Metal-sound-pipe for medical purposes / [Franz Kuhn].

Contributors

Kuhn, Franz.
Phillips, Robert E.

Publication/Creation

London : Printed for Her Majesty's Stationery Office by Darling and Son, Ltd, 1896.

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Wellcome Collection
183 Euston Road
London NW1 2BE UK
T +44 (0)20 7611 8722
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N° 15,231 A.D. 1896

Date of Application, 9th July, 1896—Accepted, 15th Aug., 1896

COMPLETE SPECIFICATION.

Metal-sound-pipe for Medical Purposes.

I, FRANZ KUHN of Giessen, in the Empire of Germany, Physician, do hereby declare the nature of this invention and in what manner the same is to be performed to be particularly described and ascertained in and by the following statement :—

The metal-tube which is the object of the present invention and which is represented in the accompanying drawing, is distinguished from other instruments, used hitherto for similar purposes, by the following facts :—

(1.) The present sound-pipe owing to its peculiar principle, meets all requirements for which, till now, special instruments have been employed made of different substances and on entirely different principles, whereas this one is more durable, simpler and more modern. It takes the place of any kind of bougie and may be substituted for those pipes which are made of silk tissue impregnated with resin, or of hard or soft gum and such like.

(2.) By the principle of this invention, the use of such instruments, will become more general and may be more widely applied, as new questions relating to medicine can be thereby solved and new fields can be opened to scientific investigation. Compared with the pipe, at present employed in medicine for various purposes, the advantages of my metallic tube are :—

(1.) It possesses very great flexibility, making it preferable to any other, even to those of india-rubber ; at the same time its flexibility may be changed at the desired moment, even after introduction into the body, by the help of apparatuses introduced into the sound-pipe.

Thus, for the first time, the safety conferred by the use of the softest pipe is combined with the precision of the most rigid instruments and this double advantage is obtained in the same pipe at any moment, during or after introduction.

(2.) The new pipe affords an adjustable mobility hitherto unobtainable as well as an optional impressionability in curves and in the direction given to the instrument at any part of its progress, this also being accomplished by mechanical means.

(3.) The metallic-tube or sound-pipe does not break and does not bend at an acute angle as do all instruments used for similar purposes ; its interior is always open and accessible. Moreover it lasts a long time.

(4.) The interior walls of the hollow tube are smooth and slippery because they are of metal. The friction being thus rendered very slight, even in case of curvature, all kinds of instruments may be introduced, for the most various purposes, into the inside of the sound-pipe and for a considerable extent, which is not the case with the flexible pipe now in use. In case of necessity, instruments may, without danger, be introduced beyond the pipe.

(5.) The spiral sound-pipe permits the transmission, from one of its extremities to the other, of different forces without changing its shape and position and independently of bends and flexions, which is an advantage offered by no other sound-pipe.

(6.) The tube is capable of rotation on its own axis, whatever may be its position and its shape, a great advantage hitherto unobtainable, especially in operating upon delicate organs and in many other cases. This rotation can be effected at great distances, thus enabling internal organs, far removed, to be reached, such, for instance, as the pylorus and the small intestines.

[*Price* 8*d*.]

(7.) The tube enables an examination to be made of the internal organs (the stomach and intestines) which has never been possible hitherto, namely a combined examination or inspection, that is to say its multiple transmission of force allows the doctor to introduce, so to speak, a finger into the depths of these organs; naturally, accessory appliances are required for this purpose.

(8.) The tube offers improved facilities for injecting into or withdrawing from the body, water or gases, and also, for the first time, a simultaneous combination can be effected for the transmission of air and water along with instrumental manipulations, which must prove very useful in diagonising.

(9.) The tube is capable of being sterilised in all cases according to modern principles; only a certain number of bougies or sound-pipes at present in use, can be so treated and that very imperfectly.

(10.) The pipe is the only one that permits the Rontgen rays to be utilized in exploring the human abdomen, seeing that the course of the intestine may be recognized by the course of the spiral tube photographed.

