

PATENT SPECIFICATION (11) 1 402 102

- (21) Application No. 43454/72 (22) Filed 20 Sept 1972
 (31) Convention Application No. 2147054 (32) Filed 21 Sept 1971 in
 (33) Germany (DT)
 (44) Complete Specification published 6 Aug 1975
 (51) INT CL² A61B.1/24
 (52) Index at acceptance A5R 59 95
 (72) Inventor Georg Gobels (Dr. med.)



(54) Laryngoscope

(71) I, GEORG GOBELS, a citizen of the German Federal Republic, 5038 Rodenkirchen b.Köln, Grugurtelstrasse 10, Germany, do hereby declare the invention, for which I pray that a patent may be granted to me, and the method by which it is to be performed, to be particularly described in and by the following statement:—

The invention relates to a laryngoscope for inspecting the larynx or the like, comprising a handle and a spatula detachable therefrom, with a longitudinal part laterally offset from a stock part and serving as a tongue deflector.

Such laryngoscopes serve for keeping free the oral cavity and the glottis by introducing the spatula into the mouth and by advancing the spatula front end into the throat gap. When this is done, the tongue deflector presses the tongue aside so that the oral and throat cavities are unencumbered. Generally, the handle part is fitted with an illuminating device permitting it to illuminate the throat cavity by means of a light bulb. Such laryngoscopes are subject to various requirements which are antithetic with regard, on the one hand, to medical demands with reference to sterilization, stability and safety, and, on the other hand, to mechanical and electrical operational proficiency.

It is customary with known kinds of laryngoscope to provide that the handle part and the spatula are capable of being coupled mechanically and electrically with respect to each other. In one such construction, the spatula is insertable into the handle, the light bulb being also in the handle part and the light being directed along the tongue deflector. Such an arrangement, with a spatula which is interchangeable and separately sterilizable, involves the disadvantage that the light source is too far away from the front end of the spatula so that the glottis is but weakly illuminated.

Moreover, the handle with the light source is intended for a plurality of uses. Thus defects and disorders in the illumination equipment may accumulate. If during a treatment, the light source fails and the

illumination is lost, valuable time may be lost during which medical help cannot be given, which, in particular in cases of emergency, e.g. accidents, may affect the saving of the patient.

As regards the circumstances which result in consequence of the sterilization, above all of the spatula, solutions have already been suggested to simplify matters. In laryngoscopes where the light bulb is fitted near the front end of the spatula, there is provided for the laryngoscope spatula a sheathing which can be slipped endwise on to the spatula. The intention is that only such a spatula sheath need be subjected to the sterilization. However, the disadvantage of such an arrangement is that the spatula is relatively unwieldy in performance because of its thickness in cross section. Consequently there may be crowding in the mouth and throat cavity. Moreover, the pressure of the upper incisors on the lateral part of the tongue deflector, is considerably increased. Furthermore, the mechanical and electrical sources of trouble are not excluded; on the contrary, the screwing up of the light bulb or, as the case may be, the checking of the tight-fitting thereof is made more difficult by the sheath which can be clipped on to the spatula. It is also known to construct the handle and the spatula of the laryngoscope as one single piece, and make only the illuminating device together with the light bulb interchangeable. The reason for this is to obtain an appliance of a reasonable price which can be thrown away after a single use in order to avoid re-sterilization of the appliance. The disadvantage connected therewith is that the entire appliance, namely the handle and the spatula, is intended to be thrown away after a single use, and this is relatively expensive. In addition, the light bulb insertable into the handle part is intended for repeated use. Hence, it may happen that the illumination unexpectedly fails thus resulting in the disadvantages hereinbefore described.

