define the scope of the patent protection. These claims are normally written as a set of claims. Usually there is a main claim and several dependent claims. The main claim therefore offers the broadest scope of protection. The dependent claims add further features and therefore have a smaller scope of protection than the main claim.

Figures The figures are there to clarify the invention.

The claims determine the scope and type of protection. The legal scope of protection of the patent is therefore determined by the claims. The claims are therefore written in a legal style.

[1] Why is a perpetuum mobile not sufficiently disclosed? Click for explanation.

For maximum protection, the invention is described as broadly as is possible in the claims. But if the invention is described too broadly, then the possibility increases, that it is deemed not new or not inventive.

4.7 Publication patent application

The patent application is published 18 months after the first filing. Figure 4.1 shows the front of the publication of the endoscope application. After the front page, the pages of the application as filed are published. The whole publication can be seen in section F.1.

This is the A publication (see the A1 code in the publication number WO 2005/067785 A1). The A publication is the publication of the patent application. The next publication is the B publication. The B publication is the publication of the granted patent.

Bibliographic data are published on the first page of a patent document. The following data are the most interesting:

Title gives a very quick indication of the subject of the patent.

Abstract gives a short summary of the contents.

Figure next to the abstract is normally a figure from the list of figures which is representing the invention.

Other data on the first page are more interesting to check for the legal aspects of the patent document:

Applicant is the one who has filed the application and the one who will normally have the patent rights.

Inventor is one person or are more persons who have made a significant contribution to the invention. In US patent law, the inventor is the one who has the rights to the patent. In other countries it is the applicant who has these rights.

Priority data is the date of the first patent application filed and for which a priority is claimed. The patent rights start from this date. In this case there is a dutch priority (NL 1025274).

Filing date is the date this application was filed.

Designated states are all the countries that are requested for patent protection when this application was filed under the PCT. The PCT procedure is used to start a world wide patent application.

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(19) World Intellectual Property Organization
International Bureau

(43) International Publication Date
28 July 2005 (28.07.2005)

PCT

(10) International Publication Number
WO 2005/067785 A1

(51) International Patent Classification[7]: A61B 1/005, 17/28, A61M 25/01

(21) International Application Number: PCT/NL2005/000001

(22) International Filing Date: 5 January 2005 (05.01.2005)

(25) Filing Language: Dutch

(26) Publication Language: English

(30) Priority Data:
1025274 16 January 2004 (16.01.2004) NL

(71) Applicant *(for all designated States except US)*: **TECHNISCHE UNIVERSITEIT DELFT** [NL/NL]; Julianalaan 134, NL-2628 BL Delft (NL).

(72) Inventors; and

(75) Inventors/Applicants *(for US only)*: **BREEDVELD, Paul** [NL/NL]; L.van Noodgodsstraat 26, NL-2801 RS Gouda (NL). **SCHELTES, Jules, Serge** [NL/NL]; Pybo Steenstrastraat 6, NL-1086 ZE Amsterdam (NL).

(74) Agent: **BREDA, Jacques van**; Octrooibureau Los En Stigter B.V, Weteringschans 96, NL-1017 XS Amsterdam (NL).

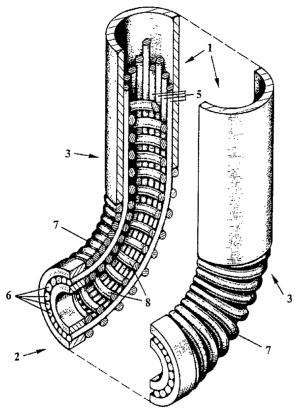
(81) Designated States *(unless otherwise indicated, for every kind of national protection available)*: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States *(unless otherwise indicated, for every kind of regional protection available)*: ARIPO (BW, GH,

[Continued on next page]

(54) Title: INSTRUMENT FOR FINE-MECHANICAL OR SURGICAL APPLICATIONS

(57) Abstract: The invention relates to an instrument for high-precision or surgical applications of a minimally invasive nature, comprising a distally positioned directable head, a shaft upon which the head is positioned, and a proximally positioned handgrip for operating the head, wherein a ring of cables comprising longitudinally extending cables connects to the head, wherein each cable of the ring of cables is disposed such that at least a part of both sides is in direct contact with another cable of the ring of cables, and wherein the cables are fixedly secured in the radial direction.



WO 2005/067785 A1

Figure 4.1: Front page of WO 2005/067785 A1

Publication date is the date this application was published and thereby known to the public. Before this date, the application was secret and not known to the public.

Also some administrative data are mentioned, so that the document can be easily identified:

Publication number is a unique number to identify a patent document. It also gives information on the type of document. The first letters are the country code. In this case WO, which stands for the PCT world wide application. Others are for example EP for the European procedure at the European Patent Office (EPO), NL for the Netherlands, US for the United States, DE for Germany, etc. There is also a kind code. In this case A1, which stands for application published with search report. When an application is granted, then often the B code is used.

Application number is the number the application gets when it is filed.

There are also classification codes published on the document. These codes are used for searching.

4.8 Claims

The claims determine the scope of protection of the patent. Usually there is a main claim with several dependent claims. The dependent claims define further features of the invention.

The function of the dependent claims is to have more specific claims in case the main claim does not hold up in the examination procedure or in court.

4.8.1 Claim of the endoscope example

The main claim of the endoscope example is as follows (the numbers after the words refer to parts in the drawings; see figure 1.5):

> An instrument (1) for high-precision or surgical applications of a minimally invasive nature, comprising a distally positioned directable head (2), a shaft (3) upon which the head (2) is positioned, and a proximal end (4) equipped for operating the head (2), wherein a ring of cables (5) comprising longitudinally extending cables (6) connects to the head (2), which cables are fixedly secured in the radial direction, characterised in that each cable (6) of the ring of cables (5) is disposed such that at least a

> part of both sides is in direct contact with another cable (6) of the ring of cables (5).

The language used in the claim is a lot more complicated than the language you might normally use to describe the invention. The invention can also be described as:

> Endoscope with a steerable end, whereby the end is actuated by cables.

One reason for this complicated language in claims is that the text is a legal text. The invention must be legally clearly described. For example, if you write that the end is actuated by cables, then that is not clear enough from a legal point of view. Is the exclusive right of the patent then only valid if the endoscope is used (is actuated) or also if it is not used (for example lying on a table)? You do not only want to be able to use the exclusive right of the patent during use, but also when for example the endoscope is for sale!

Another reason for the use of this kind of language is that the patent holder wants the largest possible scope of protection. The patent holder would also like to include embodiments of the invention that differ in features that are not important for the invention. The claim does not describe how the ring of cables is held together, but only that this is done in a specific direction (the radial direction). In the embodiment in figure 1.5 coil springs have been used for this. This specific solution using coil springs is not mentioned in the claim and therefore other solutions also fall under the scope of protection.

4.8.2 Test for novelty

As mentioned earlier, a patent must be new. In the search report in the publication of the patent application in section F.1, it can be seen that several documents are cited as state of the art. The search report is used by the examiner to asses the novelty and inventive step of the patent application. None of these documents are considered detrimental to the novelty of the endoscope claimed in the patent application.

The following demonstrates how novelty can be assessed. It starts with breaking down the claim into separate features. It is then determined whether these features are collectively known in a prior art document. For this exercise, the first document mentioned in the search report is used. This document with number US 2002/0177750 can be found in section F.2.

Try to find the answer yourself before viewing the answer.

Features claim 1 of the patent application	**Where to be found in US 2002/0177750?**

An instrument for high-precision or surgical applications of a minimally invasive nature	Click for answer.
comprising a distally positioned directable head	Click for answer.
a shaft upon which the head is positioned	Click for answer.
a proximal end equipped for operating the head	Click for answer.
a ring of cables comprising longitudinally extending cables connects to the head	Click for answer.
the cables are fixedly secured in the radial direction	Click for answer.
each cable of the ring of cables is disposed such that at least a part of both sides is in direct contact with another cable of the ring of cables	Click for answer.

Thus not all the features of the claim of the patent application can be found in the document. You have thus demonstrated that the endoscope as claimed is not known from this document. The endoscope as claimed is therefore new when compared to the disclosure in document US 2002/0177750.

4.9 Patent application procedures

Patents can be applied for in different countries, but also regionally. In Europe, a European patent can be applied for at the European Patent Office (EPO). A worldwide patent application can be applied for via the PCT procedure at the WIPO.

These different patent application procedures have great similarities, but they are not the same. Therefore, the different procedures are briefly described below. Finally, the procedures chosen in the example are described.

4.9.1 EP patent application

The patent application procedure for a European patent (EP) will be discussed first. This procedure is similar to the patent application procedures used in many countries. Figure 4.2 shows an overview of the EP procedure.

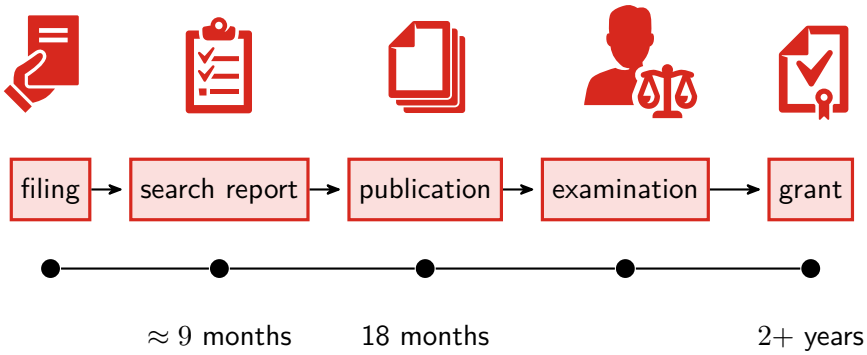


Figure 4.2: EP procedure

The application starts with the filing of the application at the patent office. The first substantive response to the request is a search report. The most relevant state of the art is mentioned in the search report. The state of the art mentioned in the search report is used in the assessment of the requirements for a patent. This assessment of the requirements takes place during the examination. In addition to the search report, a written opinion is delivered with the search report. Possible objections to the grant of the patent are noted in the written opinion. Not being new or not having an inventive step are the most well-known objections.

The application will be published 18 months after the first filing date. Up to the publication date, the application is secret. From the moment of publication, the invention is known all over the world.

Before the patent is granted, first an assessment is made whether the application meets all the requirements. If not all requirements are met, a communication will be written by the examiner and sent to the applicant. This communication states the objections against the grant and that the application can thus not be granted. The applicant has the possibility of overcoming these objections, for example, by amending the claims. This round of objections and amendments can take place several times. At the end of the procedure an oral hearing may also be held to come to a decision.

If there are no objections, the application will be granted. There is also the possibility that the application will be refused if the objections are not overcome.

After the grant, the patent must be validated at the national patent offices

in the desired countries in Europe. The European patent then becomes a bundle of national patents.

4.9.2 NL patent application

The Dutch procedure for a patent is simpler than, for example, the European procedure. The Dutch procedure is shown in figure 4.3. A similar procedure is also used in other countries, such as Belgium.

Figure 4.3: NL procedure

The big difference with, for example, the EP procedure is that there is no examination. The patents are granted automatically together with the publication. Also patents that do not meet the requirements are automatically granted. The information from the search report and the accompanying written opinion must then be used to estimate the extent to which the patent holder can exercise his patent rights. A possible lawsuit will clarify these patent rights.

4.9.3 PCT patent application

The PCT (Patent Cooperation Treaty) procedure, for the worldwide application of a patent, is shown schematically in Figure 4.4. The single central application for the most relevant countries in the world is the advantage of the PCT procedure over national or regional procedures.

However, there are 2 characteristics that form an important difference to the other procedures:

1. The PCT procedure ends after 30 months. At that moment no patent has been granted.
2. The examination is optional.

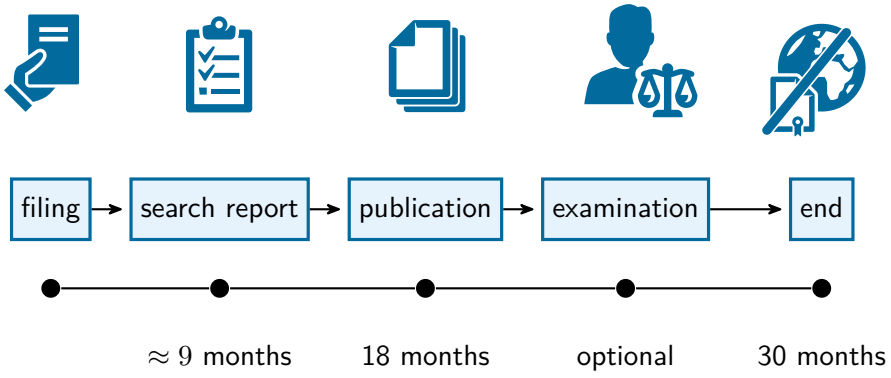


Figure 4.4: PCT procedure

The procedure to obtain a patent must be continued in regional or national proceedings. So the PCT procedure is only the beginning of the patent procedure. The optional examination is therefore not a decision to grant or refuse the patent, but an opinion on patentability.

The postponement of the choice of the desired countries and therefore also a postponement of costs is a reason why often the PCT procedure is chosen. Furthermore, the costs of a search report happen only once, because the search report from the PCT phase is used in the later national or regional examination. Otherwise, if parallel applications were made in different countries, these costs would have to be incurred in all the selected countries.

The PCT procedure is therefore of interest if patent rights are expected to be desired in several countries in different regions.

4.9.4 Priority year

It is usually only possible to assess whether continuing the application is useful after receipt of the search report. That is why most countries have the rule that the priority of a previous application from another (or the same) country can be used for 1 year. The applicant then has one year to determine in which countries a patent is also wanted. The later application will then receive the priority date of the earlier application. It is then as if the later application was filed on the date of the earlier application (see also article 87 – 89 EPC or article 8 PCT).

This priority right can also be used for regional procedures such as the EP procedure or for the PCT procedure. It is therefore possible to start with the patent application in one country and then go to the worldwide PCT procedure within 1 year. You then have the opportunity to estimate the usefulness of the patent application before larger costs have to be incurred.

4.9.5 Procedure of the endoscope patent

Figure 4.5 shows an overview of the procedure from the application of the endoscope invention up to the grant of the patent.

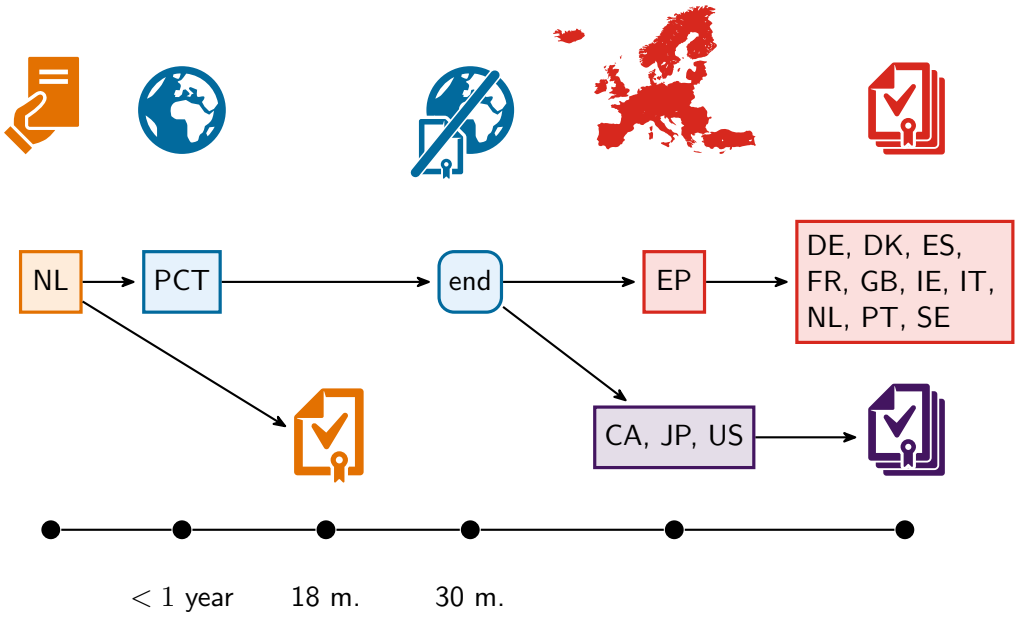


Figure 4.5: Procedure of the endoscope patent

The first patent application was filed in the Netherlands. This application was published and granted 18 months after filing. In this procedure there was no examination and the patent was granted automatically.

Before 1 year passed, the second patent application was filed as a PCT application. The second filing claimed the priority of the first filing. The PCT procedure ends after 30 months.

They decided to continue after the PCT phase in the European (EP) procedure and in various national procedures. The national procedures are in the United States (US), Japan (JP) and Canada (CA). The patent was eventually also granted in these countries.

The patent has also been granted in the EP procedure. It has since been validated in ten countries: Germany (DE), Denmark (DK), Spain (ES), France (FR), United Kingdom (GB), Ireland (IE), Italy (IT), Netherlands (NL), Portugal (PT) and Sweden (SE).

As can be seen, a patent was eventually granted in 13 countries. In this case, a patent has only been filed in the most relevant countries for production or sales.

4.9.6 Granted endoscope patent

From the search report of the patent application for the endoscope it was clear that the claimed endoscope is new. Although the claimed endoscope in the main claim is new, the main claim was amended during the examination in the EP procedure. The main claim that has been granted in the EP procedure is as follows, whereby the added text is in italics:

> An instrument (1) for high-precision or surgical applications of a minimally invasive nature, comprising a distally positioned directable head (2), a shaft (3) upon which the head (2) is positioned, and a proximal end (4) equipped for operating the head (2), wherein a ring of cables (5) comprising longitudinally extending cables (6) connects to the head (2), which cables are fixedly secured in the radial direction *and at least one of said cables (6) is for directional control*, characterised in that each cable (6) of the ring of cables (5) is disposed such that at least a part of both sides is in direct contact with another cable (6) of the ring of cables (5).

The feature that a part (at least one) of the cables is used to control the head has been added to the main claim to overcome an objection of clarity.

4.9.7 Patent family

You have seen from the example that a first patent application resulted in several equally granted patents in the different countries. These patent applications and granted patents have practically the same content. However, they are all published separately.

Most of these publications are included in the patent databases. However, when you are searching, you don't want to see every publication with the same content separately. That's not helpful. If you have seen one, you also know the content of the other publications.

In the patent databases, the publications are therefore grouped by family. A family of patents is therefore a collection of patent applications and patents that have the same content. The grouping is done automatically, using the relationship with the first filed application (the priority document) to group the documents. However, this may sometimes not be correct if a non-standard procedure has been followed.

4.10 After grant of the patent

It is only after the granting of the patent that it is clear what the exact scope of protection of the patent is. That is why the patent can only really be used to stop others using the invention once the patent has been granted. However, the work on the patent and also the costs and even risks are not over yet.

The following activities are still required:

1. You must discover potential infringement of your patent yourself. So you have to pay close attention to which competitor may be infringing.

2. You must also organize the stopping of a possible infringement yourself. Warn the potential infringer first and perhaps eventually even file a lawsuit. A lawsuit is not cheap. This will have to be taken into account when deciding on the strategy to be followed.

3. Even if your patent has been granted, you can still lose it. In the EP procedure, an opposition procedure is still possible within 9 months after the grant. During an opposition procedure, third parties can object to the granted patent. In that case, the patent may still be rejected. It is also possible that the patent needs to be modified. This is comparable to the examination of the patent application.

   The patent can also be attacked later through the courts by third parties. Also then is it possible that the patent will be declared invalid. This step is usually taken by third parties if they are accused of infringement.

4. To ensure that patent rights do not continue to exist for an unnecessarily long time, an annual maintenance fee must be paid. If payment is not made, the patent expires. If the patent does not have enough economic value, it is probably better not to maintain it any longer.

It is clear from the foregoing that the publications in the patent databases do not provide information about the status of a patent. This status must be looked up in the patent registers. Each country has its own patent register to administer this status. Some links to these registers can be found in section B.4.

Chapter 5

Using IP to make money with technical innovations

5.1 Introduction

In this chapter we will discuss the topic of strategic management and use of industrial property rights in companies. Copyrights do not belong to the industrial property rights, but they deserve a specific place in companies.

Here it is also important to distinguish ideas from inventions and innovations as they are often used throughout or amongst one another. We presented a working definition of inventions in section 4.4. While some ideas about new products and services may lead to new research and development and further product development and hence towards inventions, most of them will not be used in the process of innovation management. As such those ideas will not be translated into inventions incorporated into to valuable innovations in certain sectors of industry. Because, on the other hand an innovation is most often regarded as a new and tangible product or service which can be bought by customers in the market place thus creating economic growth.