The metal-tube or pipe is composed of metal wire or metal strips in narrow spiral turns, of varied transverse section and of different thickness. To make the walls air- and water-tight and to facilitate the sliding, india-rubber threads may be inserted between the turns or they may be covered with india-rubber.

The handling of the tube is of course the same as in using the instruments at present employed for similar purposes. A characteristic peculiarity, of the new is the power of rotating on its own axis, which rotation is communicated by hand at the moment of its introduction, without regard to shape or curves. It will be readily understood that the introduction of the new sound-tube into certain organs will be effected under technical conditions of a special nature and perhaps with special accessory instruments and the latest discoveries of science according to the different method of employment. All the cavities or canals, whether physiological or artificial, of the body, can be probed, especially the digestive canal.

The metallic-tube which is the object of the present invention, is represented in the accompanying drawing, in simple and compound varieties. In the longitudinal sections of the tube shewn in Figs. 1, 2 & 3 (*a*) is a wire wound in spiral form; (*b*) a flat bar rolled spirally and (*c*) a grooved sheet-metal strip twisted; (*d*) is the metallic-tube covering and (*e*) a second case introduced to guide or prolong the outer spiral.

In the metallic-tube shewn in Fig. 4 there is a thinner extension introduced and so arranged as to lengthen the tube or guide it, in cases where the larger (exterior) one would encounter an obstacle inside the body or would touch an ailing part in its passage or to influence the tube with regard to its position, its direction, its rigidity or its curvature.

In Fig. 5 for the guiding of the tube in case it would be necessary to introduce it further than the extremity of the stomach (*l*) as for example through the pylorus (l^{I}) to the digestive canal (l^{II}); it is provided with a guide or rod (*f*) as a distant part.

For the simultaneous rinsing, with water or otherwise, of the place reached by the tube there is shewn at Fig. 6 a bifurcation (*g*) with bifurcation-tube (*h*). (*i*) is a port or opening placed at the closed lower extremity. Figs. 6^{A} and 6^{B} are variations in one end of the metal-tube with port or opening.

The bifurcation (*g*) specially serves for the simultaneous operation of water-rinsing and mechanical manipulation, Fig. 7 represents the tube for the rectification of an intestinal stoppage. Fig. 8 represents the metallic tube serving as a simple bougie.

Fig. 9 shews the way in which a foreign body in the stomach or the intestines, or lodged in the passage of a wound, may be seized and withdrawn with the help of the instrument used for this purpose.

Fig. 9^{A} represents the adaptation of a ball (*m*) which is inflated and directed by means of an interior metal tube.

Fig. 10 represents the tube in the form of a catheter.

Fig. 11 is a metallic-tube used for fistules, the passages of wound or of bullets, and terminating in a point.

After having introduced the smooth tube into a wound opening, a mucuous membrane or any other canal, a mechanical enlargement of the tube may be effected (see Fig. 12) by the introduction of an apparatus which can be extended from the outside and on withdrawing the tube, in its altered shape, all the foreign bodies in the way of the enlargement will be drawn out with it.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is :—

(1.) A flexible metallic-tube for medical purposes made in spiral windings, turning on its own longitudinal axis for medical probing of all organs in a living human body or for analogous purposes.

(2.) In a metallic tube, as described in Claim 1, the introduction, for guiding or for other purposes, of spiral bars or spiral tubes inside the metallic-tube.