All known laryngoscopes have in common that the spatula, in the area where it rests

against the upper teeth of the jaw bone upon introduction of the laryngoscope into the mouth and the larynx gap, is made of hard inflexible material. This is necessary because
 5 with the spatula there must be exerted forces to press back the inner parts of the mouth and of the throat, the spatula being then under bending stress. Moreover, there is a considerable pressure by the upper incisors
 10 on the part of the spatula serving as a tongue deflector. These stresses are frequently of such magnitude that the seating of the teeth in the jaw and breakage of the teeth are at risk. The pressure of the teeth on the spatula
 15 of the laryngoscope is occasionally so high that scratches and notches develop in the metal surface of a rigid metal spatula, if not the breakage of teeth or loosening of same in the jaw. Added to the problems of the sterilization and the mechanical as well as electrical
 20 properties must be the problem of avoiding damage to the teeth of the upper jaw of the patient under treatment.

It is the object of the invention to provide a laryngoscope in which the aforementioned
 25 three problems are borne in mind and a trouble-free safe operation both from the mechanical and from the illumination viewpoint is permitted with the simultaneous simple solution of the sterilization problem.

According to the present invention, I provide a laryngoscope for visual observation of the larynx cavity, comprising a handle and a spatula detachable from the handle, the
 35 spatula having a longitudinal part laterally offset from a stock part and serving as a tongue deflector at the rear part of which is a separate insert of elastic material, the handle incorporating equipment for supplying electrical power, and the spatula including a socket
 40 in which a light bulb to illuminate the larynx cavity is fast in position, the handle and the spatula being capable of being coupled mechanically and electrically, and the
 45 spatula with the light bulb forming a disposable unit.

Such a construction of the laryngoscope or the spatula thereof affords the maximum assurance of operating efficiency with
 50 respect of all the requirements to be demanded from the laryngoscope. All the potential sources of trouble in use are in the disposable unit which consists only of the spatula, so that the expenditure necessary for
 55 attaining the optimum is kept small. The elastic insert in the tongue-deflector part of the spatula permits efficient and reliable manipulation of the laryngoscope without the risk of breaking off teeth of the patient,
 60 even in case of inexpert handling of the laryngoscope.

This brings about greater safety during the performance of the medical work for the patient. The provision of the light bulb in the
 65 disposable unit entails the essential advantage

that it is used only once. The risk of a failure of the light bulb during the work with the laryngoscope is practically eliminated. A failure of the illumination due to a worn-out light bulb is excluded. Added thereto is the direct immovable arrangement of the light bulb in the disposable unit, so that in this respect also the development of loose connections and other interruptions of current are completely out of the question. Hence, the possibility of a patient suffering injury due to failure of the illumination is avoided. While it is possible to sterilize a spatula with an insert of elastic sterilizable material, the stability of the elastic material is very quickly impaired by repeated sterilization. The provision of the spatula as a throw-away part therefore makes possible for the first time the arrangement of the elastic insert as a counterpressure element for the teeth of the patient. At the same time, the problem of reliable illumination is solved by the availability each time the spatula is used, on the one hand, of an unused new light bulb and, on the other hand, of clean and operationally reliable electric contact faces at the zone of coupling of the spatula with the handle part of the laryngoscope. Sterilization of spatulas in autoclaves often leads to oxidation of the electric contact faces. As a result of the construction of the laryngoscope according to the invention, requirements previously incompatible, are fully met in order to guarantee a laryngoscope which is operationally efficient in every respect.

The elastic insert in the spatula may be, for example, of rubber or plastics material. It is preferably anchored in the laterally-offset part of the spatula by means of under-cut grooves extending both transversely and longitudinally of said laterally-offset part. The disposable spatula may be of any convenient material. It is advantageous to use plastics material, as the rigidity of the spatula proper must be ensured. The spatula should have a matt and dark-coloured surface to avoid reflections resulting from the illumination.

It is advantageous to provide the bulb with its socket in the stock of the spatula. To this end, a light conductor, for example, a cluster of glass fibres or a prism, may lead to the front part of the spatula. It is also possible to fit the bulb at the front part of the spatula and to connect it by a current line with the contact point in the stock of the spatula.

The stock of the spatula preferably has a spigot rail and the handle has an undercut groove, both the spigot rail and the undercut groove tapering from one end to the other and electrical contact being established between the two by means of a contact tongue in the stock and a contact pin in the handle.