In the next section we describe a number of common steps in a company's innovation process as the basis for the use of IP. In the following sections the use and exploitation of IP rights is discussed in the various steps throughout the innovation process.

5.2 Innovation process

Often innovation is a time and resources consuming process going through various phases from first idea, prototyping, validation to market entry of an novel product or process. Throughout that innovation process information

about IP can be used in multiple ways. In figure 5.1 this innovation process is schematically pictured.

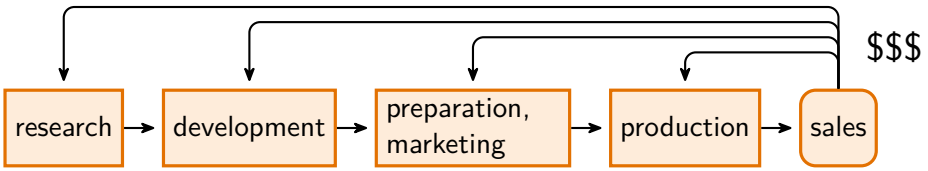


Figure 5.1: Proces from research to sale of product

Many companies start their innovation process by assigning market intelligence to one or more specialists. A state of the art research and necessary steps for product development may require significant time and resources depending on the sector of industry. For long term projects a company can decide to cooperate with a university for example for research ends working with scientists and PhD students. The goal of this phase in product development can be to ascertain proof of concept and bringing an idea for a novel product to the next stage.

At the development stage the product will be shaped towards the final version, although the manufacturing process at full scale is not yet determined. Since experts and engineers from various disciplines are involved in this stage, it can be time consuming and expensive.

Next, decisions about the output level of production and the layout of the factory have to be made during the production preparation phase before the start of a manufacturing process. Costs will usually depend on both the final product and sector of industry. For example building a construction plant for new cars can require initial investments of billions of euros.

Although marketing and sales do not seem a logical next step in an innovation process, they are of key importance. A successful market entry of new products will depend on sales to customers, thereby assuring that all investments and expenditures made earlier (like research and development, production engineering and marketing) will be earned back.

> Only the sales of the product generate revenues!

All steps in the innovation process prior to the stage of sales require adequate funding and investments. Those initial investments can be substantial while the return on these investments will be realised through sales. Using IP enables companies to create large enough margins when selling their innovative products to earn back those initial investments. Thus while IP contribute to the return on investment of companies, they can incentivize the market launch of their innovations at the same time. Conversely, intellectual properties only have value if a product is brought to market.

5.3 Using IP information for decision making throughout the innovation process

Using information from available intellectual properties in a timely manner is useful to avoid potential issues after market introduction of the product or to reduce certain costs throughout the innovation process.

In figure 5.2 the type of information that can be used and the moment of use is displayed.

We distinguish two kinds of analysis to retrieve and analyse such information;

1. patent landscape analysis

    a. Technical information about known solutions,
    b. Appropriated technical solutions with potential legal effect to take into account,
    c. A market analysis with names of competitors or potential partners

2. Freedom to Operate (FTO) analysis

    Information with potential infringement and risks assessment.

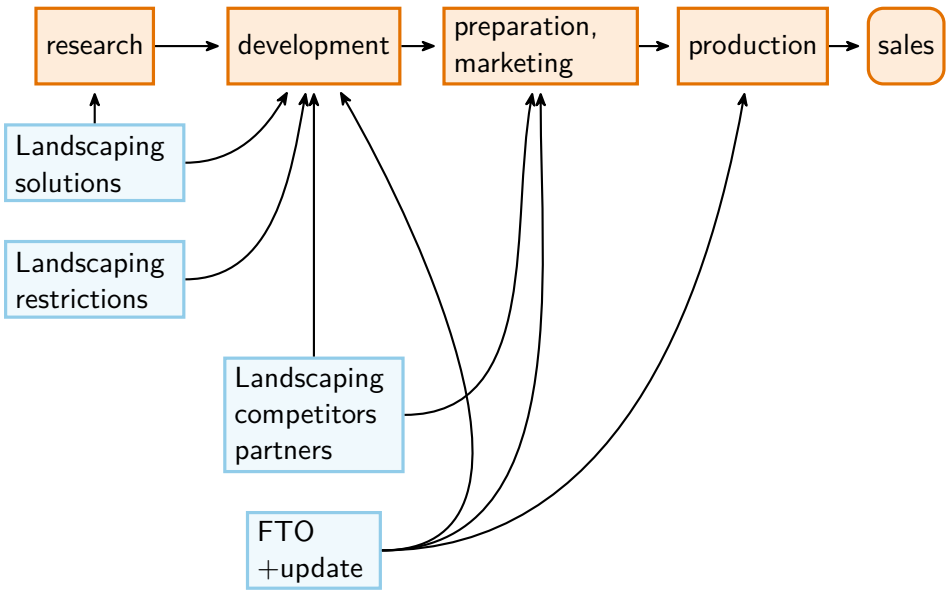


Figure 5.2: IP information in the process for a new product

5.3.1 Patent landscape analysis

In a global market companies and research organisations are surrounded by competitors and other actors. Using a patent landscape analysis one will acquire more information about them and about their technologies.

In a patent landscape analysis data can be analysed in three ways. Those three ways will generate useful data enabling easier decision making throughout different stages of the innovation process.

A. It is useful to create an overview of known technologies in order to be able to determine which problems and solutions need to be further analysed and developed within your organisation. For this analysis (technical) persons with knowledge of the subject-matter are necessary.

B. Prior to the decision to start developing a new product it is useful to study interesting technologies described by patents and pending patents. Search for possible technical solutions that may come close to the research and development of the organisation. Both technical and (legal) patent knowledge are required for these analyses. Analysing these data from a legal point of view may restrain your willingness to start a new innovation process. However, following decisions will depend on the business strategy of the organisation. Assuming that useful data have been retrieved and analysed one can decide to avoid potential litigation or infringement by redirecting the scope of research and development. A different strategy will be to license in the patents or start working as a partner of the patentee. These strategies will be further elaborated in next sections.

C. In addition to the technical and legal information from a patent landscape analysis, you can also obtain useful data for further market research. You can use this information to discover interesting countries, markets and possible partners for the sale of new products. It is also possible to analyze interesting markets in which you do not want or cannot be active yourself, but can become active through for example a partner.

5.3.2 Freedom to Operate (FTO) analysis

If the product reaches its final appearance at the end of the development phase, it could be useful to make an analysis about the risks to potential infringement of patents of third parties. An infringement of patents of third parties by may seriously hinder or even stop market introduction of a novel product or device. Such a risk assessment is called a Freedom to Operate analysis.

Throughout the patent landscape analysis one has analysed a first indication of potential infringement. But only when the the product is sufficiently specified and defined, an FTO analysis will be able to give sufficient certainty

of the risks. Until the moment that your product will become part of the state-of-the-art for example through sales, a publication or a patent, it is still possible that others will get IP rights that will hinder sales of the products. Therefore it is useful to update the FTO analysis.

An FTO analysis requires both technical knowledge and legal IP expertise. Also knowledge about legal and financial risks is required. Due to that multidisciplinary character of such an FTO analysis costs are high. Therefore scope and nature of an FTO analysis better be aligned with the risks and business strategy of the company.

5.4 Strategic IP use

For companies it is important to determine which sort of IP rights are needed for launching successful innovations. Bigger companies and established firms have their own IP division with an IP strategy in place. In line with their strategy they usually start applying for a diversity of IP rights during the various stages of their innovation process. More in depth information about commonly used IP appropriation regimes by economic sector, products and process innovations can be found Cohen, Nelson, and Walsh [CNW00] and Scotchmer [Sco04], chapter 9.

We know that IP can enable companies to create enough margins once they sell their products to have a return on their investments thus incentivizing innovations. As IP proprietor the innovator may decide to stop competitors to bring the same product or process at the market price at lower costs or prices. Such mechanism is called a defensive IP strategy and is generally used by companies in the pharma sector. Economic literature about such a price mechanism enabled by product or process patents is described by Greenhalgh and Rogers [GR10] in chapters 1 and 2.

Figure 5.3 describes which kind of IP can be relevant in certain stages of the innovation process.

During research and development leading to technical innovations patents often are used. When publishing articles about scientific results at universities copyrights are important. Depending on the sector of industry in which a company is operational designs becomes relevant at the stage when the product will have a clearly defined outer shape and the shape needs to be easily recognizable by customers.

Brands are important for the marketing of products and services. In the interest of marketing designs can be used as well.

Know-how (secrets) about certain features in a manufacturing technology process, for example the use of parts are regarded as yet another intellectual property. If a company has a more offensive IP strategy patents can be used

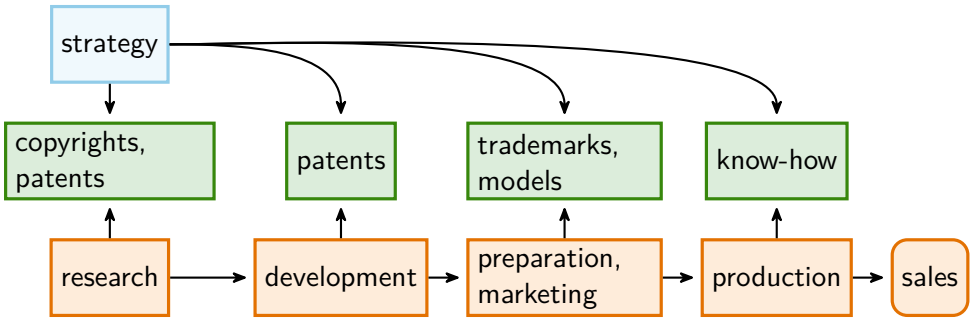


Figure 5.3: Generating IP with a new product

for (parts of) the manufacturing process. Such patented processes maybe out-licensed for example by companies in the chemical industry.

5.5 Purchasing and selling IP

In most economic sectors technologies are well developed at such a stage that many parts and processes are now available. Hence, there is no more reason to develop or manufacture those parts or processes. This is a huge difference compared with the upcoming economy at the start of the industrial revolution when manufacturers needed to have all parts and manufacturing processes in house by themselves. For example: the Ford Company wanted to have their own rubber plantations for the production of the tyres.

During the stage of research and development it is useful to analyse which technology, semi-finished products or parts can be purchased from others. Next the company can decide what needs further development by itself. Such strategy is also useful to identify interesting technologies developed by others which may solve technical problems and can be applied for further use. If these technologies have been appropriated in a patent portfolio of others they cannot be use as such without further analysis. Maybe there is a possibility to acquire ownership by assignment or come to terms in a license agreement.

5.5.1 Inlicensing patented technologies

A company may decide to obtain a license for a technology in order to start production and sales easier or faster. The results from a patent landscape analysis or Freedom to Operate may show that such a technology already exists or even that obtaining such a license agreement from a licensor is compulsory given the legal situation. Obviously, further information about the legal status on the validity of the patent in the country where the licensee

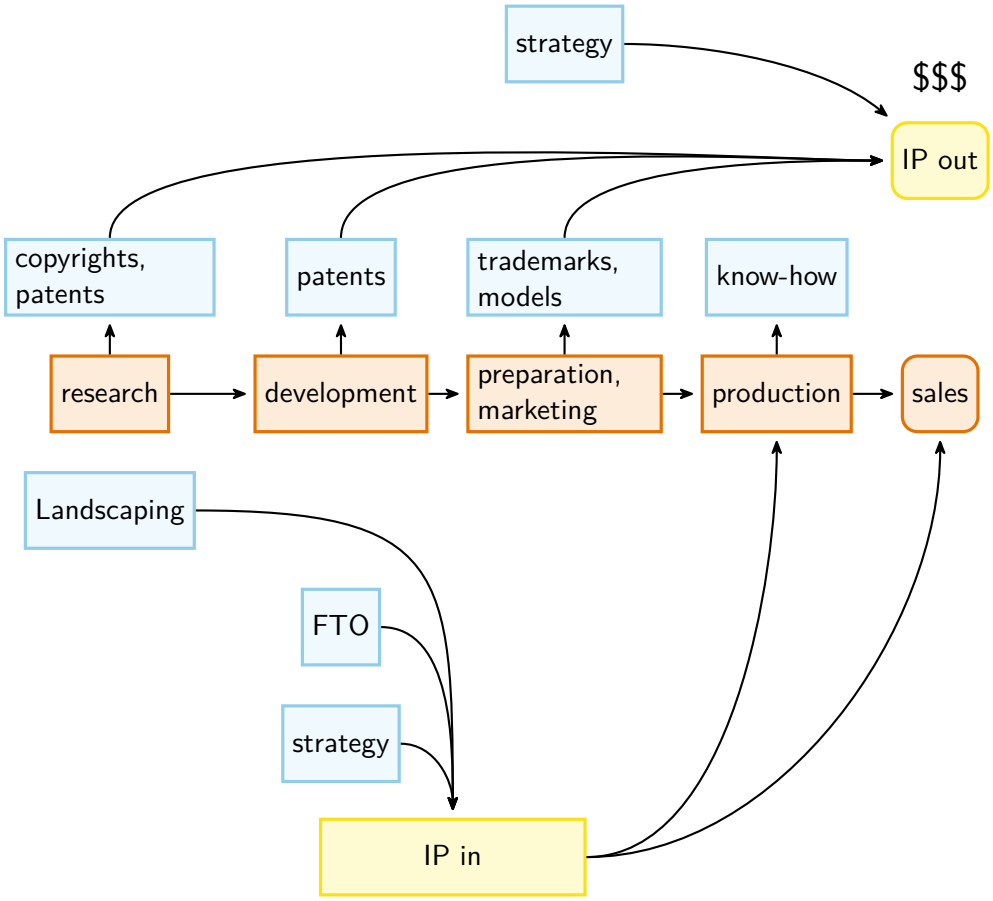


Figure 5.4: IE in and out

is operating is then required. For example if a Dutch manufacturer who is only working in the Netherlands needs certain technology the patent from the licensor should be valid in the Netherlands.

The business strategy and market perspectives are key in the decision making process to use licenses on technologies from third parties. But a patent landscape analysis is a useful business tool for companies with limited budgets for research and development. Next the company can contact the original patentee to start negotiations to obtain necessary patent licenses depending on its results. This is called inlicensing and presented as "IP in" in figure 5.4.

5.5.2 Outlicensing patented technologies

Usually a company decides to start production in a country or for a market by itself or by approaching others. Licensing technologies to others or franchising enables the patentee to do both. Such strategic decisions are often taken at central level of a multinational company or organisation and then followed up at decentral level.

But even if the patentee decides not to commercialise the technology itself, licensing to third parties remains an interesting option for example for organisations without production capacity in a particular country or market or a sales force. This is called outlicensing technologies and presented by "IP out" in figure 5.4. Outlicensing is often used successfully in cooperation with companies who are already active in certain markets and regions using the outlicensed technology to diversify their supply chain of products. Often the patentee is required to show successful sales records in an established home market for its patented technology.

5.5.3 Using patents in IP strategies

Depending on business strategy and use of IP a company can decide to outlicense their patent portfolio enabling others introducing new products or using manufacturing processes. Thereby allowing other companies to generate revenues without prior investments (in research and development, manufacturing, marketing, etc.) which were made by the patentee. This is called an offensive IP strategy which maybe more relevant for companies with products based upon a platform technology or compound with a large and diverse scope of applications.

On the other hand, companies may have a defensive IP strategy in the markets thereby stopping competitors selling look alike products to customers at lower prices. A large portfolio of nationally registered patented products in many countries is usually a prerequisite. Such a strategy may be relevant

for companies with patented products based upon very narrowly defined technologies and compounds which can easily be copied or circumvented.

Which IP strategy a company can use will depend on its market position at present and foreseeable future versus those of competitors. A patent landscape analysis gives interesting insights and a global overview on certain technical developments over the years. Such information is useful to determine the market position as defined by patents and can contribute in the decision making process which IP strategy best be followed. At the same time with this analysis one can retrieve information about the patent strategy of competitors.

5.6 Example of IP use at Deam

Deam uses some IP rights. In addition to patents, also trademarks are used.

5.6.1 Patents

The patent that is used as the example, is the first patent used by Deam. However, Deam was not the proprietor of this patent. It had a license from the TU Delft for this patent. The patent is valid for the maximum period of twenty years in the choosen countries.

More recently, in 2016, 2018 and 2019, Deam has filed for 3 patents. These patents cover specific embodiments of their products. These patents are filed in a limited number of countries, mostly US, CA, NL and JP.

5.6.2 Trademarks

Deam has registered a small number of trademarks in the Benelux. The logo (see figure 5.5) and the company name are registered. Also the product names (Laprofix and Laproflex) are registered.

Figure 5.5: Deam trademark

Chapter 6

Using IP for specific topics

6.1 Introduction

In this chapter the use of IP for specific topics is described. These topics are not linked to a specific activity as e.g. mentioned in chapter 5 and are of more general use.

Since software is nowadays very important in many parts of innovation and in society this topic is especially dealt with in section 6.2 and for open-source software in section 6.3.

6.2 Software

Computer programs are primarily protected by copyright.

Sometimes a patent can also be obtained on software-related inventions. Computer programs as such cannot be protected by patent law.

6.2.1 Copyright on software

Historically, there has been a long debate about whether software should be protected under patent law, copyright law or a separate legal regime. Ultimately, it was decided to protect software primarily under copyright law. This was a practical choice. Because software is written in programming language, it can be expressed as a kind of text. That is why computer programs are protected as literary works under copyright law. This principle is laid down in Article 10, paragraph 1, of the TRIPs Agreement and Article 4 of the WIPO Copyright Treaty.

Copyright protection of software relates to the concrete expression of the computer program, i.e. the specific form in which the programmer has expressed his intellectual creation in the source code. The source code concerns the instructions written by the programmer in a programming language and readable by humans. The target code is also subject to copyright protection. The object code comprises the binary, computer-readable and executable instructions generated from the source code by a compiler or interpreter. The object code is therefore in fact the translation of the source code into a computer-readable form.

The same conditions apply to copyright protection of software as to any other work. The source code and object code must demonstrate originality. They may not be derived from earlier software and the programmer must have made creative choices when writing the source code. If these conditions are met, the computer program is legally protected under copyright.[1]

Copyright does not protect an idea underlying a work. This means that the functionality, logic, method or purpose of a computer program and the processes, procedures, algorithms, programming languages and layout of data files that are used in the context of a computer program to be able to use certain functions of the program are not protected by copyright.

Copyright does not create a monopoly on the functionality of software. It grants the creator or right holder exclusive rights to permit or prohibit the reproduction (copying or editing) and publication (publishing, marketing, lending, renting or making available on demand) of a computer program. However, the creator or right holder cannot prohibit others from developing their own computer programs that pursue the same or similar purpose or functionality.

Copyright on software largely follows the same rules as those that apply to any other work. For example, the rules for authorship and legal succession are the same, right holders are entitled to the same broad exploitation rights and the term of protection is determined in the same way. However, there are a few special provisions concerning computer programs that are recorded in Chapter VI of the Copyright Act.

Based on the right of reproduction, the right holder may prohibit others from copying or taking over the computer program in whole or in part or from changing the source code. The law also stipulates that the right of reproduction also includes reproductions that are necessary for loading, displaying, executing, transmitting or storing the computer program. Someone who has lawfully obtained the software, such as the person who has purchased a computer program, may make these reproductions to the extent necessary

[1] Preparatory design material can also be protected by copyright, provided that no programming step with creative steps is needed to turn that material into a computer program.

for the use of the computer program. The lawful acquirer may also make a backup copy if this is necessary for the intended use.

In addition, the law permits the operation of software to be observed, studied and tested in order to discover the underlying ideas and principles. There is therefore an explicit authority to 'reverse-engineer' the software.

Furthermore, the 'decompilation' of a computer program, the reconstruction of a source code based on the target code, is permitted under certain circumstances. The law stipulates that a computer program may be decompiled, not in order to create a competing program that imitates the decompiled software, but to create compatible programs that can communicate with the decompiled software and are therefore interoperable. Furthermore, it follows from case law that decompilation is permitted to correct errors in the proper functioning of a computer program.

Graphical user interface and other elements

When executing a computer program on a computer, users are primarily confronted with the graphical user interface (GUI). These are the visual elements that enable the user to communicate with a computer program and thus instruct the program (software) to control the computer (hardware). Think of the various icons in the taskbar or the menu of a computer program.

However, the GUI itself is not a computer program. The special provisions regarding computer programs therefore do not apply to GUIs. A GUI can be independently protected by copyright, if the designer has made creative choices in the design of the interface. When decompiling a computer program for the purpose of interoperability or error correction, the source code may be reconstructed on the basis of the target code, but the GUI may not also be copied to the extent that it is protected by copyright. That would infringe the copyright on the GUI.