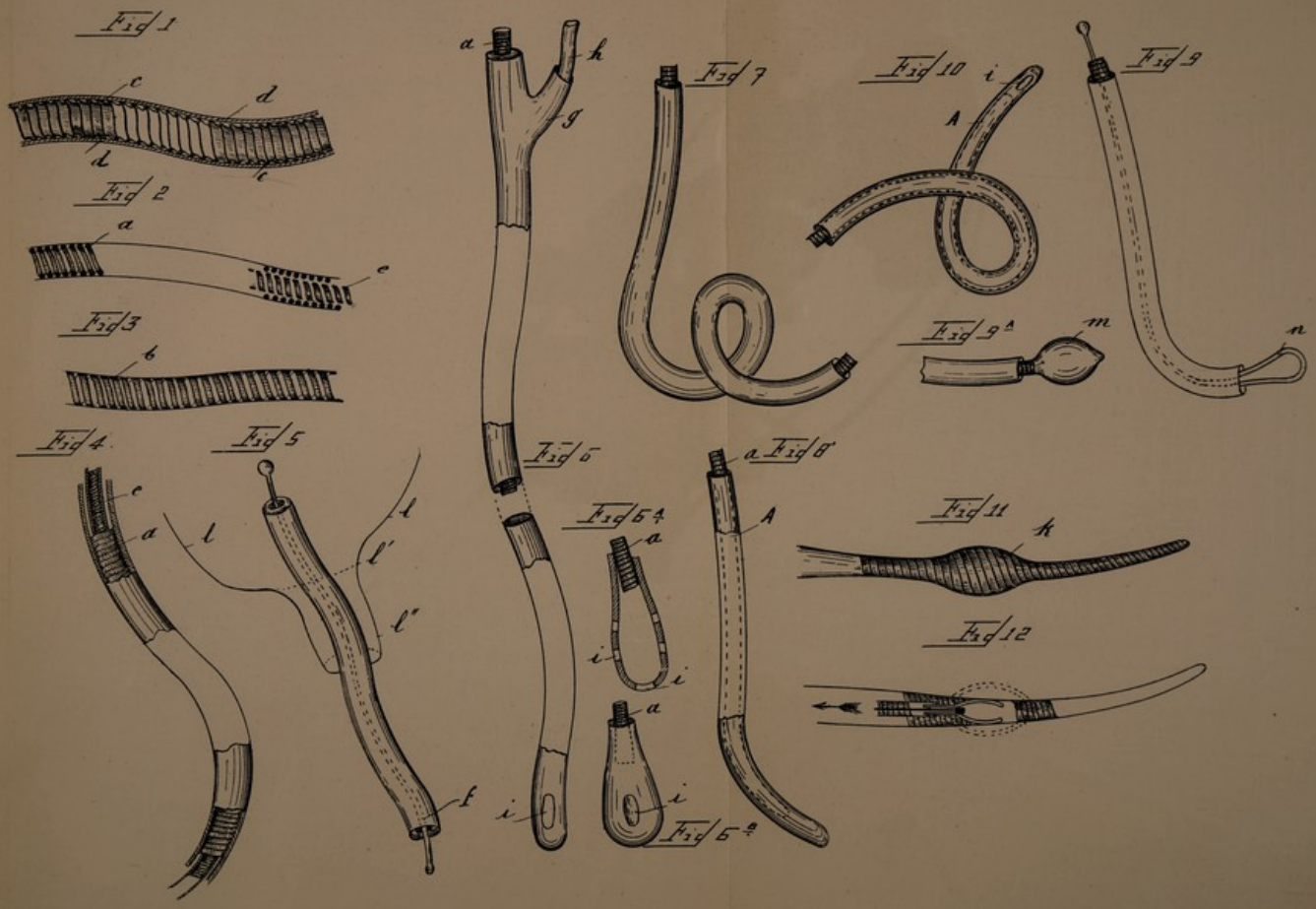
(3.) In a metallic-tube, according to Claim 1, with a view of directing same, or for any other purpose, the introduction or the application of a tube or of a metallic wire, or of a wire with or without a seizing or other instrument.

(4.) In a metallic-tube as specified in Claim 1, the application of a cover or case made of india-rubber, gutta-percha, or any other substance, the whole as described and for the purpose specified.

Dated this 9th day of July 1896.

ROBERT E. PHILLIPS, Assoc. M. Inst. C.E., M.I. Mech. E.,
Consulting Engineer and Patent Agent,
70, Chancery Lane, London, W.C., Associate Agent.

London : Printed for Her Majesty's Stationery Office, by Darling & Son, Ltd.—1896



[This Drawing is a reproduction of the Original on a reduced scale.]

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