Two embodiments of the invention will now be described, by way of example, with

70

75

80

85

90

95

100

105

110

115

120

125

130

reference to the accompanying drawing, in which:—

Fig. 1 is predominantly a longitudinal section through a laryngoscope according to the invention, a spatula being shown partly in elevation;

Fig. 2 is a plan view of the spatula of the laryngoscope of Fig. 1, showing an open longitudinal groove for the insertion of elastic material;

Figs. 3 and 4 show a spatula holder and coupling unit located between the handle and the spatula, in longitudinal section and plan view, respectively;

Fig. 5 is predominantly a diagrammatic longitudinal section through another laryngoscope according to the invention, in which a bulb is housed in a stock of a spatula, the spatula being shown partly in elevation; and

Fig. 6 is a plan view of the spatula of the laryngoscope of Fig. 5.

Referring now to the drawings, and firstly to Figs. 1 to 4, the laryngoscope has a handle 18 and a spatula 6, the spatula being provided with a longitudinal part 1 offset laterally from a stock 7 thereof and serving as a tongue deflector. An insert 3 of elastic material such as rubber or plastics material, is arranged in the part 1 of the spatula 6. This insert 3 is in the rear part of the spatula and serves to cushion the patient's teeth, when the spatula with the insert rests against the teeth upon use of the laryngoscope. Anchorage of the elastic insert 3 is conveniently carried out in a longitudinal groove 4 with undercut cross faces 4a and by means of an undercut cross groove 23 in cheeks 22 flanking the groove 4, the insert 3 being formed at its underside intermediate its length with a transverse ridge 5, the cross-section of which is adapted to the shape of the groove 23 and which is engaged in the groove 23 when the insert is fitted into position, the elasticity of the insert 3 enabling such fitting to be effected. Within the tongue-deflector part 1 of the spatula 6 is located a light bulb 2 in a socket therefor near the front end of the part 1, the bulb being soldered in position. Current supply lines 10 and 11 extend along the groove 4 and through bores therefor in the ridge 5 and in the stock 7 of the spatula 6, to contact pieces 12 and 13 in a spigot rail 9, a contact tongue 8 being provided in the spigot rail 9. Spatula 6 with the elastic insert 3 and the elements of the illuminating system such as light bulb 2, supply lines 11 and 10 and contact members 12 and 13 permanently arranged in the spatula, form a single unit which is intended to be thrown away after a single use.

The handle part 18 receives one or more insertable battery cells 17. At the upper end of the handle 18 there is screwed into place a spatula holder 14 in which is guided a resiliently-supported contact pin 16 insu-

lated with respect to the surrounding part of the holder 14. Contact member 13 is the earth contact and is designed as a contact rail extending transversely to the plug-in direction, the free ends of the rail resting firmly against guide surfaces 15 flanking an undercut groove 21 in the holder 14. Contact 13 may be alternatively constructed as a spring contact supporting itself against the bottom of groove 21. The lower end of handle part 18 is closed by a detachable cap 19 which carries the support and contact spring 20 for battery 17.

The groove 21 in the spatula holder 14 is a socket intended to receive the spigot rail 9 of spatula 6, the guide surfaces 15 of the groove 21 being slightly inclined each in the same direction towards the plane bisecting the groove longitudinally, so that the groove is tapered from one end to the other and the slide-in or plug-in fitment of the spatula to the handle part can be effected in one direction only, the spigot rail 9 being appropriately shaped so that there is no free play between the two when the spatula is fitted to the handle.

The spatula 6 and the spatula stock 7 with the spigot rail 9 are preferably of a black-coloured plastics material or the like, all the surfaces being matt. Black colouring has proved its quality as a contrast surface against the red mucosa of mouth and throat, for the illuminating operation. The elastic insert 3 may be formed with a slight lateral bulge 3a as an additional protection of the lips.