The same applies to the graphic and sound elements of, for example, video games. These can be independently protected by copyright if they are the creator's own intellectual creation, but do not themselves qualify as a computer program.

Video games

Video games generally consist of different types of works. In addition to software (source and target code), many video games contain a storyline, characters, images, animations, video, music and texts. Provided that the requirements are met, each of these

works enjoys copyright protection. In principle, the copyright on the various works can lie with different creators. Sometimes hundreds of people can have made a creative contribution to a single video game. Because permission must be obtained from each rights holder for the release of the video game, the large number of rights holders can greatly hinder exploitation.

In practice, it is therefore arranged that all copyrights on the video game are, as much as possible, in the hands of the producer of the video game. The Copyright Act already provides for this to some extent. Insofar as creators have contributed to a video game under employment, the copyrights are in principle already held by the producer as employer under the law. For components of a video game that have been created by freelancers on assignment, the producer will usually have the copyrights contractually transferred to him. In addition, the producer can stipulate that the creator waives the right to mention his name, so that the rights are automatically granted to his/her company. For existing works that are included in a video game, such as the music that plays in the background of a video game, the producer will usually arrange permission by concluding a license agreement with the relevant copyright holders.

6.2.2 Software patent law

The starting point of patent law is that software as such cannot be patented, because computer programs are not considered inventions. However, the term invention contains the requirement of technical nature. A computer program that has a 'further technical effect' when executed on a computer, beyond the effect of the normal control of the computer, can therefore be patented. The computer program must provide a technical solution to a technical problem. Inventions with software must also meet the patent law requirements of novelty, inventive step and industrial applicability (see section 4.5).

Examples of computer programs that have a 'further technical effect' when executed on a computer are programs for controlling an anti-lock braking system (ABS) in cars, determining emissions from X-ray equipment, compressing data, encrypting electronic communications, restoring distorted digital images or training artificial intelligence. A 'further technical effect' can also concern the internal functioning or security of the computer. For example, programs for distributing the processor load, memory allocation or securing integrity during start-up offer a technical solution to a technical problem.

Patent protection is broader than copyright protection in the sense that patent law does grant a temporary monopoly on the technical functionality of the software-related invention. Patent law gives the holder the exclusive right to prohibit others from applying and using the patented invention for commercial purposes. It is therefore not permitted to market computer programs with the same 'further technical effect', or an effect that is more or less equivalent, during the period that the patent is valid.

6.2.3 Other ways to protect software

In addition to copyright protection of computer programs and patent protection of software-related inventions, software or parts thereof can also be protected by other intellectual property rights. For example, the source code of computer programs can be protected as a trade secret. Graphic features of computer programs, such as icons or pictograms of the graphic user interface, can be protected as drawings under design and model law, provided of course that the specific protection conditions are met.

In addition, the producer of software can of course contractually agree on additional protection with third parties, for example in license agreements.

Software can of course also be protected technologically, by security measures such as encryption methods and copy protection. The Copyright Act offers protection against circumvention of such technological protection measures.

6.3 Example of IP use in open source software

Open source software, or alternatively also called free software (free as freedom and not necessarily free as in a free beer), aims to make the software available to everyone and to be developed jointly.

Part of this software is in the public domain and another part is licensed. Well-known licenses are the GPL (GNU General Public License) or the BSD (Berkely Software Distribution) license. These licenses allow the use of the software under certain conditions. The user must therefore comply with those conditions and is not free to do everything.

Question:

> How can the terms of the open source licenses be enforced if the source code is publicly available? Click for answer.

Although the open source movement mainly originated in the academic world, there are now many large companies that develop open source software. These companies use the joint development to offer products and services around the open source software.

6.4 Example of IP use with standards

6.4.1 VESA (Video Electronics Standards Association)

Vesa is a non-profit corporation, which represents more than 300 companies. These companies are members of the corporation. It sets and supports interface standards for computers and consumer electronics.

The vision statement (from the website):

> VESA's vision is continual growth in technical standards development and evolution into an international trade association, with world-wide membership driving standards initiatives, product implementations, and market implementation.

6.4.2 Displayport

The displayport connection between a computer and a monitor is an important Vesa standard. The Vesa members are allowed to use the displayport logo on their products if these meet the requirements of the standard. In figure 6.1 the logo is displayed.

Figure 6.1: Displayport logo

Question:

> How can the use of the logo be limited to members who comply to the standard? Click for answer.

Appendix A

Glossary

B

BCIP

Benelux Convention on Intellectual Property (trademarks and designs). The Benelux Convention on Intellectual Property is a treaty between the Netherlands, Belgium and Luxembourg and provides the legal system for trademarks and designs in the Benelux. 20, 70

BOIP

Benelux Office for Intellectual Property. The Benelux Office for Intellectual Property (dutch BBIE: Benelux-Bureau voor de Intellectuele Eigendom, french: Office Benelux de la Propriété intellectuelle) registers trademarks and designs for the Benelux. 20, 25, 26, 65

C

claims

The claims are part of a patent to define the scope of protection. Usually, the set of claims consists of a main claim with several dependent claims. 33, 36

D

diversify

Diversification gives companies the opportunity to expand their range of products and services. 52

DPMA

Deutsches Patent- und Markenamt. The German Patent and Trademark Office is tasked with the granting of patents and trademarks for Germany. 65

E

EPC

European Patent Convention. A multilateral treaty to provide the legal system for granting European patents. Next to articles and rules for obtaining a patent, it also institutes the European Patent Organisation. In German: EPÜ, French: CBE. The European Patent Office is tasked with the granting of the European patents. 29, 61, 82

EPO

European Patent Office. The European Patent Office is tasked with the granting of the European patents according the EPC. Main seat in Munich with dependancies in Rijswijk, Berlin and Vienna. 29, 36, 38, 65

EUIPO

European Union Intellectual Property Office. The European Union Intellectual Property Office registers trademarks and designs for the EU. 20, 25, 26, 65

EUTMR

Regulation (EU) 2017/1001 of the European parliament and of the council of 14 June 2017 on the European Union trade mark. 21, 76

examiner

The person working at a patent office, who will do the substantive examination (search report and grant) of a patent application. 37

exhaustion

If a patent, trademark or design holder, or someone else with the permission of the holder, has sold a product, he can no longer use the patent, trademark or design right for that product. 27, 30

F

Freedom to Operate

Freedom to Operate (FTO) is a study that analyzes potential risks of possible infringement of third party patents when introducing a new product to the market. 47, 48, 50

I

industrial property rights

Industrial property rights are all intellectual property rights except copyright. 45

innovation

Innovation is most often regarded as a new and tangible product or service which can be bought by customers in the market place. 45

intellectual properties

Intellectual property is a category of property that includes intangible creations of the human intellect. 8, 46, 47, 62

intellectual property rights

Intellectual Property Rights are the legal rights for creators over the creations of the minds. Intellectual property rights include patents, copyright, industrial design rights, trademarks, plant variety rights, trade dress, geographical indications, and in some jurisdictions trade secrets. 8, 62

IP

Intellectual Property. See also the description of intellectual properties and intellectual property rights in the glossary. 2, 8, 9, 11, 16, 46, 49, 52, 54, 62

IPR

Intellectual Property Rights are the legal rights for creators over the creations of their minds. See also the description of intellectual property rights and intellectual properties in the glossary. 8, 10, 11

J

JPO

Japan Patent Office. The Japan Patent Patent Office is tasked with the granting of patents and trademarks for Japan. 65

L

license

Meaning of license when used in IP: The right to commercially use a product or service to which another legal entity has intellectual property rights, on the basis of financial or material compensation. 50

O

Octrooicentrum Nederland

The Netherlands Patent Office is the patent office of the Netherlands. The Netherlands Patent Office is a department of the Netherlands Enterprise Agency, an agency of the Ministry of Economic Affairs and

Climate Policy. The Netherlands Patent Office grants patents in the Netherlands and deals with European patents validated in the Netherlands. 29, 65

P

patent

A patent is an intellectual property right for an invention. 11, 28

patent landscape analysis

A patent landscape analysis provides a worldwide overview of patent holders who have technology in the economic sector of your organization. This gives you both market and product information of existing technology. With the help of this analysis, you can adjust research and development in time or decide to apply for a license from the patent holder for your market. 47, 48, 50, 53

PCT

Patent Cooperation Treaty. The Patent Cooperation Treaty is an international patent law treaty. It provides a unified procedure for filing patent applications to protect inventions in each of its contracting states. A patent application filed under the PCT is called an international application, or PCT application. 29, 34, 38, 40, 84

person skilled in the art

The term person skilled in the art, as used in patent law, is a constructed virtual person with knowledge and skill of a (broad) technical field. The person skilled in the art knows the entire state of the art, but has no inventive capacity. This constructed person skilled in the art is used in drawing up arguments, especially in the case of inventive step, sufficient disclosure and clarity of the patent application. 31–33

priority

A patent application can get right of priority from an earlier filing. This has the effect as if the patent application is filed on the date of the earlier filing. 41

R

ROW

National Patents Act 1995. Law for patents valid in the Netherlands, including the Caribbean, Curaçao and Sint Maarten. 29, 80

S

search report

The search report is prepared by the patent office where the patent application has been filed. It is used to assess novelty and inventive step during the examination of the patent. It therefore contains the most relevant documents that are used in the examination. 37, 39

state of the art

The state of the art is formed by everything made available to the public by means of a written or oral description, by use, or in any other way, before the date of filing of the patent application 31, 37, 46

U

USPTO

United States Patent and Trademark Office. The United States Patent and Trademark Office is tasked with the granting of patents and trademarks for the United States of America. 65

W

WIPO

World Intellectual Property Organisation. The World Intellectual Property Organization is one of the 15 specialized agencies of the United Nations (UN). WIPO administers 26 international treaties that concern a wide variety of intellectual property issues, ranging from the protection of audiovisual works to establishing international patent classification. WIPO currently has 193 member states and is headquartered in Geneva, Switzerland. 20, 29, 38, 65

Appendix B

Links

B.1 National and international IP offices

Netherlands patent office (Octrooicentrum Nederland):
https://www.rvo.nl/onderwerpen/innovatief-ondernemen/octrooien-ofwel-patenten

Benelux Office for Intellectual Property (BOIP):
https://www.boip.int/

European Patent Office (EPO):
https://www.epo.org/

European Union Intellectual Property Office (EUIPO):
https://www.euipo.europa.eu/

World Intellectual Property Organisation (WIPO):
https://www.wipo.int/

German patent office (DPMA):
https://www.dpma.de/

United States Patents and Trademark Office (USPTO):
https://www.uspto.gov/

Japan Patent Office (JPO):
https://www.jpo.go.jp/e/

B.2 Additional information

ThatsIP E-learning Intellectuel Property:
https://www.thatsip.nl/en/
Netherlands patent office, videos explaining basics of patents:
https://www.rvo.nl/onderwerpen/octrooien-ofwel-patenten/uitlegvideos

UK Intellectual Property Office, videos on IP basic, case studies and others:
https://www.youtube.com/user/ipogovuk

Werkgemeenschap Octrooi-informatie Nederland (WON):
http://www.won-nl.org

B.3 Interesting publications from the WIPO

What is Intellectual Property?
https://www.wipo.int/publications/en/details.jsp?id=4528&plang=EN

Intellectual Property Basics: A Q&A for Students
https://www.wipo.int/publications/en/details.jsp?id=4410&plang=EN

Understanding Industrial Property
https://www.wipo.int/publications/en/details.jsp?id=4080&plang=EN

Inventing the Future
An Introduction to Patents for Small and Medium-sized Enterprises
https://www.wipo.int/publications/en/details.jsp?id=4350&plang=EN

Enterprising Ideas
A Guide to Intellectual Property for Startups
https://www.wipo.int/publications/en/details.jsp?id=4545&plang=EN

Guide to the International Patent Classification (2022)
https://www.wipo.int/publications/en/details.jsp?id=4593&plang=EN

International Patent Classification (IPC)
https://www.wipo.int/publications/en/details.jsp?id=4582&plang=EN

B.4 IP databases

Espacenet:
https://worldwide.espacenet.com/patent/

Espacenet pocket guide:
https://www.epo.org/espacenet-pocket-guide

Manual Espacenet (Dutch):
https://www.rvo.nl/sites/default/files/2021/03/Handleiding%20Espacenet_februari2021.pdf

European Patent Register:
https://register.epo.org/

European Patent Bulletin:
https://data.epo.org/expert-services/index.html

Google patents:
https://patents.google.com/

Depatisnet (DPMA):
https://depatisnet.dpma.de/DepatisNet/depatisnet

Patentscope:
https://patentscope.wipo.int/

The lens:
https://www.lens.org/

Trademark view and Design view:
https://www.tmdn.org/

EUIPO register (eSearch plus):
https://euipo.europa.eu/eSearch/

BOIP trademark register:
https://www.boip.int/en/trademarks-register

BOIP design register:
https://www.boip.int/en/designs-register

Register of the Netherlands patent office:
https://mijnoctrooi.rvo.nl/fo-eregister-view/

Register of the German patent office (DPMA register):
https://register.dpma.de/DPMAregister/pat/basis

UK Intellectual Property Office, online patent information and document inspection service:
https://www.ipo.gov.uk/p-ipsum.htm

Japan platform for patent information:
https://www.j-platpat.inpit.go.jp/

B.5 The patent classification schemes

CPC classification scheme at the USPTO (US patent and trademark office):
https://www.uspto.gov/web/patents/classification/cpc/html/cpc.html

CPC classification scheme in table to download scheme and definitions:
https://www.cooperativepatentclassification.org/cpcSchemeAndDefinitions/table

Appendix C

Bibliography

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Appendix D

Parts of IP law

D.1 Parts of the Benelux Convention on Intellectual Property (trademarks)

These are some of the most relevant parts of the Benelux Convention on Intellectual Property (BCIP).

- Article 2.1. Signs that may constitute a trademark

  A trademark may consist of any signs, in particular words, including personal names, or designs, letters, numerals, colours, the shape of goods or of the packaging of goods, or sounds, provided that such signs are capable of:

  a. distinguishing the goods or services of one undertaking from those of other undertakings; and
  b. being represented on the register in a manner which enables the competent authorities and the public to determine the clear and precise subject matter of the protection afforded to its proprietor.

- Article 2.2bis Absolute grounds for refusal or invalidity

  1. The following shall not be registered or, if registered, shall be liable to be declared invalid:
     a. signs which cannot constitute a trademark;
     b. trademarks which are devoid of any distinctive character;
     c. trademarks which consist exclusively of signs or indications which may serve, in trade, to designate the kind, quality, quantity, intended purpose, value, geographical origin, or the time of production of the goods or of rendering of the service, or other characteristics of the goods or services;

d. trademarks which consist exclusively of signs or indications which have become customary in the current language or in the bona fide and established practices of the trade;
e. signs which consist exclusively of:
    i. the shape, or another characteristic, which results from the nature of the goods themselves;
    ii. the shape, or another characteristic, of goods which is necessary to obtain a technical result;
    iii. the shape, or another characteristic, which gives substantial value to the goods;
f. trademarks which are contrary to public policy or to accepted principles of morality;
g. trademarks which are of such a nature as to deceive the public, for instance, as to the nature, quality or geographical origin of the goods or service;
h. trademarks which have not been authorised by the competent authorities and are to be refused or invalidated pursuant to Article 6ter of the Paris Convention;
i. trademarks which are excluded from registration pursuant to Union legislation or the internal law of one of the Benelux countries, or to international agreements to which the European Union is party or which have effect in a Benelux country, providing for protection of designations of origin and geographical indications;
j. trademarks which are excluded from registration pursuant to Union legislation or international agreements to which the European Union is party, providing for protection of traditional terms for wine;
k. trademarks which are excluded from registration pursuant to Union legislation or international agreements to which the European Union is party, providing for protection of traditional specialities guaranteed;
l. trademarks which consist of, or reproduce in their essential elements, an earlier plant variety denomination registered in accordance with Union legislation or the internal law of one of the Benelux countries, or international agreements to which the European Union is party or which have effect in a Benelux country, providing protection for plant variety rights, and which are in respect of plant varieties of the same or closely related species.

2. A trademark shall be liable to be declared invalid where the application for registration of the trademark was made in bad faith by the applicant.

3. A trademark shall not be refused registration in accordance with paragraph 1 (b), (c) or (d) if, before the date of application for registration, following the use which has been made of it, it has acquired a distinctive character. A trademark shall not be declared invalid for the same reasons if, before the date of application for a declaration of invalidity, following the use which has been made of it, it has acquired a distinctive character.

- Article 2.20 Rights conferred by a trademark

1. The registration of a trademark referred to in Article 2.2 shall confer on the proprietor exclusive rights therein.
2. Without prejudice to the rights of proprietors acquired before the filing date or the priority date of the registered trademark, and without prejudice to the possible application of ordinary law in matters of civil liability, the proprietor of that registered trademark shall be entitled to prevent all third parties not having his consent from using any sign where such sign:
    a. is identical with the trademark and is used in the course of trade in relation to goods or services which are identical with those for which the trademark is registered;
    b. is identical with, or similar to, the trademark and is used in the course of trade in relation to goods or services which are identical with, or similar to, the goods or services for which the trademark is registered, if there exists a likelihood of confusion on the part of the public; the likelihood of confusion includes the likelihood of association between the sign and the trademark;
    c. is identical with, or similar to, the trademark irrespective of whether it is used in relation to goods or services which are identical with, similar to, or not similar to, those for which the trademark is registered, where the latter has a reputation in the Benelux territory and where use in the course of trade of that sign without due cause takes unfair advantage of, or is detrimental to, the distinctive character or the repute of the trademark;
    d. is used for purposes other than those of distinguishing goods or services, where use of the sign without due cause, would take unfair advantage of or be detrimental to the distinctive character or the repute of the trademark.
3. The following, in particular, may be prohibited under paragraph 2 (a) to (c):
    a. affixing the sign to the goods or to the packaging thereof;

b. offering the goods or putting them on the market, or stocking them for those purposes, under the sign, or offeringor supplying services thereunder;
c. importing or exporting the goods under the sign;
d. using the sign as a trade or company name or part of a trade or company name;
e. using the sign on business papers and in advertising;
f. using the sign in comparative advertising in a manner that is contrary to Directive 2006/114/EC of the European Parliament and of the Council of 12 December 2006 concerning misleading and comparative advertising.

4. Without prejudice to the rights of proprietors acquired before the filing date or the priority date of the registered trademark, the proprietor of that registered trademark shall also be entitled to prevent all third parties from bringing goods, in the course of trade, into the Benelux territory, without being released for free circulation there, where such goods, including the packaging thereof, come from third countries and bear without authorisation a trademark which is identical with the trademark registered in respect of such goods, or which cannot be distinguished in its essential aspects from that trademark. The entitlement of the trademark proprietor pursuant to the first subparagraph shall lapse if, during the proceedings to determine whether the registered trademark has been infringed, initiated in accordance with Regulation (EU) No 608/2013 of the European Parliament and of the Council of 12 June 2013 concerning customs enforcement of intellectual property rights and repealing Council Regulation (EC) No 1383/2003, evidence is provided by the declarant or the holder of the goods that the proprietor of the registered trademark is not entitled to prohibit the placing of the goods on the market in the country of final destination.

5. Where the risk exists that the packaging, labels, tags, security or authenticity features or devices, or any other means to which the trademark is affixed, could be used in relation to goods or services and that use would constitute an infringement of the rights of the proprietor of a trademark under paragraph 2 and 3, the proprietor of that trademark shall have the right to prohibit the following acts if carried out in the course of trade:

a. affixing a sign identical with, or similar to, the trademark on packaging, labels, tags, security or authenticity features or devices, or any other means to which the mark may be affixed;

b. offering or placing on the market, or stocking for those purposes, or importing or exporting, packaging, labels, tags, security or authenticity features or devices, or any other means to which the mark is affixed.

6. The exclusive right to a trademark expressed in one of the national or regional languages of the Benelux territory extends automatically to its translation into another of those languages. Evaluation of the similarity arising from translations into one or more languages foreign to the aforesaid territory shall be a matter for the courts.

- Article 2.23 Limitation of the effects of the exclusive right

1. A trademark shall not entitle the proprietor to prohibit a third party from using, in the course of trade:
   a. the name or address of the third party, where that third party is a natural person;
   b. signs or indications which are not distinctive or which concern the kind, quality, quantity, intended purpose, value, geographical origin, the time of production of goods or of rendering of the service, or other characteristics of goods or services;
   c. the trademark for the purpose of identifying or referring to goods or services as those of the proprietor of that trademark, in particular, where the use of the trademark is necessary to indicate the intended purpose of a product or service, in particular as accessories or spare parts; provided that such use is made in accordance with honest practices in industrial or commercial matters.
2. A trademark shall not entitle the proprietor to prohibit a third party from using, in the course of trade, an earlier right which only applies in a particular locality, if that right is recognised by the law of one of the Benelux countries and the use of that right is within the limits of the territory in which it is recognised.
3. A trademark shall not entitle the proprietor to prohibit its use in relation to goods which have been put on the market in the European Economic Area under that trademark by the proprietor or with the proprietor's consent, unless there exist legitimate reasons for the proprietor to oppose further commercialisation of the goods, especially where the condition of the goods is changed or impaired after they have been put on the market.

- Article 2.23bis Genuine use of the trademark

1. If, within a period of five years following the date of the completion of the registration procedure, the proprietor has not put the trademark to genuine use in the Benelux territory in connection with the goods or services in respect of which it is registered, or if such use has been suspended during a continuous five-year period, the trademark shall be subject to the limits and sanctions provided for in Article 2.16bis (1) and (2) 2.23ter, 2.27 (2) and 2.30quinquies (3) and (4), unless there are proper reasons for non-use.
2. In the case referred to in Article 2.8 (2), the five-year period referred to in paragraph 1 shall be calculated from the date when the mark can no longer be subject of a refusal on absolute grounds or an opposition or, in the event that a refusal has been issued or an opposition has been lodged, from the date when a decision decision lifting the Office's objections on absolute grounds or terminating the opposition proceedings became final or the opposition was withdrawn.
3. With regard to international trademarks having effect in the Benelux territory, the five-year period referred to in paragraph 1 shall be calculated from the date when the mark can no longer be subject to refusal or opposition. Where an opposition has been lodged or when a refusal on absolute grounds has been notified, the period shall be calculated from the date when a decision terminating the opposition proceedings or a ruling on absolute grounds for refusal became final or the opposition was withdrawn.
4. The date of commencement of the five-year period, as referred to in paragraphs 1 and 2, shall be entered in the register.
5. The following shall also constitute use within the meaning of paragraph 1:
    a. use of the trademark in a form differing in elements which do not alter the distinctive character of the mark in the form in which it was registered, regardless of whether or not the trademark in the form as used is also registered in the name of the proprietor;
    b. affixing of the trademark to goods or to the packaging thereof in the Benelux territory solely for export purposes.
6. Use of the trademark with the consent of the proprietor shall be deemed to constitute use by the proprietor.

D.2 Parts of the Regulation on the European Union trade mark

These are some of the most relevant parts of the Regulation (EU) 2017/1001 of the European parliament and of the council of 14 June 2017 on the European Union trade mark (EUTMR).

- Article 4. Signs of which an EU trade mark may consist

  An EU trade mark may consist of any signs, in particular words, including personal names, or designs, letters, numerals, colours, the shape of goods or of the packaging of goods, or sounds, provided that such signs are capable of:

  (a) distinguishing the goods or services of one undertaking from those of other undertakings; and

  (b) being represented on the Register of European Union trade marks ('the Register'), in a manner which enables the competent authorities and the public to determine the clear and precise subject matter of the protection afforded to its proprietor.

- Article 7. Absolute grounds for refusal

  1. The following shall not be registered:
     (a) signs which do not conform to the requirements of Article 4;
     (b) trade marks which are devoid of any distinctive character;
     (c) trade marks which consist exclusively of signs or indications which may serve, in trade, to designate the kind, quality, quantity, intended purpose, value, geographical origin or the time of production of the goods or of rendering of the service, or other characteristics of the goods or service;
     (d) trade marks which consist exclusively of signs or indications which have become customary in the current language or in the bona fide and established practices of the trade;
     (e) signs which consist exclusively of:
        (i) the shape, or another characteristic, which results from the nature of the goods themselves;
        (ii) the shape, or another characteristic, of goods which is necessary to obtain a technical result;
        (iii) the shape, or another characteristic, which gives substantial value to the goods;
     (f) trade marks which are contrary to public policy or to accepted principles of morality;

(g) trade marks which are of such a nature as to deceive the public, for instance as to the nature, quality or geographical origin of the goods or service;

(h) trade marks which have not been authorised by the competent authorities and are to be refused pursuant to Article 6ter of the Paris Convention for the Protection of Industrial Property ('Paris Convention');

(i) trade marks which include badges, emblems or escutcheons other than those covered by Article 6ter of the Paris Convention and which are of particular public interest, unless the consent of the competent authority to their registration has been given;

(j) trade marks which are excluded from registration, pursuant to Union legislation or national law or to international agreements to which the Union or the Member State concerned is party, providing for protection of designations of origin and geographical indications;

(k) trade marks which are excluded from registration pursuant to Union legislation or international agreements to which the Union is party, providing for protection of traditional terms for wine;

(l) trade marks which are excluded from registration pursuant to Union legislation or international agreements to which the Union is party, providing for protection of traditional specialities guaranteed;

(m) trade marks which consist of, or reproduce in their essential elements, an earlier plant variety denomination registered in accordance with Union legislation or national law, or international agreements to which the Union or the Member State concerned is a party, providing for protection of plant variety rights, and which are in respect of plant varieties of the same or closely related species.

2. Paragraph 1 shall apply notwithstanding that the grounds of non-registrability obtain in only part of the Union.

3. Paragraph 1(b), (c) and (d) shall not apply if the trade mark has become distinctive in relation to the goods or services for which registration is requested as a consequence of the use which has been made of it.

- Article 9. Rights conferred by an EU trade mark

1. The registration of an EU trade mark shall confer on the proprietor exclusive rights therein.

2. Without prejudice to the rights of proprietors acquired before the filing date or the priority date of the EU trade mark, the proprietor of that EU trade mark shall be entitled to prevent all third parties not having his consent from using in the course of trade, in relation to goods or services, any sign where:
   (a) the sign is identical with the EU trade mark and is used in relation to goods or services which are identical with those for which the EU trade mark is registered;
   (b) the sign is identical with, or similar to, the EU trade mark and is used in relation to goods or services which are identical with, or similar to, the goods or services for which the EU trade mark is registered, if there exists a likelihood of confusion on the part of the public; the likelihood of confusion includes the likelihood of association between the sign and the trade mark;
   (c) the sign is identical with, or similar to, the EU trade mark irrespective of whether it is used in relation to goods or services which are identical with, similar to or not similar to those for which the EU trade mark is registered, where the latter has a reputation in the Union and where use of that sign without due cause takes unfair advantage of, or is detrimental to, the distinctive character or the repute of the EU trade mark.
3. The following, in particular, may be prohibited under paragraph 2:
   (a) affixing the sign to the goods or to the packaging of those goods;
   (b) offering the goods, putting them on the market, or stocking them for those purposes under the sign, or offering or supplying services thereunder;
   (c) importing or exporting the goods under the sign;
   (d) using the sign as a trade or company name or part of a trade or company name;
   (e) using the sign on business papers and in advertising;
   (f) using the sign in comparative advertising in a manner that is contrary to Directive 2006/114/EC.
4. Without prejudice to the rights of proprietors acquired before the filing date or the priority date of the EU trade mark, the proprietor of that EU trade mark shall also be entitled to prevent all third parties from bringing goods, in the course of trade, into the Union without being released for free circulation there, where such goods, including packaging, come from third countries and

bear without authorisation a trade mark which is identical with the EU trade mark registered in respect of such goods, or which cannot be distinguished in its essential aspects from that trade mark.

The entitlement of the proprietor of an EU trade mark pursuant to the first subparagraph shall lapse if, during the proceedings to determine whether the EU trade mark has been infringed, initiated in accordance with Regulation (EU) No 608/2013, evidence is provided by the declarant or the holder of the goods that the proprietor of the EU trade mark is not entitled to prohibit the placing of the goods on the market in the country of final destination.

- Article 14. Limitation of the effects of an EU trade mark

  1. An EU trade mark shall not entitle the proprietor to prohibit a third party from using, in the course of trade:
     (a) the name or address of the third party, where that third party is a natural person;
     (b) signs or indications which are not distinctive or which concern the kind, quality, quantity, intended purpose, value, geographical origin, the time of production of goods or of rendering of the service, or other characteristics of the goods or services;
     (c) the EU trade mark for the purpose of identifying or referring to goods or services as those of the proprietor of that trade mark, in particular, where the use of that trade mark is necessary to indicate the intended purpose of a product or service, in particular as accessories or spare parts.
  2. Paragraph 1 shall only apply where the use made by the third party is in accordance with honest practices in industrial or commercial matters.

- Article 15. Exhaustion of the rights conferred by an EU trade mark

  1. An EU trade mark shall not entitle the proprietor to prohibit its use in relation to goods which have been put on the market in the European Economic Area under that trade mark by the proprietor or with his consent.
  2. Paragraph 1 shall not apply where there exist legitimate reasons for the proprietor to oppose further commercialisation of the goods, especially where the condition of the goods is changed or impaired after they have been put on the market.

- Article 18. Use of an EU trade mark

    1. If, within a period of five years following registration, the proprietor has not put the EU trade mark to genuine use in the Union in connection with the goods or services in respect of which it is registered, or if such use has been suspended during an uninterrupted period of five years, the EU trade mark shall be subject to the sanctions provided for in this Regulation, unless there are proper reasons for non-use.

       The following shall also constitute use within the meaning of the first subparagraph:

       (a) use of the EU trade mark in a form differing in elements which do not alter the distinctive character of the mark in the form in which it was registered, regardless of whether or not the trade mark in the form as used is also registered in the name of the proprietor;

       (b) affixing of the EU trade mark to goods or to the packaging thereof in the Union solely for export purposes.

    2. Use of the EU trade mark with the consent of the proprietor shall be deemed to constitute use by the proprietor.

D.3 Parts of the Dutch patent law, Rijksoctrooiwet 1995 (in Dutch)

These are some of the most relevant parts of Dutch patent law (ROW).

- Artikel 53

    1. Een octrooi geeft de octrooihouder, behoudens de bepalingen van de artikelen 53a tot en met 60, het uitsluitend recht:
        a. het geoctrooieerde voortbrengsel in of voor zijn bedrijf te vervaardigen, te gebruiken, in het verkeer te brengen of verder te verkopen, te verhuren, af te leveren of anderszins te verhandelen, dan wel voor een of ander aan te bieden, in te voeren of in voorraad te hebben;
        b. de geoctrooieerde werkwijze in of voor zijn bedrijf toe te passen of het voortbrengsel, dat rechtstreeks verkregen is door toepassing van die werkwijze, in of voor zijn bedrijf te gebruiken, in het verkeer te brengen of verder te verkopen, te verhuren, af te leveren of anderszins te verhandelen, dan wel voor een of ander aan te bieden, in te voeren of in voorraad te hebben.

2. Het uitsluitend recht wordt bepaald door de conclusies van het octrooischrift, waarbij de beschrijving en de tekeningen dienen tot uitleg van die conclusies.
3. Het uitsluitend recht strekt zich niet uit over handelingen, uitsluitend dienende tot onderzoek van het geoctrooieerde, daaronder begrepen het door toepassing van de geoctrooieerde werkwijze rechtstreeks verkregen voortbrengsel. Het uitsluitend recht strekt zich evenmin uit tot de bereiding voor direct gebruik ten behoeve van individuele gevallen op medisch voorschrift van geneesmiddelen in apotheken, noch tot handelingen betreffende de aldus bereide geneesmiddelen.
4. Het uitvoeren van de noodzakelijke studies, tests en proeven met het oog op de toepassing van artikel 10, eerste tot en met vierde lid, van Richtlijn 2001/83/EG tot vaststelling van een communautair wetboek betreffende geneesmiddelen voor menselijk gebruik (PbEG L 311) of artikel 13, eerste tot en met het vijfde lid van Richtlijn 2001/82/EG tot vaststelling van een communautair wetboek betreffende geneesmiddelen voor diergeneeskundig gebruik (PbEG L 311) en de daaruit voortvloeiende praktische vereisten worden niet beschouwd als een inbreuk op octrooien met betrekking tot geneesmiddelen voor menselijk gebruik, respectievelijk geneesmiddelen voor diergeneeskundig gebruik.
5. Is een voortbrengsel als in het eerste lid, onder a of b, bedoeld, in Nederland, Curaçao of Sint Maarten rechtmatig in het verkeer gebracht, dan wel door de octrooihouder of met diens toestemming in één der Lid-Staten van de Europese Gemeenschap of in een andere staat die partij is bij de Overeenkomst betreffende de Europese Economische Ruimte in het verkeer gebracht, dan handelt de verkrijger of latere houder niet in strijd met het octrooi, door dit voortbrengsel in of voor zijn bedrijf te gebruiken, te verkopen, te verhuren, af te leveren of anderszins te verhandelen, dan wel voor een of ander aan te bieden, in te voeren of in voorraad te hebben.
6. Een voortbrengsel als in het eerste lid, onder a of b, bedoeld, dat voor de verlening van het octrooi, of, indien het een Europees octrooi betreft, voor de dag, waarop overeenkomstig artikel 97, derde lid, van het Europees Octrooiverdrag de vermelding van de verlening van het Europees octrooi is gepubliceerd, in een bedrijf is vervaardigd, mag niettegenstaande het octrooi ten dienste van dat bedrijf worden gebruikt.

D.4 Parts of the European Patent Convention

These are some of the most relevant parts of patent law in the European Patent Convention (EPC).

- Article 52. Patentable inventions

  (1) European patents shall be granted for any inventions, in all fields of technology, provided that they are new, involve an inventive step and are susceptible of industrial application.
  (2) The following in particular shall not be regarded as inventions within the meaning of paragraph 1:
    a) discoveries, scientific theories and mathematical methods;
    b) aesthetic creations;
    c) schemes, rules and methods for performing mental acts, playing games or doing business, and programs for computers;
    d) presentations of information.
  (3) Paragraph 2 shall exclude the patentability of the subject-matter or activities referred to therein only to the extent to which a European patent application or European patent relates to such subject-matter or activities as such.

- Article 54. Novelty

  (1) An invention shall be considered to be new if it does not form part of the state of the art.
  (2) The state of the art shall be held to comprise everything made available to the public by means of a written or oral description, by use, or in any other way, before the date of filing of the European patent application.
  (3) Additionally, the content of European patent applications as filed, the dates of filing of which are prior to the date referred to in paragraph 2 and which were published on or after that date, shall be considered as comprised in the state of the art.
  (4) Paragraphs 2 and 3 shall not exclude the patentability of any substance or composition, comprised in the state of the art, for use in a method referred to in Article 53(c), provided that its use for any such method is not comprised in the state of the art.
  (5) Paragraphs 2 and 3 shall also not exclude the patentability of any substance or composition referred to in paragraph 4 for any specific use in a method referred to in Article 53(c), provided that such use is not comprised in the state of the art.

- Article 56. Inventive step

  An invention shall be considered as involving an inventive step if, having regard to the state of the art, it is not obvious to a person skilled in the art. If the state of the art also includes documents within the meaning of Article 54, paragraph 3, these documents shall not be considered in deciding whether there has been an inventive step.

- Article 83. Disclosure of the invention

  The European patent application shall disclose the invention in a manner sufficiently clear and complete for it to be carried out by a person skilled in the art.

- Article 84. Claims

  The claims shall define the matter for which protection is sought. They shall be clear and concise and be supported by the description.

- Article 87. Priority right

  (1) Any person who has duly filed, in or for
    (a) any State party to the Paris Convention for the Protection of Industrial Property or
    (b) any Member of the World Trade Organization,

  an application for a patent, a utility model or a utility certificate, or his successor in title, shall enjoy, for the purpose of filing a European patent application in respect of the same invention, a right of priority during a period of twelve months from the date of filing of the first application.

  (2) Every filing that is equivalent to a regular national filing under the national law of the State where it was made or under bilateral or multilateral agreements, including this Convention, shall be recognised as giving rise to a right of priority.

  (3) A regular national filing shall mean any filing that is sufficient to establish the date on which the application was filed, whatever the outcome of the application may be.

  (4) A subsequent application in respect of the same subject-matter as a previous first application and filed in or for the same State shall be considered as the first application for the purposes of determining priority, provided that, at the date of filing the subsequent application, the previous application has been withdrawn, abandoned or refused, without being open to public inspection and without leaving any rights outstanding, and has not served as a basis for claiming a right of priority. The previous application may not thereafter serve as a basis for claiming a right of priority.

(5) If the first filing has been made with an industrial property authority which is not subject to the Paris Convention for the Protection of Industrial Property or the Agreement Establishing the World Trade Organization, paragraphs 1 to 4 shall apply if that authority, according to a communication issued by the President of the European Patent Office, recognises that a first filing made with the European Patent Office gives rise to a right of priority under conditions and with effects equivalent to those laid down in the Paris Convention.

- Article 88. Claiming priority

  (1) An applicant desiring to take advantage of the priority of a previous application shall file a declaration of priority and any other document required, in accordance with the Implementing Regulations.
  (2) Multiple priorities may be claimed in respect of a European patent application, notwithstanding the fact that they originated in different countries. Where appropriate, multiple priorities may be claimed for any one claim. Where multiple priorities are claimed, time limits which run from the date of priority shall run from the earliest date of priority.
  (3) If one or more priorities are claimed in respect of a European patent application, the right of priority shall cover only those elements of the European patent application which are included in the application or applications whose priority is claimed.
  (4) If certain elements of the invention for which priority is claimed do not appear among the claims formulated in the previous application, priority may nonetheless be granted, provided that the documents of the previous application as a whole specifically disclose such elements.

- Article 89. Effect of priority right

  The right of priority shall have the effect that the date of priority shall count as the date of filing of the European patent application for the purposes of Article 54, paragraphs 2 and 3, and Article 60, paragraph 2.

D.5 Parts of the Patent Cooperation Treaty

These are some of the most relevant parts of Patent Cooperation Treaty (PCT).

- Article 5. The Description

  The description shall disclose the invention in a manner sufficiently clear and complete for the invention to be carried out by a person skilled in the art.

- Article 6. The Claims

  The claim or claims shall define the matter for which protection is sought. Claims shall be clear and concise. They shall be fully supported by the description.

- Article 8. Claiming Priority

  (1) The international application may contain a declaration, as prescribed in the Regulations, claiming the priority of one or more earlier applications filed in or for any country party to the Paris Convention for the Protection of Industrial Property.

  (2) (a) Subject to the provisions of subparagraph (b), the conditions for, and the effect of, any priority claim declared under paragraph (1) shall be as provided in Article 4 of the Stockholm Act of the Paris Convention for the Protection of Industrial Property

  (b) The international application for which the priority of one or more earlier applications filed in or for a Contracting State is claimed may contain the designation of that State. Where, in the international application, the priority of one or more national applications filed in or for a designated State is claimed, or where the priority of an international application having designated only one State is claimed, the conditions for, and the effect of, the priority claim in that State shall be governed by the national law of that State.

- Article 33. The International Preliminary Examination

  (1) The objective of the international preliminary examination is to formulate a preliminary and non-binding opinion on the questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), and to be industrially applicable.

  (2) For the purposes of the international preliminary examination, a claimed invention shall be considered novel if it is not anticipated by the prior art as defined in the Regulations.

  (3) For the purposes of the international preliminary examination, a claimed invention shall be considered to involve an inventive step if, having regard to the prior art as defined in the Regulations, it

is not, at the prescribed relevant date, obvious to a person skilled in the art.

(4) For the purposes of the international preliminary examination, a claimed invention shall be considered industrially applicable if, according to its nature, it can be made or used (in the technological sense) in any kind of industry. "Industry" shall be understood in its broadest sense, as in the Paris Convention for the Protection of Industrial Property.

(5) The criteria described above merely serve the purposes of international preliminary examination. Any Contracting State may apply additional or different criteria for the purpose of deciding whether, in that State, the claimed invention is patentable or not.

(6) The international preliminary examination shall take into consideration all the documents cited in the international search report. It may take into consideration any additional documents considered to be relevant in the particular case.

- Rule 64. Prior Art for International Preliminary Examination

  64.1 Prior Art

  (a) For the purposes of Article 33(2) and (3), everything made available to the public anywhere in the world by means of written disclosure (including drawings and other illustrations) shall be considered prior art provided that such making available occurred prior to the relevant date.

  (b) For the purposes of paragraph (a), the relevant date shall be:

    (i) subject to item (ii) and (iii), the international filing date of the international application under international preliminary examination;

    (ii) where the international application under international preliminary examination claims the priority of an earlier application and has an international filing date which is within the priority period, the filing date of such earlier application, unless the International Preliminary Examining Authority considers that the priority claim is not valid;

    (iii) where the international application under international preliminary examination claims the priority of an earlier application and has an international filing date which is later than the date on which the priority period expired but within the period of two months from that date, the filing date of such earlier application, unless the International Preliminary Examining Authority considers that the priority claim is not valid for reasons other than the fact that the international

application has an international filing date which is later than the date on which the priority period expired.

64.2 Non-Written Disclosures

In cases where the making available to the public occurred by means of an oral disclosure, use, exhibition or other non-written means ("non-written disclosure") before the relevant date as defined in Rule 64.1(b) and the date of such non-written disclosure is indicated in a written disclosure which has been made available to the public on a date which is the same as, or later than, the relevant date, the non-written disclosure shall not be considered part of the prior art for the purposes of Article 33(2) and (3). Nevertheless, the international preliminary examination report shall call attention to such non-written disclosure in the manner provided for in Rule 70.9.

64.3 Certain Published Documents

In cases where any application or any patent which would constitute prior art for the purposes of Article 33(2) and (3) had it been published prior to the relevant date referred to in Rule 64.1 was published on a date which is the same as, or later than, the relevant date but was filed earlier than the relevant date or claimed the priority of an earlier application which had been filed prior to the relevant date, such published application or patent shall not be considered part of the prior art for the purposes of Article 33(2) and (3). Nevertheless, the international preliminary examination report shall call attention to such application or patent in the manner provided for in Rule 70.10.

Appendix E

Nice classification

This is a short version of the Nice classification. The full version can be found on the website WIPO Nice classification.

Goods class	Short description
1	Chemicals used in industry, science and photography, as well as in agriculture, horticulture and forestry; unprocessed artificial resins, unprocessed plastics; manures; fire extinguishing compositions; tempering and soldering preparations; chemical substances for preserving foodstuffs; tanning substances; adhesives used in industry.
2	Paints, varnishes, lacquers; preservatives against rust and against deterioration of wood; colorants; mordants; raw natural resins; metals in foil and powder form for use in painting, decorating, printing and art.
3	Bleaching preparations and other substances for laundry use; cleaning, polishing, scouring and abrasive preparations; soaps; perfumery, essential oils, cosmetics, hair lotions; dentifrices.
4	Industrial oils and greases; lubricants; dust absorbing, wetting and binding compositions; fuels (including motor spirit) and illuminants; candles and wicks for lighting.
5	Pharmaceuticals, medical and veterinary preparations; sanitary preparations for medical purposes; dietetic food and substances adapted for medical or veterinary use, food for babies; dietary supplements for humans and animals; plasters, materials for dressings; material for stopping teeth, dental wax; disinfectants; preparations for destroying vermin; fungicides, herbicides.

Goods class	Short description
6	Common metals and their alloys; metal building materials; transportable buildings of metal; materials of metal for railway tracks; non-electric cables and wires of common metal; ironmongery, small items of metal hardware; pipes and tubes of metal; safes; ores.
7	Machines and machine tools; motors and engines (except for land vehicles); machine coupling and transmission components (except for land vehicles); agricultural implements other than hand-operated; incubators for eggs; automatic vending machines.
8	Hand tools and implements (hand-operated); cutlery; side arms; razors.
9	Scientific, nautical, surveying, photographic, cinematographic, optical, weighing, measuring, signalling, checking (supervision), life-saving and teaching apparatus and instruments; apparatus and instruments for conducting, switching, transforming, accumulating, regulating or controlling electricity; apparatus for recording, transmission or reproduction of sound or images; magnetic data carriers, recording discs; compact discs, DVDs and other digital recording media; mechanisms for coin-operated apparatus; cash registers, calculating machines, data processing equipment, computers; computer software; fire-extinguishing apparatus.
10	Surgical, medical, dental and veterinary apparatus and instruments; artificial limbs, eyes and teeth; orthopedic articles; suture materials.
11	Apparatus for lighting, heating, steam generating, cooking, refrigerating, drying, ventilating, water supply and sanitary purposes.
12	Vehicles; apparatus for locomotion by land, air or water.
13	Firearms; ammunition and projectiles; explosives; fireworks.
14	Precious metals and their alloys; jewellery, precious stones; horological and chronometric instruments.
15	Musical instruments.

Goods class	Short description
16	Paper and cardboard; printed matter; bookbinding material; photographs; stationery; adhesives for stationery or household purposes; artists' materials; paintbrushes; typewriters and office requisites (except furniture); instructional and teaching material (except apparatus); plastic materials for packaging; printers' type; printing blocks.
17	Unprocessed and semi-processed rubber, gutta-percha, gum, asbestos, mica and substitutes for all these materials; plastics in extruded form for use in manufacture; packing, stopping and insulating materials; flexible pipes, not of metal.
18	Leather and imitations of leather; animal skins, hides; trunks and travelling bags; umbrellas and parasols; walking sticks; whips, harness and saddlery.
19	Building materials (non-metallic); non-metallic rigid pipes for building; asphalt, pitch and bitumen; non-metallic transportable buildings; monuments, not of metal.
20	Furniture, mirrors, picture frames; unworked or semi-worked bone, horn, ivory, whalebone or mother-of-pearl; shells; meerschaum; yellow amber.
21	Household or kitchen utensils and containers; combs and sponges; brushes (except paintbrushes); brush-making materials; articles for cleaning purposes; steelwool; unworked or semi-worked glass (except glass used in building); glassware, porcelain and earthenware.
22	Ropes and string; nets; tents, awnings and tarpaulins; sails; sacks; padding and stuffing materials (except of paper, cardboard, rubber or plastics); raw fibrous textile materials.
23	Yarns and threads, for textile use.
24	Textiles and substitutes for textiles; bed covers; table covers.
25	Clothing, footwear, headgear.
26	Lace and embroidery, ribbons and braid; buttons, hooks and eyes, pins and needles; artificial flowers.
27	Carpets, rugs, mats and matting, linoleum and other materials for covering existing floors; wall hangings (non-textile).
28	Games and playthings; gymnastic and sporting articles; decorations for Christmas trees.
29	Meat, fish, poultry and game; meat extracts; preserved, frozen, dried and cooked fruits and vegetables; jellies, jams, compotes; eggs; milk and milk products; edible oils and fats.

Goods class	Short description
30	Coffee, tea, cocoa and artificial coffee; rice; tapioca and sago; flour and preparations made from cereals; bread, pastries and confectionery; edible ices; sugar, honey, treacle; yeast, baking-powder; salt; mustard; vinegar, sauces (condiments); spices; ice.
31	Agricultural, horticultural and forestry products; raw and unprocessed grains and seeds; fresh fruits and vegetables; natural plants and flowers; live animals; foodstuffs for animals; malt.
32	Beers; mineral and aerated waters and other non-alcoholic beverages; fruit beverages and fruit juices; syrups and other preparations for making beverages.
33	Alcoholic beverages (except beers).
34	Tobacco; smokers' articles; matches.Tobacco; smokers' articles; matches.

Services class	Short description
35	Advertising; business management; business administration; office functions.
36	Insurance; financial affairs; monetary affairs; real estate affairs.
37	Building construction; repair; installation services.
38	Telecommunications.
39	Transport; packaging and storage of goods; travel arrangement.
40	Treatment of materials.
41	Education; providing of training; entertainment; sporting and cultural activities.
42	Scientific and technological services and research and design relating thereto; industrial analysis and research services; design and development of computer hardware and software.
43	Services for providing food and drink; temporary accommodation.
44	Medical services; veterinary services; hygienic and beauty care for human beings or animals; agriculture, horticulture and forestry services.
45	Legal services; security services for the protection of property and individuals; personal and social services rendered by others to meet the needs of individuals.

Appendix F

Documents

F.1 WO 2005/067785 A1

(12) INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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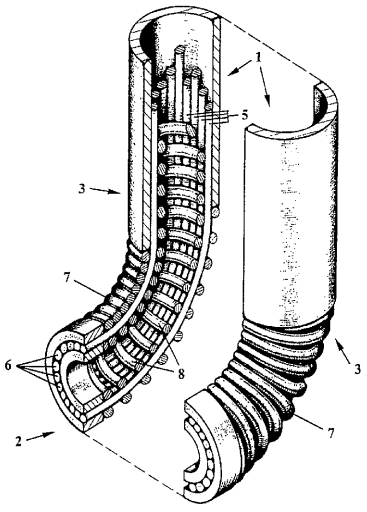
(54) Title: INSTRUMENT FOR FINE-MECHANICAL OR SURGICAL APPLICATIONS



(57) Abstract: The invention relates to an instrument for high-precision or surgical applications of a minimally invasive nature, comprising a distally positioned directable head, a shaft upon which the head is positioned, and a proximally positioned handgrip for operating the head, wherein a ring of cables comprising longitudinally extending cables connects to the head, wherein each cable of the ring of cables is disposed such that at least a part of both sides is in direct contact with another cable of the ring of cables, and wherein the cables are fixedly secured in the radial direction.

WO 2005/067785 A1

GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

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For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

Instrument for fine-mechanical or surgical applications

The invention relates to an instrument for high-precision or surgical applications of a minimally invasive nature, comprising a distally positioned directable head, a rigid, flexible, or semi-flexible shaft upon which the head is positioned, and a proximal end equipped for operating the head. This proximal end may be provided with, for example, a handgrip or a control (possibly motor-powered). In the latter case, this may also entail a computerised control. The high-precision applications include, for example, the inspection and repair of motors, machines, radiators or tubular systems.

Such an instrument is known for medical applications from, among others, the international patent application PCT/NL01/00552, published under no. WO 02/13682.

From this publication an endoscope is known, embodied with a distally positioned camera, fitted on an endoscope shaft, wherein proximally positioned means are provided for operating the camera. To realise the coupling of the operating means and the camera, use is made of a spring, which is comprised of a chain of in themselves closed, flexible elements wherein the elements of each pair of two adjacent elements as comprised in this chain are only partially connected with each other. Through these mutually connected elements traction wires are threaded through feed-through openings that are provided in the elements.

The known construction has several drawbacks. These drawbacks concern the fact that there is a limit to how small the elements forming the spring can be while still keeping the spring at a desirably low cost price. Another drawback is that when the camera is set at an angle to the shaft, the four traction wires used in the known construction establish preferred positions.

An object of the invention is to eliminate these problems and to allow the medical instrument to be constructed at low costs.

Corresponding to the preamble of claim 1, an instru-

ment of the kind explained above is known from US-A-2002/0177750, wherein a ring of cables comprising longitudinally extending cables connects to the head, which cables are fixedly secured in the radial direction. A disadvantage of this instrument is, however, that the cables are fed through guide-sleeves provided in the longitudinal direction of the cables and attached to an externally extending leaf spring. This construction is complex and expensive.

The instrument according to the invention is characterized in that each cable of the ring of cables is disposed such that at least a part of both sides is in direct contact with another cable of the ring of cables.

This instrument lends itself especially for surgical applications, as will become apparent from the following explanation. Of course, high-precision applications are equally well possible, and may be derived without inventive effort from the explanation given hereinbelow. It should be noted that other longitudinally extending elements, with which a closed ring can be formed, also fall within the scope of the term "cable" used in the invention. This relates, for example, to a ring of (hollow) tubes, or glass fibres to be mentioned hereinbelow. Similarly, it is not necessary for all of the cables to have the same dimensions. For example, cables having a completely round cross-section may be disposed next to cables having a banana-shaped cross-section.

The instrument according to the invention can be manufactured at exceptionally low costs since the cables may be thin steel cables of the kind normally available on the market. Such steel cables are available with a diameter of, for example, 0.2 mm. This means that if a central channel delimiting the ring of cables has a diameter of 0.2 mm, it is possible to manufacture a ring of cables having a minimum diameter of 0.6 mm. It is thus possible to realise a shaft diameter having a diameter of approximately 1 mm.

An essential aspect of the invention is that in the radial and tangential direction, the cables of the ring of cables are fixedly secured. Preferably, the cables comprising the ring of cables are over their whole length in direct con-

tact with neighbouring cables. This enables the cables of the ring of cables to absorb a pulling force as well as a pushing force, allowing the ring of cables to be used for the mechanical coupling of the head to a handgrip.

An important advantage of the instrument according to the invention is further that the same is without preferred positions with respect to the movement of the head in relation to the shaft.

For the mechanical coupling of the head to the handgrip any cable from the ring of cables may be employed. In a preferred embodiment, however, the instrument according to the invention is characterized in that the ends of at least some of the cables of the ring of cables possess a fastening to the head and to the proximal end. In this way the fastening can be constructed in a simple and consequently cheap manner, for example, by means of soldered connections or by using bolts provided in an endplate wherein the ends of the cables having a pulling function can be received.

An embodiment that is preferred when all of the cables provide the mechanical coupling of the head to the handgrip, is characterized in that the fastening is embodied as an interior ring and an exterior ring, which together delimit a slot for clampingly receiving the cables. This construction can also be used if only some of the cables of the ring of cables are received in the slot.

A simple and inexpensive embodiment of the instrument according to the invention for the fixedly securing the ring of cables is characterized in that the ring of cables is enclosed by an exterior spring lying against the cables of the ring of cables.

It is also possible for the ring of cables to be provided at its exterior side with a construction element selected from the group comprising glass fibres, cables, power cables, power cables surrounded by glass fibres, an optionally torsion-stiff tube or tubes, optionally with lateral scoring and optionally stranded, a bellows, a stent and a spring as specified in WO 02/13682.

For the internal retention of the ring of cables nu-

merous technical possibilities can be used. For example, a simple and effective possibility is to be found in the embodiment wherein the ring of cables is provided at its interior side with an interior spring lying against the cables of the ring of cables.

It is also possible for the ring of cables to be provided at its interior side with a construction element that is selected from the group comprising a bundle of glass fibres, a cable, power cables, a power cable surrounded by a ring of glass fibres, an optionally torsion-stiff tube or tubes, optionally with lateral scoring and optionally stranded, bellows, a stent and a spring as specified in WO 02/13682.

It is also conceivable that the construction element selected from this group is used in combination with an internal spring lying against the cables of the ring of cables. If such an internal spring is not used, the selected construction element itself must lie against the cables of the ring of cables.

If the construction element is a cable, it is advantageous that on the head of the instrument a grab jaw, scissors or clipping tongs be mounted and the cable be embodied as control cable therefor. This is especially useful for medical applications.

However, if the construction element comprises a power cable, it is advantageous for the instrument to be embodied with a camera mounted on the head, wherein the power cable serves for the power supply of said camera and/or for transporting image data obtained with the camera. Of course, it is also possible to use several power cables having separate functions. In addition, the power cable or power cables may serve for feeding a light source, such as an LED or the like. Glass fibres are also useful as light conductors, while they are at the same time able to serve as traction rope.

The instrument proposed in accordance with the invention, is preferably selected from the group comprising laparoscope, thoracoscope, colonoscope, gastroscope, bronchoscope, endoscope, catheter, surgical drill, uretheroscope,

laryngoscope, cystoscope, guidable endoscope, guidable drill, gripping tongs, clipping tongs, scissors, coagulation hook, and generally instruments for ear, nose and throat surgery, eye surgery, neurosurgery and brain surgery.

Hereinbelow the invention will be further elucidated by way of the drawing.

In the drawing:

- Fig. 1a shows a cut-away drawing of substantially the head of the instrument according to the invention;
- Fig. 1b shows a detail of a preferred embodiment of the fastening of the ring of cables;
- Figs. 2a and 2b show a longitudinal cross-section of an instrument according to the invention in the straight and bent condition, respectively;
- Fig. 3 shows a longitudinal cross-section of an alternative embodiment of the construction of the instrument according to the invention shown in Figs. 2a and 2b;
- Fig. 4 shows several alternative constructions for internally securing the ring of cables forming part of the instrument according to the invention.
- Figs. 5a and 5b show several alternative fastenings of the cables of the ring of cables, to be used at the head and/or the proximal end of the instrument according to the invention.

Similar components in the figures carry identical reference numerals.

With reference first to Figs. 2a and 2b, showing the main portion of a medical instrument selected from the group comprising laparoscope, thoracoscope, colonoscope, gastroscope, bronchoscope, endoscope, catheter, surgical drill, uretheroscope, laryngoscope, cystoscope, guidable endoscope, guidable drill, gripping tongs, clipping tongs, scissors, coagulation hook, instruments for ear, nose and throat surgery, eye surgery, neurosurgery and brain surgery.

Comparison between the Figs. 2a and 2b shows clearly that the instrument 1 possesses a distally positioned directable head 2, a shaft 3 on which a head 2 is positioned and a proximal end on which in this case a handgrip 4 is positioned

that serves for controlling the head 2.

Depending on the desired application, the head 2 may be provided, for example, with a grab jaw or a camera, as will be explained hereinbelow.

A detail of the instrument 1 near the head 2 is shown in the Figs. 1a and 1b.

Fig. 1a shows the shaft 3 and the head 2 positioned on the shaft 3 in two separate longitudinally extending halves. This illustrates that in this example shown, the shaft 3 possesses a shaft wall wherein a ring of cables 5 is contained that comprises cables 6 extending longitudinally in the shaft 3, as indicated with regard to a number of these cables in Fig. 1a. From Fig. 1a it is further clearly apparent that in the radial direction each cable 6 of the ring of cables 5 is fixedly secured. To this effect, the construction shown in Fig. 1a is provided with an external spring 7 disposed up against the cables 6 of the ring of cables 5 and an internal spring 8 lying against the interior side of the ring of cables 5 up against the cables 6 of the ring of cables 5.

The ring of cables 5 serves for the mechanical coupling of the head 2 with the handgrip 4 (see Figs. 2a and 2b).

Fig. 1b shows an exploded view of a means for realising a fastening 9 of cables 6 of the ring of cables 5 to the head 2 and the handgrip 4, respectively. The fastening 9 shown in Fig. 1b comprises an interior ring 10 and an exterior ring 11, which together delimit a slot 12 serving to clampingly receive the cables 6 of the ring of cables 5. As already mentioned in the introduction of this exemplary embodiment, this may, for example, be realised such that only every other cable 6 is received in the slot 12. In such a case other fastenings 9 are also feasible. Some non-limiting examples are shown in Figs. 5a and 5b.

Fig. 5a shows the fastening 9 wherein the ends of every other cable 6′ may be received in an endplate 13 in order to be fixed therein with soldering points 14. Between these fixed cables 6′ run so-called floating cables 6′′.

Fig. 5b shows the construction in which ends of the

cables 6' are received in an endplate 13 in order to be fixed therein with bolts 15.

With respect to the interior spring 8 serving to secure the cables 6 of the ring of cables 5 at the inside, alternative embodiments are also conceivable. Fig. 4 on the right, shows an embodiment in which the cables 6 of the ring of cables are internally delimited by a cable 16. This may be, for example, a traction rope, which serves to operate a grab jaw to be mounted on the head 2 of the instrument 1. In that embodiment, the traction rope 16 is able to undergo a longitudinal movement in relation to the adjacent cables 6 of the ring of cables 5. In a manner known to the person skilled in the art, the grab jaw may be equipped with a spring element to produce a counter-force to the force to be exerted by means of the traction rope 16, such that the grab jaw can be both opened and closed, depending on the position of the traction rope 16. It should be noted, that in the construction illustrated the traction rope 16 may also be used as pushing rope, so that the said spring element may be omitted. Since a person skilled in the art is acquainted with the character of such a grab jaw, a further constructive explanation is superfluous and is therefore omitted.

Fig. 4 on the left, shows an embodiment of the instrument 1 according to the invention wherein the traction rope 16 extends in the interior of an interior spring 8, which together with the exterior spring 7 ensures that the cables 6 of the ring of cables 5 are fixedly secured.

Apart from the just explained embodiment in which a traction rope 16 extends at the inside of the ring of cables 5, it is also possible to provide a power cable or power cables, or a power cable surrounded by a ring of glass fibres, or a tube or even a spring as specified in WO 02/13682. Another possibility is the application of a stent. Each of the above-mentioned possibilities has its advantages, which may be selected in accordance with the intended application. For example, the embodiment using the stent or using the spring known from WO 02/13682, possesses greater torsion rigidity in comparison with the embodiment using an internal spring.

The embodiment in which the construction element is a power cable, may advantageously be embodied with a camera mounted on the head 2, wherein the power cable, in a manner known to the person skilled in the art, serves to feed the camera and wherein said same cable or more additional power cables can be used for the transport of image data. It is also possible to use glass fibres, which are preferably applied in a ring around the power cable for conducting light for the image data to be recorded with the camera. The person skilled in the art is quite familiar with the manner in which this is to be accomplished, so that there is no need for further explanation.

With regard to the directability of the head 2, the working principle of the instrument 1 according to the invention may be explained quite simply by referring to the Figs. 2a and 2b.

It is, for example, possible to fasten a miniature camera to the head 2, with a feed cable for the camera and glass fibres for the conduction of light through the interior of the interior spring 8. The cables 6 of the ring of cables 5 are fixed with a fastening 9, which at the head side surrounds the interior ring 10 discussed with reference to Fig. 1b and the exterior ring 11. A similar construction is provided at the side of the handgrip 4. The fastening 9 is at the side of the handgrip 4 slidably accommodated therein.

The illustrated instrument 1 comprises four helical springs, i.e. a compression spring 17 directly behind the head 2, a draw spring 18 between shaft 3 and handgrip 4, a compensation spring 19 accommodated in the handgrip 4 and an interior spring 8 extending over the total length of the instrument 1. It should be noted that in the (straight) shaft 3, the interior spring 8 may be substituted by a tube.

The springs have the following functions:

- The draw spring 18 is embodied as closed draw spring so that the same is relatively rigid with respect to movements other than the desired bending movement. Along a portion of the circumference, the draw spring 18 is preferably glued to the shaft 3 or the handgrip 4, respectively, in

order to increase the torsion rigidity of the construction.

- The interior spring 8 is a weak spring whose function is to keep the cables 6 of the ring of cables 5 in position.

- The function of the compensation spring 19 is to in the straight condition compress the spring 17 positioned behind the head 2 until the same is closed. To this end the compensation spring 19 is slightly heavier than the compression spring 17.

The instrument 1 works as follows: bending the handgrip 4 causes the portion of the lower cables 6 of the ring of cables 5 indicated with arrow A to elongate. Because the portion of said cables 6 indicated with arrow B is unable to shorten due to the spring 17 being in the straight condition completely closed, the cables 6 in the portion of cables 6 indicated with C are caused to shorten. This makes the fastening rings 9 in the handgrip 4 move in the direction of the distal end while the upper cables 6 are paid out to give the compression spring 17 room to bend over a same angle as draw spring 18 does as a result of the handgrip 4 being moved.

Fig. 3 finally shows a schematic illustration of an embodiment of the medical instrument 1 according to the invention, wherein the compensation spring 19 shown in Figs. 2a and 2b in the handgrip 4 is omitted. When the handgrip 4 is being moved, the necessary length of the cables 6 must then be made available through compression of the spring 17 located behind the head 2, to which end the spring 17 must not be closed in the straight condition.

The study that resulted in the present invention was made possible by a grant from the Royal Dutch Academy of Sciences.

CLAIMS

1. An instrument (1) for high-precision or surgical applications of a minimally invasive nature, comprising a distally positioned directable head (2), a shaft (3) upon which the head (2) is positioned, and a proximal end (4) equipped for operating the head (2), wherein a ring of cables (5) comprising longitudinally extending cables (6) connects to the head (2), which cables are fixedly secured in the radial direction, **characterised** in that each cable (6) of the ring of cables (5) is disposed such that at least a part of both sides is in direct contact with another cable (6) of the ring of cables (5).

2. An instrument according to claim 1, **characterised** in that the ring of cables (5) is designed for mechanically coupling the head (2) to the handgrip (4).

3. An instrument according to claim 2, **characterised** in that the ends of at least some of the cables (6) of the ring of cables (5) possess a fastening to the head (2) and to the proximal end (4).

4. An instrument according to claim 3, **characterised** in that the fastening (9) is embodied as an interior ring (10) and an exterior ring (11), which together delimit a slot (12) for clampingly receiving the cables.

5. An instrument according to one of the claims 1-4, **characterised** in that the ring of cables (5) is enclosed by an exterior spring (7) lying against the cables (6) of the ring of cables (5).

6. An instrument according to one of the claims 1-5, **characterised** in that the ring of cables (5) is provided at its exterior side with a construction element selected from the group comprising glass fibres, cables, power cables, power cables surrounded by glass fibres, an optionally torsion-stiff tube or tubes, optionally with lateral scoring and optionally stranded, a bellows, a stent and a spring as specified in WO 02/13682.

7. An instrument according to one of the claims 1-

6, **characterised** in that the ring of cables (5) is provided at its interior side with an interior spring (8) lying against the cables (6) of the ring of cables (5).

8. An instrument according to one of the claims 1-7, **characterised** in that the ring of cables (5) is provided at its interior side with a construction element that is selected from the group comprising a bundle of glass fibres, a cable, power cables, a power cable surrounded by a ring of glass fibres, an optionally torsion-stiff tube or tubes, optionally with lateral scoring and optionally stranded, bellows, a stent and a spring as specified in WO 02/13682.

9. An instrument according to one of the claims 1-6 and 8, **characterised** in that the construction element lies against the cables (6) of the ring of cables (5).

10. An instrument according to claim 8 or 9 wherein the construction element is a cable, **characterised** in that on the head a grab jaw, scissors or clipping tongs are mounted and the cable is embodied as control cable therefor.

11. An instrument according to claim 8 or 9 wherein the construction element comprises at least one power cable, **characterised** in that a camera is mounted on the head and that the power cable serves for the power supply of the camera and/or for transporting image data obtained with the camera.

12. An instrument according to one of the preceding claims, **characterised** in that the same is selected from the group comprising laparoscope, thoracoscope, colonoscope, gastroscope, bronchoscope, endoscope, catheter, surgical drill, uretheroscope, laryngoscope, cystoscope, guidable endoscope, guidable drill, gripping tongs, clipping tongs, scissors, coagulation hook, and generally instruments for ear, nose and throat surgery, eye surgery, neurosurgery and brain surgery.

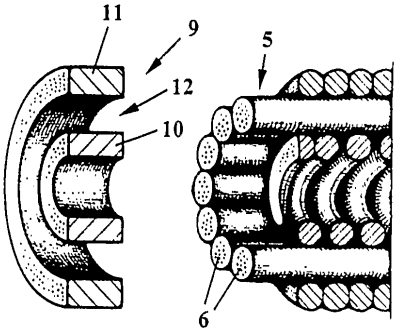

FIG. 1B

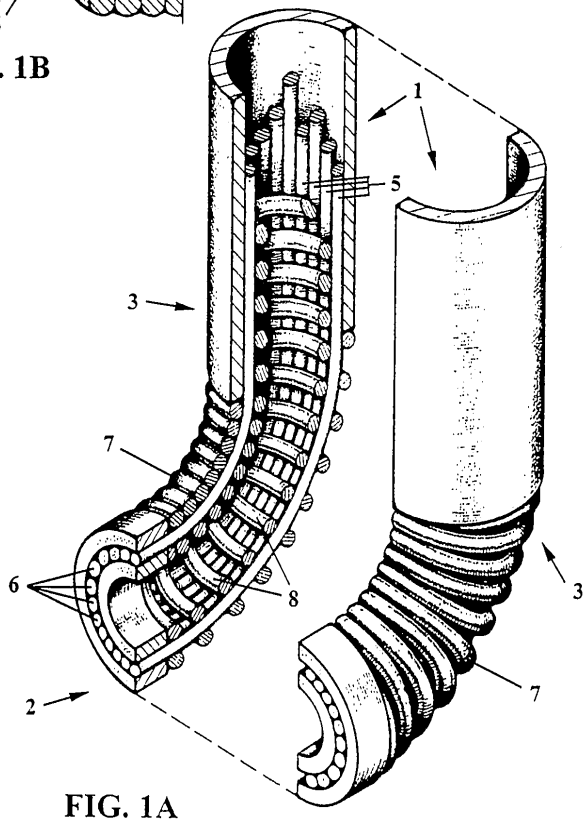

FIG. 1A

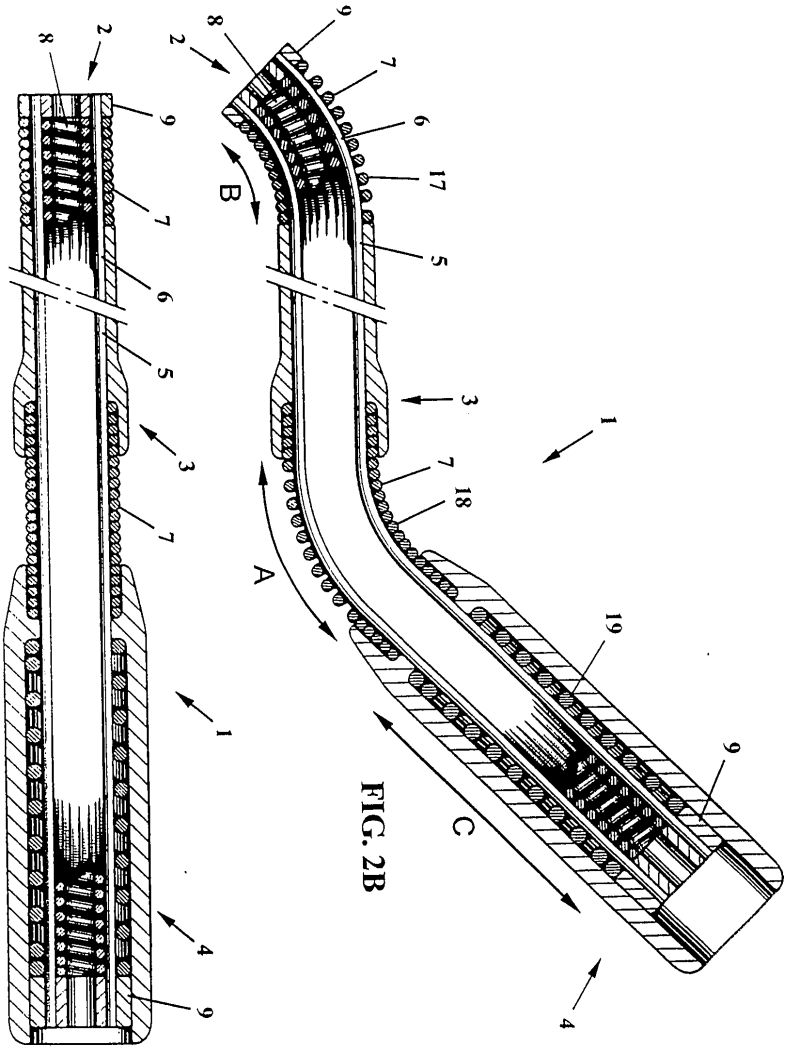

FIG. 2B

FIG. 2A

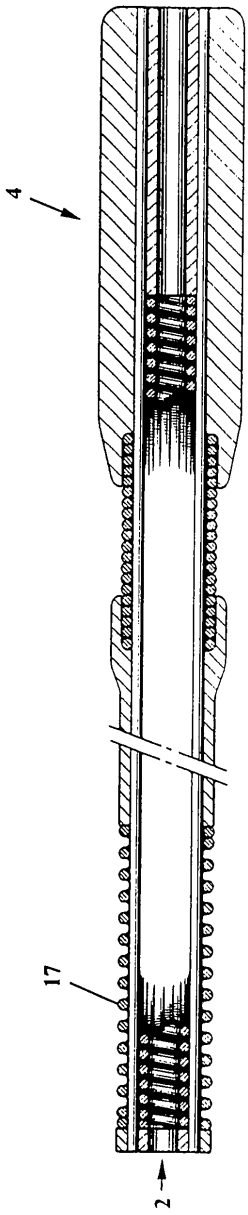

FIG. 3

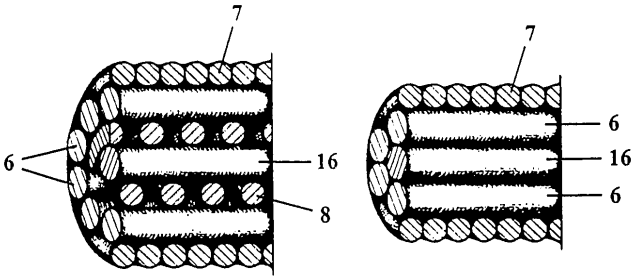

FIG. 4

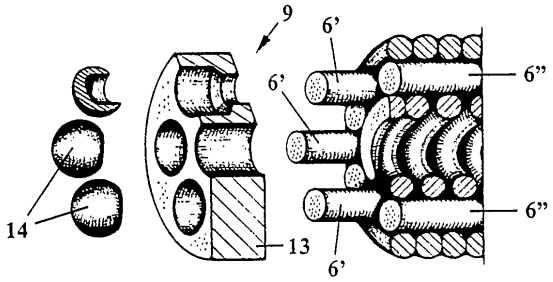

FIG. 5A

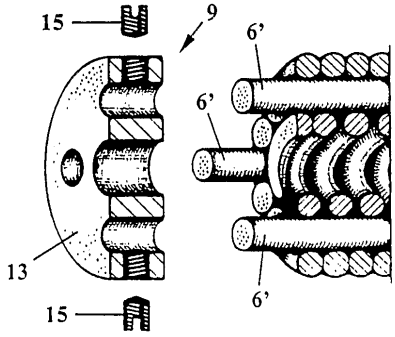

FIG. 5B

INTERNATIONAL SEARCH REPORT

Inte I Application No
PCT/NL2005/000001

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 A61B1/005 A61B17/28 A61M25/01

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 A61B A61M

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 2002/177750 A1 (PILVISTO TONIS) 28 November 2002 (2002-11-28) paragraph '0031! - paragraph '0036! paragraph '0042!; figures 1-3	1
A	WO 02/13682 A (HIROSE SHIGEO ; BREEDVELD PAUL (NL); UNIV DELFT TECH (NL)) 21 February 2002 (2002-02-21) cited in the application abstract; figures 1-5	1
A	US 4 149 391 A (DRIVER W B) 17 April 1979 (1979-04-17) abstract; figure 1	1
A	DE 28 20 239 A (OLYMPUS OPTICAL CO) 16 November 1978 (1978-11-16) page 12, paragraph 3; figure 11	1

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[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

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"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
14 April 2005	22/04/2005

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Moers, R

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INTERNATIONAL SEARCH REPORT

Inter al Application No
PCT/NL2005/000001

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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A	US 5 372 587 A (HAMMERSLAG GARY R ET AL) 13 December 1994 (1994-12-13) abstract; figures 9,24	1
A	US 3 498 286 A (KOESTER CHARLES J ET AL) 3 March 1970 (1970-03-03) abstract; figures 3-7	1

INTERNATIONAL SEARCH REPORT

Inter il Application No
PCT/NL2005/000001

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US 20020177750A1

(19) **United States**

(12) **Patent Application Publication** (10) **Pub. No.: US 2002/0177750 A1**

Pilvisto (43) **Pub. Date: Nov. 28, 2002**

(54) **ENDOSCOPE-TYPE DEVICE, PARTICULARLY FOR EMERGENCY INTUBATION**

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Austin, TX 78746 (US)

(21) Appl. No.: **10/041,709**

(22) Filed: **Jan. 8, 2002**

(30) **Foreign Application Priority Data**

Jan. 9, 2001 (DE)..... 101 00 533.4

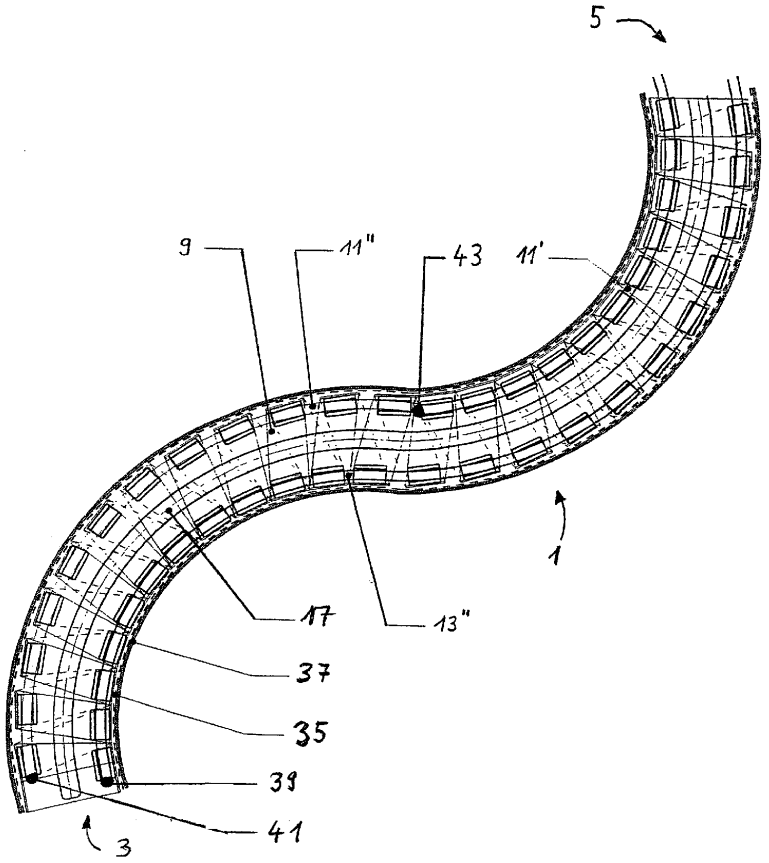
Publication Classification

(51) **Int. Cl.**[7] **A61B 1/00**

(52) **U.S. Cl.** **600/146**; 600/148

(57) **ABSTRACT**

The invention relates to an endoscope-type device, particularly an endoscope for emergency intubation, comprising a holding portion **(7)** and a shaft **(1)** which is configured to be flexible at least in partial areas, with at least two longitudinal bendable pulling and/or pushing elements acting on said shaft **(1)** in the axial direction at different distances from the proximal end, with said pulling and/or pushing elements extending as far as the proximal end and being lockably received in a fixing device, and with said endoscope-type device comprising an endoscope tip **(50)** whose movement is controllable via control means **(54)** and a control device **(52)** arranged in the proximal portion.



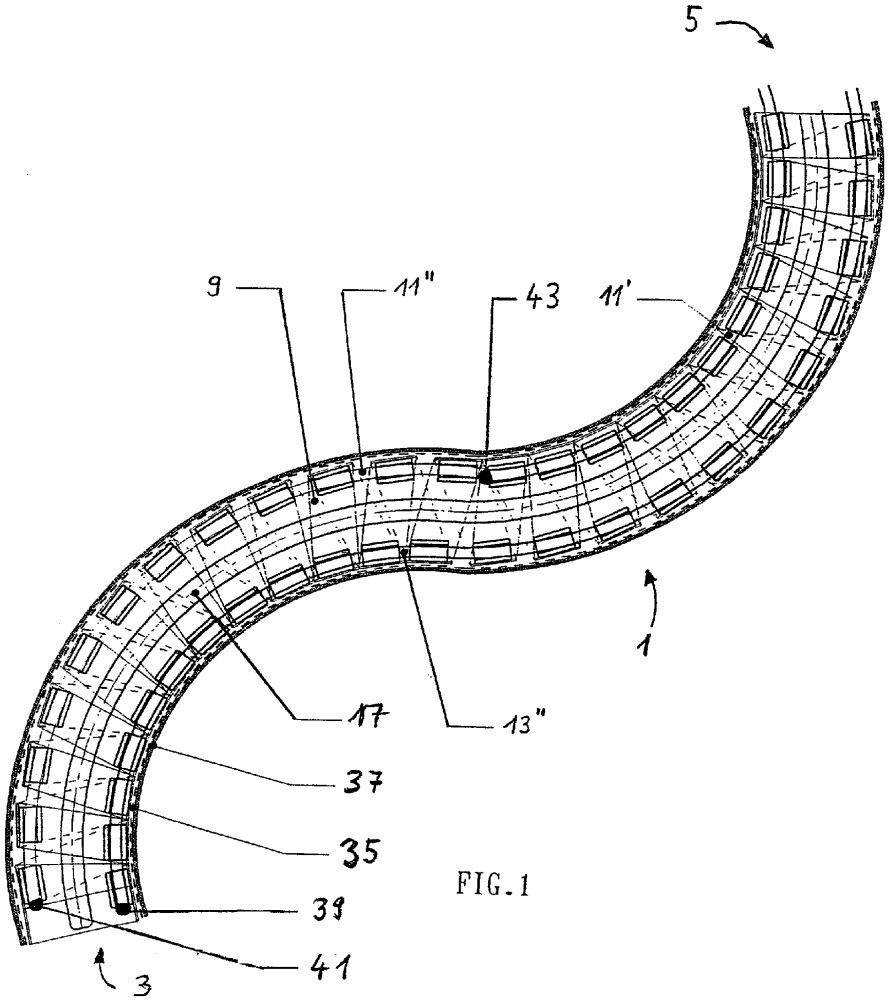


FIG.1

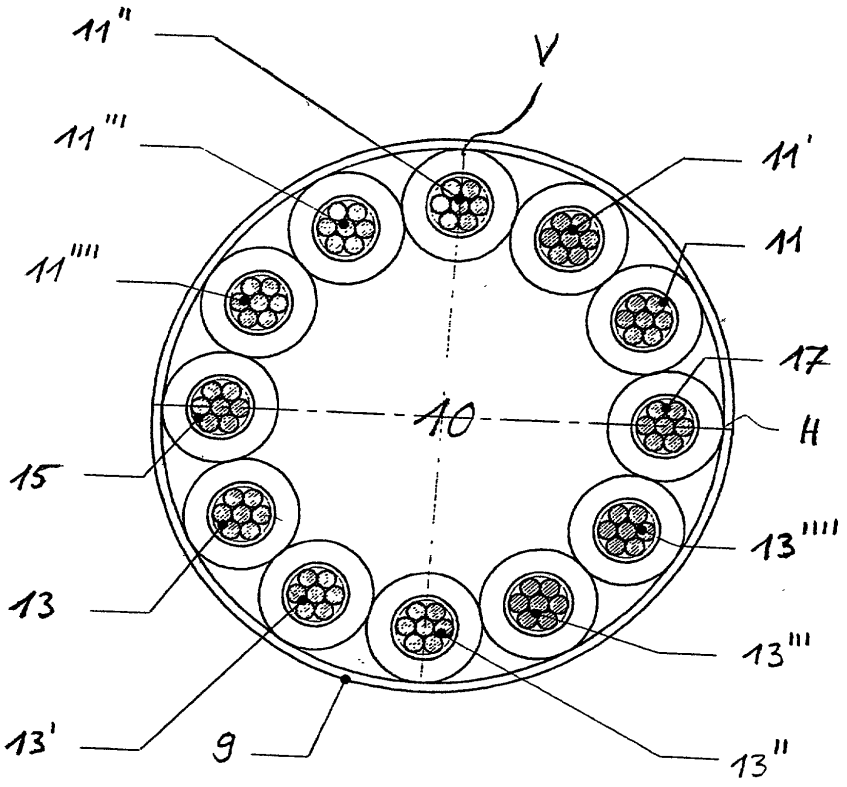


FIG.2

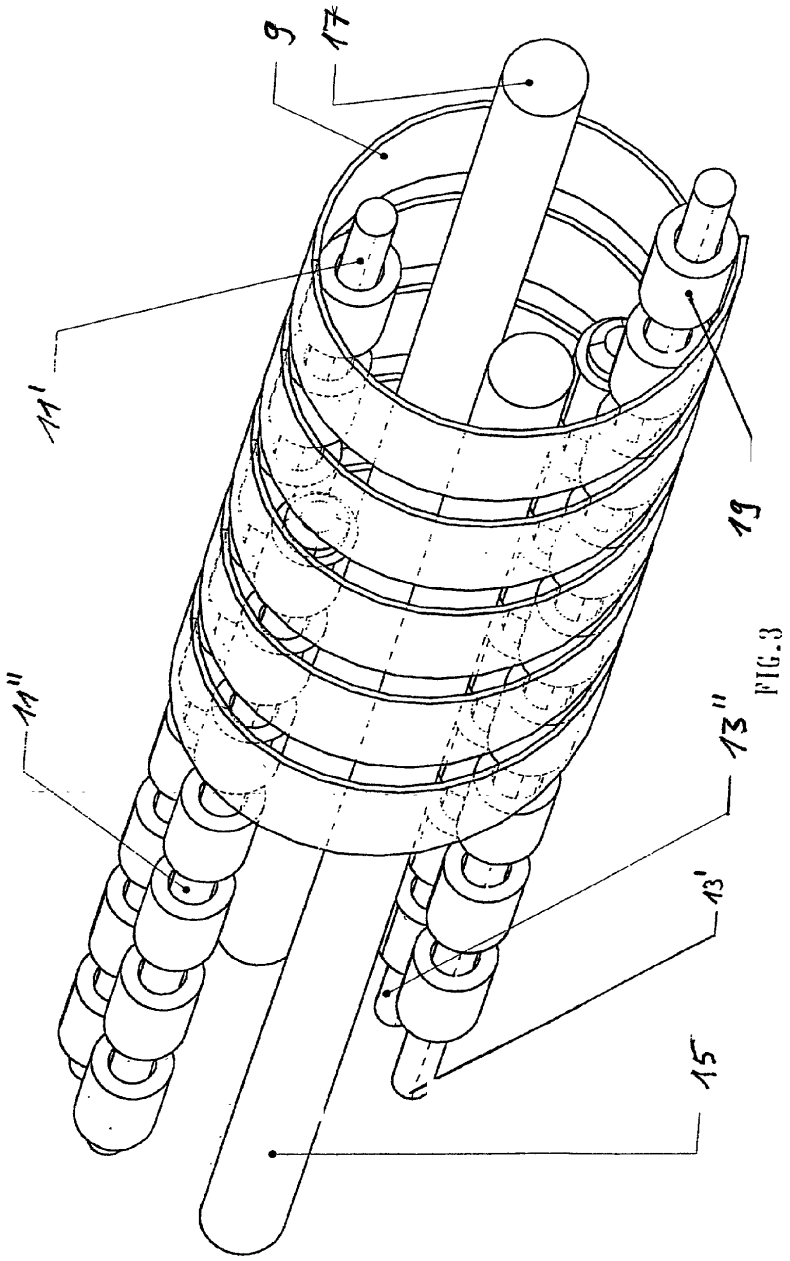


FIG.3

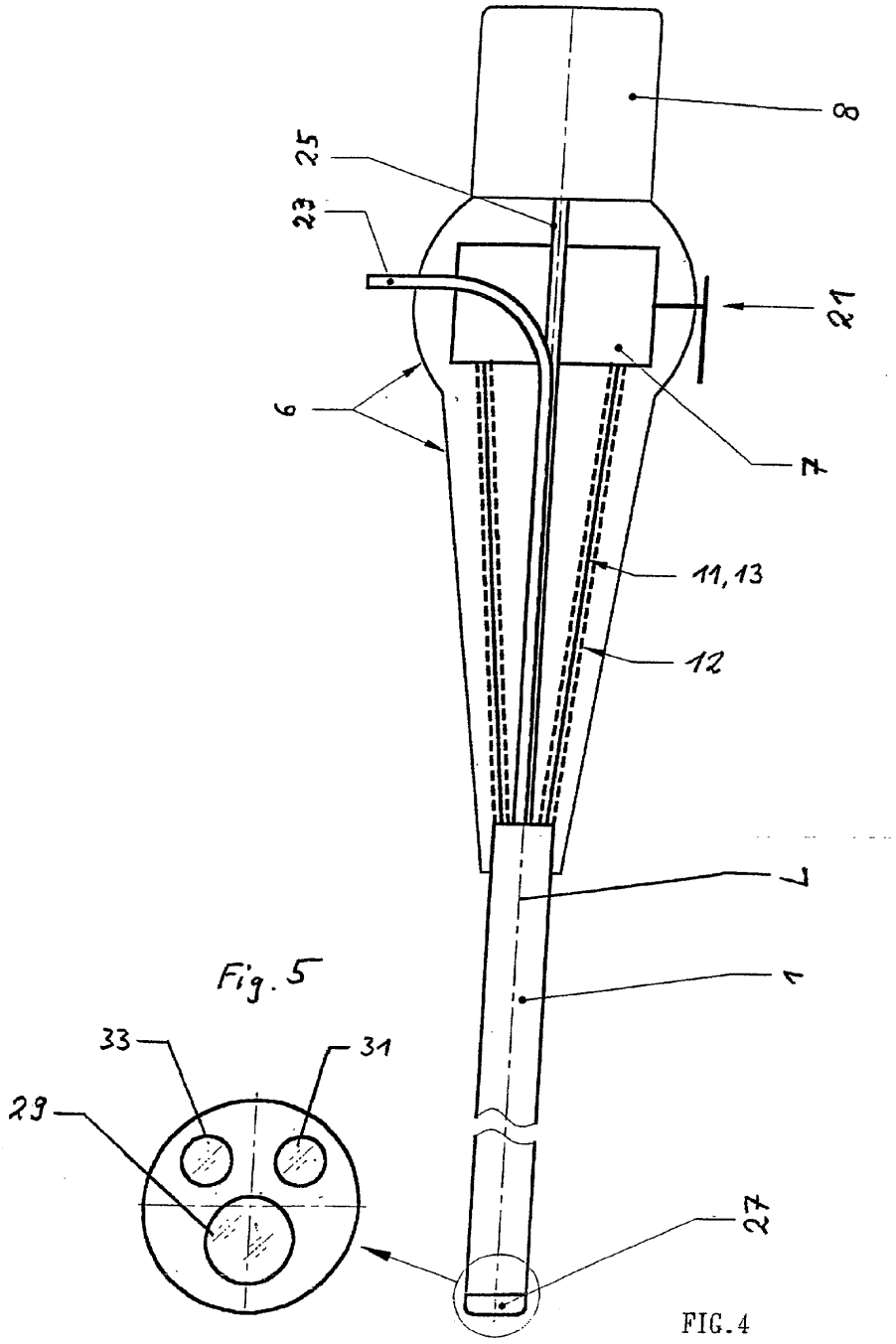


FIG.4

Fig. 5

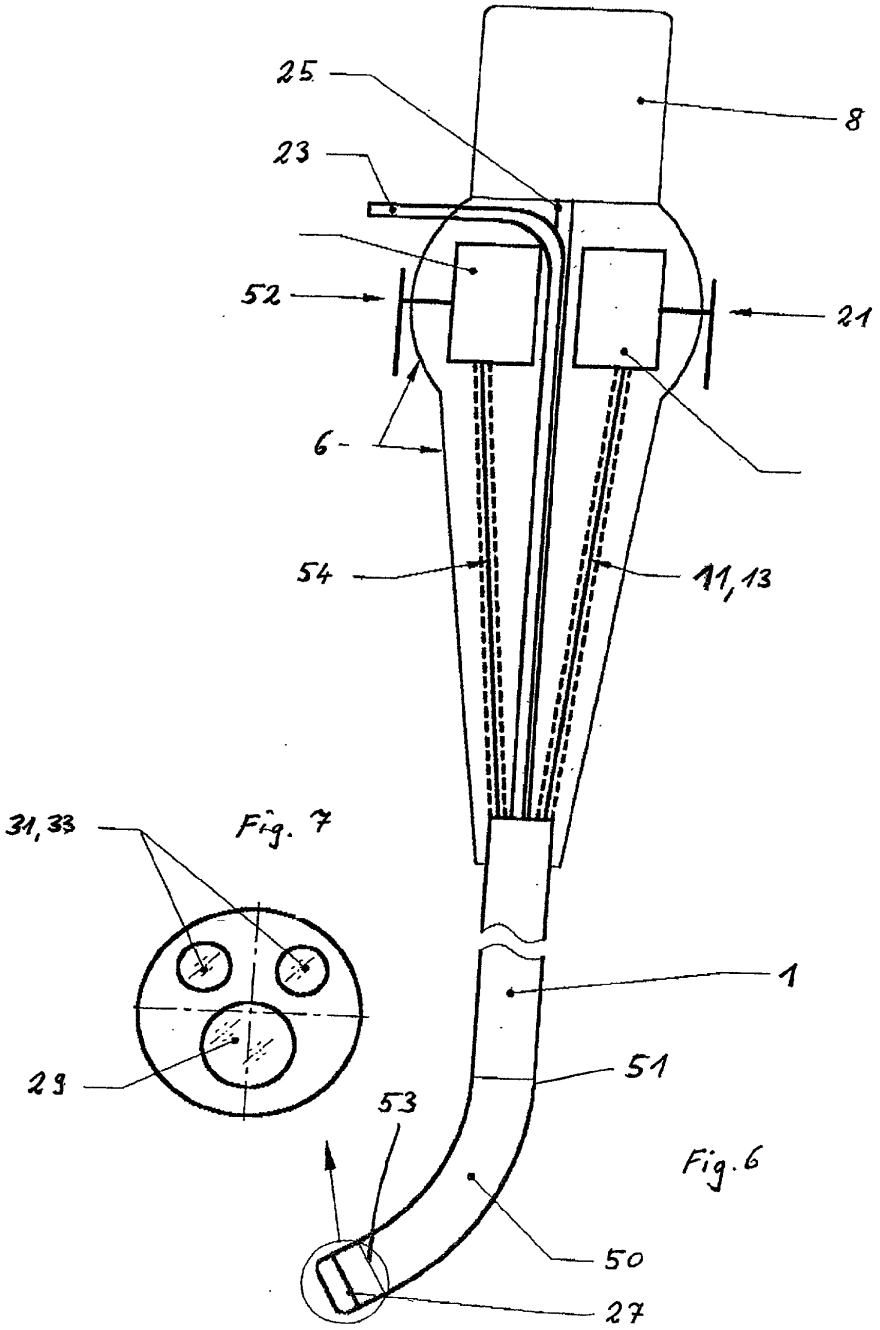


Fig. 6

Fig. 7

ENDOSCOPE-TYPE DEVICE, PARTICULARLY FOR EMERGENCY INTUBATION

[0001] The invention relates to an endoscope-type device according to the preamble of claim 1.

[0002] Devices of this kind are used in many different fields of application, such as medicine, for example endoscopy, particularly for emergency intubation, but also in engineering, for example as endoscope-type tools with an endoscope-type, flexible and formable shaft, and in general fields of application such as the controlled movement of extremities, particularly human extremities.

[0003] Intubation is the introduction of a tube (or a catheter) consisting of rubber or plastic material into the larynx and then into the trachea of the individual. It serves to maintain an effective exchange of gases, which is essential for providing organs with oxygen, among other things, and which is usually effected by respiration. In situations in which the patient is not capable of breathing himself any more as a result of an illness, an injury or medication, for example when a narcosis is carried out, artificial respiration has to be carried out. A prerequisite for this artificial respiration is a secure connection between the respirator and the patient's respiratory tract. In order to ensure that air is supplied to the respiratory organs only, without any air reaching the digestive tract via the esophagus, the tube is pushed with its distal end into the trachea via the mouth or the nose and is positioned there in such a way that both lobes of the lung are aerated. At the proximal end, the tube is connected with the tube system of the respirator via a standardized projection (connector).

[0004] If the tip of the tube is not positioned in the trachea, the lobes of the lung are not aerated. In this case, the blood flowing through the lung is not enriched with oxygen to a sufficient extent, and the organs are not provided with oxygen any more. Depending on how long the organs are not supplied with oxygen to a sufficient extent, apart from the complete restoration of all bodily functions, permanent cerebral injuries (such as a coma) or even death because of cardiac arrest might be possible. Faulty intubation, meaning those maneuvers of intubation in which the tube is not positioned correctly and the tip of the tube rests in the esophagus instead of the trachea, for example, will have the same consequences.

[0005] There are several methods and shapes of tubes to ensure secure positioning of the tip of the tube. With patients for whom no special anatomic or pathological conditions are to be taken into account, intubation is usually easy and fast to carry out with the usual methods, mainly the laryngoscopical intubation. However, difficulties may arise if there are pathological changes or anatomic peculiarities; in this case, the patient, who is not breathing any more, is subjected to artificial respiration by applying a combination of laryngoscopical intubation and fiber-optical intubation or by using devices employed specifically for this purpose.

[0006] In emergency intubation, which usually means the intubation of a person who has become unconscious and whose lung is liable to fill with water, it is necessary to supply air from outside as soon as possible in order to minimize the risk of lung injury.

[0007] In an emergency situation, i.e. at the site of the accident and usually not in a hospital, this is done by means of laryngoscopical intubation; here, using a laryngoscope, lifting the tongue root and the epiglottis, the patient's pharynx is opened in order to gain a good view on the entrance to the larynx, the rima glottidis. If the rima glottidis is only partially visible, it is difficult to introduce the tube. One manages by changing the shape of the tube in its longitudinal axis until the tip of the tube can securely reach the entrance to the trachea. By now, this has been done by internally splinting the tube by means of a guide rod in the form of a flexible wire sheathed with plastic material which is inserted therein, which is so stable after bending that it transfers its shape in the longitudinal axis to the elastic tube. It is displaceable in the longitudinal axis within the tube, so it may also project from the distal tube end with its soft tip. Depending on the anatomic conditions, the guide rod is bent in such a way that its tip can be pushed through the rima glottidis and the tip of the tube can then be positioned in the trachea by sliding it over the guide rod. If the rima glottidis is not visible because of anatomic difficulties, so the path of the tube or the guide rod cannot be watched when it is pushed forward, there is a higher risk of injuries and a markedly reduced hitting accuracy. Although there are special instruments which are to make it possible to see the rima glottidis even under difficult conditions, the view through the tube is often obstructed when they are used because of the narrow conditions. For this reason, in difficult cases, the application of laryngoscopical intubation is not favorable.

[0008] Therefore, in these cases, fiber-optical intubation is preferably applied, in which an endoscope of the type mentioned at the beginning is used in order to find the entrance to the trachea and to illuminate and make visible the area to be inspected. Furthermore, by means of a mechanism mounted on the holding portion of the endoscope, the position of the tip of the endoscope can be changed, and it can therefore be visibly pushed through the rima glottidis. The tube previously placed upon the tube of the endoscope is then pushed forward as far as into the trachea; then, the endoscope is pulled out of the tube which has been positioned correctly, and the tube is fixed to the patient's head and is connected with the respirator.

[0009] However, the fiber-optical method cannot be carried out optimally in all cases, either. It is particularly different if the patient is lying on his back and his musculature is slackened, because the tongue root falls back, thus blocking the path to the trachea. Furthermore, as one hand is required to guide the endoscope—usually by means of the surrounding tube—in fiber-optical intubation and a second hand is required to operate the mechanism of the endoscope, another person is necessary to lift the tongue root by means of a laryngoscope; however, such a person is not necessarily present in case of an emergency.

[0010] In the document EP 0 742 026 A, a flexible and simultaneously formable endoscope with a viewing lens was therefore suggested, over which a tube can be slid. Here, formability and flexibility was to be obtained by an articulated rod whose individual adjacent links with convex or concave surfaces could be tensed by tensional or compressive forces. What was disadvantageous, however, was that tests during manufacturing revealed that this principle is very complex because of the frictional forces which are difficult to control and that sufficient flexibility with simultaneously adjustable stiffness cannot be realized with this endoscope.

[0011] Thus, the object of the invention is to provide an endoscope-type device at low cost and in a simple manner, which overcomes the above-mentioned drawbacks and which comprises, at least partially, a formable and stiff shaft which, after releasing, changes into a flexible condition at least in these partial areas.

[0012] According to the invention, this object is achieved with the features of claim 1. By arranging longitudinal bendable pulling and/or pushing elements or their distal ends at the shaft at different distances from the proximal end, the shaft can manually be brought into a desired shape in the flexible, i.e. non-fixed condition, which becomes stiff by locking the pulling and/or pushing elements. Here, the pulling and/or pushing elements, which are limited at least in the pushing or pulling direction, act on the shaft, and the stability of the stiffness can be increased by a bilateral limitation. In spite of the fact that a pre-formed shape of the shaft has been locked, the introduction is made easier by the controllable tip of the endoscope, particularly in extreme situations or for physicians with less experience, because when introducing the device into the trachea—for example in case of an emergency intubation—the respective next section of the path ahead can be watched via the lens and the tip can be adjusted to the respective curves. As a result, for example even in case of rupture of the trachea, it is possible to compensate the existing displacement of the trachea ends (which might be several millimeters) at the point of rupture by moving the tip correspondingly and to guarantee an easy and fast introduction of a tube or a trachea catheter (slid over the shaft), even past such an extreme position.

[0013] In an advantageous embodiment of the invention, the tip of the device is controllable in only one plane to be moved up and down or to the left and to the right; advantageously, this movement can already be achieved with a small number of control means and the cross-section of the shaft within which the control means are housed can be maintained correspondingly small.

[0014] By rotating the entire device about its longitudinal axis, however, arbitrary directions or head positions can be reached, with such a rotation being possible in a specific range without causing an injury to the trachea even in case of emergency intubation. Of course, with corresponding dimensions, it is also conceivable to arrange further control means in the shaft up to the tip so that it is made possible to control the tip of the device in all directions, as is the case with conventional flexible endoscopes. As, in the preferred embodiment of the invention, the movability and formability may be limited to a movement within the same plane including the longitudinal axis of the device, too (for example, an S-shaped movement), as is the case with the controllability of the tip, the rigidity in other planes and thus the resistance to upsetting deformation or distortion is particularly high, especially in case of a rotation about the longitudinal axis of the device. In this case, the entire device constitutes a body which is naturally rigid or strong, thus resisting to movements in other directions.

[0015] In an embodiment of the invention, the pulling and/or pushing elements, for example steel strands, may be movably received in guide elements at the shaft in the longitudinal direction. Hereby, the stability of the rigidity is advantageously increased, as the path length of the pulling and/or pushing elements is defined exactly by the fact that the guide elements receiving the pulling and/or pushing elements are fixedly positioned.

[0016] In a further embodiment of the invention, seen from a cross-sectional view, the pulling and/or pushing elements are positioned in a ring-shaped arrangement within said shaft (**1**) at the inner periphery thereof, so their lever action and thus the stability of the rigidity, which increases with increasing distance from the center line, is advantageously improved.

[0017] In a further embodiment of the invention, lateral guide means are arranged inside the shaft which, seen in a cross-sectional view, are opposed to each other, and which are fixedly connected with the shaft at least in partial areas. Advantageously, this will prevent undesired bending of the shaft within the plane defined by lateral guide means.

[0018] In a further embodiment of the invention, the channel is configured as a channel for an optical light guide and an optical image guide or as a channel for instruments. Advantageously, this makes it possible to check and facilitate the arrival at an aiming point when the endoscope-type device is introduced into a non-visible portion.

[0019] In a further embodiment of the invention, pulling and/or pushing elements act on the shaft in pairs in the axial direction, substantially at equal distances from the proximal end. Hereby, as a result of the cooperation of pulling and pushing forces of a pair, stability may be increased. Such pairs of pulling and/or pushing elements may be arranged point-symmetrically at the shaft in order to advantageously exert the optimum stability in a freely movable shaft without any lateral limitation with their maximum distance from each other.

[0020] In case of lateral limitation to the movement, however, it may also be advantageous for an optimum effect of the forces to arrange pairs of pulling and/or pushing elements at the shaft to be symmetrical to the horizontal or the vertical axis, in other words: symmetrical to the plane defined by the lateral guide means, respectively.

[0021] Further advantageous embodiments of the invention are apparent from the dependent claims.

[0022] In the following, the invention is explained in greater detail with the aid of an embodiment shown in the drawings, in which

[0023] **FIG. 1** shows a longitudinal sectional view of a shaft of an endoscope-type device according to the invention;

[0024] **FIG. 2** shows a cross-sectional view of the shaft according to **FIG. 1**;

[0025] **FIG. 3** shows a perspective, schematic view of the structure of a partial portion of the shaft according to **FIG. 1**;

[0026] **FIG. 4** shows a lateral view in partial section of the endoscope-type device according to the invention;

[0027] **FIG. 5** shows a front view of the detail according to **FIG. 4**;

[0028] **FIG. 6** shows a lateral view in partial section of another embodiment of an endoscope-type device according to the invention; and

[0029] **FIG. 7** shows a front view of the detail according to **FIG. 6**.

[0030] FIGS. **1** to **5** show a first embodiment of the invention, which corresponds to the endoscope-type device of German patent application 199 32 022.5, which has not been published yet.

[0031] **FIG. 1** shows a shaft **1** of an endoscope-type device according to the invention with a distal end **3** and a proximal end **5**. Adjacent the proximal end **5** of the shaft **1**, a housing **6** with a holding portion **7** (see **FIG. 4**) and an eyepiece **8** as shown in **FIG. 4** is arranged.

[0032] As will be apparent from **FIG. 3**, the shaft **1** consists of a spring with a ring-shaped cross-section, particularly a leaf spring **9**, which extends from the proximal end **5** to the distal end **3** of the shaft **1**. The spring, the ring-shaped cross-section of which includes both the circular shape, the oval shape and the polygonal shape, is made of steel or plastic material, for example.

[0033] At the inner periphery or the inner wall of the leaf spring **9**, several—for example five—ropes **11** to **11**"" guided on top and five ropes **13** to **13**"" guided at the bottom and lateral guide means at the left side **15** and the right side **17** are arranged.

[0034] The cross-sectional distribution of ropes **11** to **11**"", **13** to **13**"", **15** and **17** shown in **FIG. 2** illustrates that the lateral guide means are positioned, when seen from a cross-sectional view, at the inner periphery of the leaf spring **9** in such a way that they lie opposite to each other in a horizontal mid-plane or are arranged on a horizontal center line H. Above and below the axis H, ropes **11** to **11**"" and **13** to **13**"" guided on top and at the bottom are arranged at the inner periphery, particularly at equal distances.

[0035] As will be apparent from **FIG. 2**, all ropes may be configured as strands, particularly made of steel or plastic material, with five leads, for example. The ropes **11** to **11**"" and **13** to **13**"" guided on top and at the bottom extend in guide elements **19** which may be configured to be ring-shaped and which are arranged at the inner periphery in the longitudinal direction and along a longitudinal axis in distances, particularly equal distances, corresponding to the turn or the convolution and the width of the leaf spring, for example by laser welding.

[0036] The ropes **11** to **11**"" and **13** to **13**"", whose outer periphery is of somewhat smaller dimension than the inner periphery of the guide elements **19**, are guided out of the proximal end **5** of the shaft in a first conically widened portion of the housing **6** shown in **FIG. 4** and extend as far as into the holding portion **7** arranged in the adjacent widened and conical portion. The diameter of the—seen from a cross-sectional view—ring-shaped arrangement of the guided ropes **11** to **11**"" and **13** to **13**"" increases from some millimeters, such as 3 mm in the area of the shaft (provided that the shaft **1** has an outer diameter of approximately 5 to 6 mm) to approximately the double value. In this area, the ropes **11** to **11**"" and **13** to **13**"" may extend within guide means, too—such as rigid guide means **12** shown in dotted lines in the drawing—in spite of the fact that the holding portion **7** is fixedly arranged in the housing **6**, so as not to exert pulling forces only, but also pushing forces.

[0037] In its first portion adjacent the proximal end **5** of the shaft **1**, the housing **6** is widened correspondingly and is configured to be conical, for example. Next to this first portion, the housing **6** continues to form a widened spherical portion with the holding portion **7**. In the first portion, the guided ropes **11** to **11**"" and **13** to **13**"" are guided in a rigid sleeve which is fixedly arranged in the housing.

[0038] In this holding portion **7**, a fixing mechanism is located which is not shown in greater detail in the drawings and which can be operated by an operating element, such as an operating lever **21**, in order to release the proximal ends of the ropes **11** and **13** so as to be movable in their longitudinal direction or to fix them. A fixing device of this kind may be configured as a guide plate arranged perpendicularly to the plane of the drawings, which contains holes with the corresponding geometry, e.g. circular, in one line or in two parallel rows in order to receive the ropes **11** to **13** so as to be movable in the longitudinal direction. Of course, the holes in the guide plate have a slightly larger inner diameter than the outer diameter of the ropes **11** to **11**"" and **13** to **13**"". In order to block or release the ropes in their longitudinal direction, a second guide plate which is configured to correspond to the first guide plate and is arranged adjacent to it, and whose holes are aligned in the releasing position, can be displaced with respect to the first plate via the operating lever **21**, for example. In this case, the rope ends are clamped in their respective longitudinal position. Thus, the operating lever **21** and the second guide plate, which acts as a clamping plate and can be displaced with respect to the first plate parallel thereto, provide a releasing and a locking position; in these positions, the operating lever and thus the clamping plate can be fixed via locking means or can be pre-stressed permanently in a position, particularly the fixing position, by means of a spring, for example, so as to be put into the releasing position only during the operation of the operating lever. At least in the portion in which they are capable of being displaced in the longitudinal direction inside the fixing device, the rope ends may be configured as rods or may be surrounded by rigid sleeves. Advantageously, this contributes to prevent deterioration or wear, such as splicing of the ends as a result of continued use.

[0039] As will be apparent from **FIG. 4**, in the area of the partially spherical section which is located adjacent the conical first section of the housing and which includes the holding element **7**, an optical light guide is guided from inside the housing to the outside so as to be connected to a light source which is not shown in the drawings. The cylindrical portion, which forms the proximal end of the housing and which has a smaller diameter than the spherical section, is configured as an eyepiece **8** (not shown in greater detail) for the operating personnel, such as the physician. This eyepiece **8** is connected with an optical image guide **25** which, like the optical light guide **23**, extends inside the endoscope to the distal end thereof.

[0040] At the distal end **3** of the endoscope or the shaft **1**, there is an endoscope head **27**, which is sealed off from the ambience like the entire shaft **1**.

[0041] As will be apparent from **FIG. 5**, the endoscope head includes an image lens **29** which is connected with the optical image guide **25** inside the shaft, and two light lenses **31** and **33**, which are connected with the optical light guide via a Y-connection in the interior of the shaft, which comprises a free space **10** (see **FIG. 2**) in the form of a channel, for example, in a manner which is not shown in greater detail.

[0042] As shown in **FIG. 1**, for reasons of stability, the leaf spring **9** is surrounded by an elastic net **35**, which consists of steel braiding, for example, and which is sheathed by a flexible sleeve **37** made of plastic material or rubber. This sleeve **37** seals off the shaft **1** and, as the case may be, also the head **27** from the ambience and, advantageously, reduces friction inside a tube or catheter at the same time.

[0043] As will be apparent from **FIG. 1**, the ropes **11** to **11**"" and **13** to **13**"" guided in guide elements along an axis parallel to the longitudinal axis L terminate at their ends opposite to the proximal end at different distances from the proximal end. Their end points are fixedly connected with the corresponding guide elements, for example by laser welding, or they have a larger head which projects from the corresponding guide element in the distal direction and serves as a stop means to this guide element in the proximal direction.

[0044] For reasons of clarity, only the ropes **11'**, **11"** and **13"** as well as their ends **43**, **41** and **39** are illustrated in **FIG. 4**. In the preferred embodiment shown in the drawing, the ropes are subdivided in pairs of approximately the same rope length, point-symmetrically or symmetrically with the axis H, for example; the pairs of ropes (such as **11**; **13**, **11'**; **13'**, **11"**; **13"**, **11'"**; **13'"** and **11""**; **13""**) are fixed to the shaft **1** or the leaf spring **9** at different distances from the proximal end **5** or form a stop means in the direction towards the proximal end **5**, i.e. in the pulling direction of the ropes.

[0045] The different fixing points may subdivide the shaft into sections of equal length; in the area which is likely to be subjected to strong bending forces by specific forms of use of the device, the distances may advantageously be chosen to be smaller in order to define the bending action more exactly. Contrasting to this, in parts which are likely to remain straight or parts in which no specific exact bending is desired, the distances may be made larger. As is apparent from **FIG. 1**, after clamping or fixing the rope ends, stiffening of the last shape chosen in the flexible condition will occur in the direction of fixing. Here, the rope lengths of ropes **11** to **11**"" and **13** to **13**"" are fixed, and thus also the distances of the fixing points, i.e. the respective rope ends **39**, **41**, **43** etc., from the distal end. Of course, the number of ropes and of fixing points may be increased in order to keep the possible extension or elongation between longitudinally adjacent fixing points within small tolerances. Furthermore, in the arrangement in pairs, stability is supported not only by the pulling force, but also by the pushing force of the respective partner of a traction rope. Moreover, the leaf spring **9**, too, has a certain tendency to subdivide the entire distance between two adjacent fixing points in the longitudinal direction into equal distances of adjacent turns or adjacent guide elements **19** in the longitudinal direction in this area, if possible.

[0046] As, in the embodiment illustrated, the endoscope-type device is to be used for emergency intubation, an S-shape is to be obtained for anatomic reasons, for example, which has to be given to a flexible tube or catheter which has previously been placed onto the shaft.

[0047] This S-shape is to be formed in one plane so that lateral forces can be exerted when introducing the device, too. To achieve this, in the embodiment, the lateral guide means **15** and **17** are not only connected to the shaft **1** or the leaf spring **9** at their end points—contrasting to the guided ropes **11** to **11**"" and **13** to **13**""—, but at several, advantageously all points at which they contact the leaf spring **9** along the longitudinal axis thereof. In this way, the opposite sides are neither extendable nor compressible along these axes in their length, so bending of the shaft **1** in the plane of the two lateral guide means **15** and **17**, i.e. in a plane perpendicular to the plane of the drawing **FIG. 1**, is avoided.

[0048] After the pharynx has been opened with one hand using a laryngoscope, the shaft **1** with the tube is introduced into the lung via the trachea with the other hand. If the previously formed S-shape should prove to be not ideal when introducing the device, it is possible to change the stable shape by releasing the fixing device using the operating lever **21** so that the portion which has already partially been introduced adjusts to the different S-shape. In this shape which has been adjusted to the anatomic conditions of the individual case, the device can be further introduced until the physician detects via the eyepiece **8** that the entrance to the lung has been reached. Then, the rigid S-form of the endoscope is changed by releasing the fixing device so that the endoscope, which is now flexible, or the shaft **1** thereof can be pulled out of the tube. There are no or only very small frictional forces between the flexible tube and the shaft **1** so that inadvertent extraction of the tube is avoided.

[0049] **FIGS. 6 and 7** show another embodiment of an endoscope-type device according to the invention, which—contrasting to the embodiment explained above—comprises a controllable tip **50**. This controllable tip **50**, which is shown in its bent position (bent to the left) in **FIG. 6**, extends from the dividing line **51** to the dividing line **53**, so the shaft **1** of the endoscope does not directly merge into the endoscope head **27** like in the embodiment explained above, but there is the controllable endoscope tip **50** between the end of the shaft **1** (dividing line **51**) and the beginning of the endoscope head **27** (dividing line **53**). This tip is substantially shorter in its longitudinal dimension in relation to the length of the shaft **1** of the endoscope; this relation may be approximately 1:10, for example, with a tip length of 2 to 4 cm, particularly 3 cm, and a shaft length of 30 to 40 cm, for example.

[0050] The length of the shaft corresponds to the length of a commonly used tube, for example a trachea catheter, which is to be used in an emergency intubation. Advantageously, the tip **50** may project from the catheter which has been placed upon the shaft **1**, as the catheter is relatively rigid in such a short portion (2 to 4 cm) and would impede a movement of the endoscope tip **50** to a considerable extent or would even make it impossible. The movement of the endoscope tip **50** via control means which are configured as traction wires **54** of a Bowden wire device, for example, and which are only shown schematically in the drawings, is effected via a control device arranged in the proximal portion, which may be configured as a control lever **52**; this control or the movability of the endoscope tip **50** may be effected by conventional mechanisms of the type used for controlling the shaft of flexible endoscopes.

[0051] As for the rest, this further embodiment is configured like the embodiment explained above, apart from the controllable tip and from the means **52**, **54** to control it, so this embodiment has all the advantages of the aforesaid embodiment and is additionally controllable in the small tip

portion because of the configuration of a controllable tip **50**. Advantageously, in extreme cases such as a strongly bent trachea or a trachea with a rupture, a person handling the device, usually the emergency physician, can therefore make control movements at the tip when introducing a catheter placed upon the shaft **1**, so introducing the catheter is made easier.

[**0052**] This makes it possible in case of a torn trachea, for example, which is displaced by several millimeters—5 to 10 mm, for example—at the point of rupture, to compensate this displacement when introducing the endoscope or during intubation by correspondingly moving the endoscope tip **50** via the lever **52** and then easily and quickly introducing the tip and thus the catheter placed upon the shaft **1** into the displaced portion of the trachea.

[**0053**] However, this flexible controllable tip **50** also makes it considerably easier for less experienced physicians to introduce an air catheter, particularly when treating patients in an emergency situation, because during the introduction, the path taken inside the potentially injured trachea can be watched at any time via the eyepiece, and the tip **50** can be adjusted to unexpected or extreme situations accordingly. Because of the small dimensions of the flexible controllable tip **50**, which of course cannot be fixed—as is the case with conventional flexible endoscope shafts—and thus be brought into a rigid condition (to act against forces and pressures occurring when introducing the device) like the shaft **1**, the advantages of a fixable rigid shaft **1** explained above for the first embodiment are maintained, namely, manual bending of the shaft **1** into a corresponding shape (by a person handling the device, particularly an emergency physician), fixing the shaft in this shape so that no upsetting deformation (and, as the case may be, damage to the device, for example, the lens) of the shaft **1** may occur during the introduction thereof, and changing this rigid condition again in order to pull the endoscope out of the catheter introduced as easily as possible and with minimum friction, or changing this condition during the introduction (thus making it possible to adjust the device to the existing shape of the trachea) and fixing the shaft **1** again in this adjusted condition, in order to make it possible to exert further pressure or force substantially in the longitudinal direction, i.e. the direction of introduction of the endoscope with the catheter without the danger of any upsetting deformation of the shaft **1**.

[**0054**] In the preferred embodiment, the endoscope tip **50** is pivotable in one plane only, such as in the plane of the drawing, as shown, to be pivotable upwards and downwards or to the left and to the right; advantageously, this movement can already be achieved with a small number of control ropes **54** and the cross-section of the shaft **1** and the tip **50** can be kept correspondingly small. By turning the entire device about its longitudinal axis, however, arbitrary directions can be reached, with such turning being even possible within a certain range without causing damage to the trachea when the device is used in emergency intubation. Of course, it is also conceivable to arrange additional control ropes **54** in the shaft **1** of the endoscope up to the tip **50**—provided that the device has corresponding dimensions—so that controllability of the endoscope tip **50** in all directions like in conventional flexible endoscopes is made possible. As, in the preferred embodiment of the invention, the capability of the shaft **1** to be formed can be limited to a movement within the same plane (such as an S-shaped movement) like the controllability of the tip **50**, the rigidity in other planes and thus the resistance to upsetting deformation or distortion, particularly if the device is rotated about its longitudinal axis, is particularly high.

[**0055**] The invention is not limited to endoscopy, particularly emergency intubation, but may be applied to all endoscope-type devices. It is pointed out explicitly that this term is to be interpreted broadly according to the invention; for example, bendable shafts in technology relating to tools, particularly for extending screw drivers, drills and the like, and bendable links which are configured to be flexible or bendable at least in partial portions and in which stiffening to an arbitrary predetermined shape is desired, are to be included in this definition. Advantageously, the formability and flexibility described above may exist along the entire shaft **1**. The rigidity in the fixed position makes it possible to obtain a pre-formable structure which is subsequently resistant to pressures and forces which occur when the device is introduced into a trachea, for example, so that a potentially resulting upsetting deformation can be avoided. Contrasting to flexible endoscopes with a controllable shaft, such as a bronchoscope, the rigid shape is maintained once it has been taken (until the fixing device is released) so that damage by upsetting deformation, such as damage to the lens, and expensive repairing, which might cost several thousand German Marks, can be avoided.

1. An endoscope-type device, particularly an endoscope for emergency intubation, comprising a holding portion **(7)** and a shaft **(1)** which is configured to be flexible at least in partial areas

characterized in that

at least two longitudinal bendable pulling and/or pushing elements act on said shaft **(1)** in the axial direction at different distances from the proximal end, with said pulling and/or pushing elements extending as far as to the proximal end and being lockably and releasably received in a fixing device and

that said endoscope-type device comprises a tip **(50)** of the endoscope, whose movement is controllable via control means **(54)** and a control device **(52)** arranged in the proximal portion.

2. A device according to claim 1, characterized in that said shaft **(1)** has a ring-shaped cross-section and is configured as a leaf spring **(9)**.

3. A device according to claim 1 or **2**, characterized in that said pulling and/or pushing elements are configured as ropes which are substantially rigid in the longitudinal direction.

4. A device according to one of the preceding claims, characterized in that said pulling and/or pushing elements are received within said shaft **(1)** in guide elements **(19)** in such a way that they are movable in the longitudinal direction.

5. A device according to one of the preceding claims, characterized in that, seen from a cross-sectional view, said pulling and/or pushing elements are positioned in a ring-shaped arrangement within said shaft **(1)** at the inner periphery thereof.

6. A device according to one of the preceding claims, characterized in that said pulling and/or pushing devices act upon said shaft **(1)** in such a way that they are limited to the pulling and pushing directions.

7. A device according to one of the preceding claims, characterized in that lateral guide means are arranged inside said shaft **(1)** which, seen in a cross-sectional view, are opposed to each other, and which are fixedly connected at least in partial areas.

8. A device according to one of the preceding claims, characterized in that said shaft **(1)** comprises a channel **(10)** in the interior.

9. A device according to claim 8, characterized in that said channel **(10)** is configured as a channel for an optical light guide **(23)** and an optical image guide **(25)** or as a channel for instruments.

10 A device according to one of the preceding claims, characterized in that said pulling and/or pushing elements engage said shaft **(1)** in pairs in the axial direction at substantially equal distances from the proximal end.

11. A device according to one of the preceding claims, characterized in that the ends of said pairs of pulling and/or pushing elements are arranged at said shaft **(1)** point-symmetrically or symmetrically with the horizontal H or vertical axis V.

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F.3 Copy from Benelux trademark register

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Trademark information

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Status	Trademark registered

Trademark

Representation of the mark	DEAM
Type	Word mark
Kind	Individual trademark

Goods and services

List of goods and services

Cl 10 Chirurgische apparaten en instrumenten; Tandheelkundige apparaten en instrumenten; Medische apparaten en instrumenten.

Cl 42 Wetenschappelijke en technologische diensten; Onderzoek met betrekking tot technologie; Wetenschappelijke diensten en ontwerp met betrekking tot genoemde diensten; Technologische diensten en technologisch ontwerp; Wetenschappelijk onderzoek.

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