In the embodiment of the laryngoscope of Figs. 5 and 6 in which elements identical to those of the Figs. 1 to 4 embodiment are denoted by reference numerals with a prime index mark, the spatula 6' as a piece dispensable after a single use is also fitted with an insert of elastic material, the insert 3' being anchored in place in the same way as in the previous embodiment. Bulb 2' is in the stock 7' of the spatula 6' and is firmly fitted in a socket 24, e.g. is soldered therein, the socket at the same time serving as a contact part for the co-operating contact 16' in the handle part 18'. The spatula 6', 7' is capable of being coupled with the handle 18' by means of thread 25. It is also possible to couple the spatula and handle together by means of a bayonet joint. From the light bulb 2' a light conductor 26 leads to the front part of spatula 6' so that a good illumination of the rear throat cavity and the like is ensured. Also in this embodiment, the spatula 6' with all the elements which are arranged therein, in particular with the elastic insert 3' and the firmly fitted lamp 2' as well as the light conductor 26, is a single disposable unit ensuring a high functional efficiency.

WHAT I CLAIM IS:—

1. A laryngoscope for visual observation



reference to the accompanying drawing, in which:—

Fig. 1 is predominantly a longitudinal section through a laryngoscope according to the invention, a spatula being shown partly in elevation;

Fig. 2 is a plan view of the spatula of the laryngoscope of Fig. 1, showing an open longitudinal groove for the insertion of elastic material;

Figs. 3 and 4 show a spatula holder and coupling unit located between the handle and the spatula, in longitudinal section and plan view, respectively;

Fig. 5 is predominantly a diagrammatic longitudinal section through another laryngoscope according to the invention, in which a bulb is housed in a stock of a spatula, the spatula being shown partly in elevation; and

Fig. 6 is a plan view of the spatula of the laryngoscope of Fig. 5.

Referring now to the drawings, and firstly to Figs. 1 to 4, the laryngoscope has a handle 18 and a spatula 6, the spatula being provided with a longitudinal part 1 offset laterally from a stock 7 thereof and serving as a tongue deflector. An insert 3 of elastic material such as rubber or plastics material, is arranged in the part 1 of the spatula 6. This insert 3 is in the rear part of the spatula and serves to cushion the patient's teeth, when the spatula with the insert rests against the teeth upon use of the laryngoscope. Anchorage of the elastic insert 3 is conveniently carried out in a longitudinal groove 4 with undercut faces 4a and by means of an undercut cross groove 23 in cheeks 22 flanking the groove 4, the insert 3 being formed at its underside intermediate its length with a transverse ridge 5, the cross-section of which is adapted to the shape of the groove 23 and which is engaged in the groove 23 when the insert is fitted into position, the elasticity of the insert 3 enabling such fitting to be effected. Within the tongue-deflector part 1 of the spatula 6 is located a light bulb 2 in a socket therefor near the front end of the part 1, the bulb being soldered in position. Current supply lines 10 and 11 extend along the groove 4 and through bores therefor in the ridge 5 and in the stock 7 of the spatula 6, to contact pieces 12 and 13 in a spigot rail 9, a contact tongue 8 being provided in the spigot rail 9. Spatula 6 with the elastic insert 3 and the elements of the illuminating system such as light bulb 2, supply lines 11 and 10 and contact members 12 and 13 permanently arranged in the spatula, form a single unit which is intended to be thrown away after a single use.

The handle part 18 receives one or more insertable battery cells 17. At the upper end of the handle 18 there is screwed into place a spatula holder 14 in which is guided a resiliently-supported contact pin 16 insu-

lated with respect to the surrounding part of the holder 14. Contact member 13 is the earth contact and is designed as a contact rail extending transversely to the plug-in direction, the free ends of the rail resting firmly against guide surfaces 15 flanking an undercut groove 21 in the holder 14. Contact 13 may be alternatively constructed as a spring contact supporting itself against the bottom of groove 21. The lower end of handle part 18 is closed by a detachable cap 19 which carries the support and contact spring 20 for battery 17.

The groove 21 in the spatula holder 14 is a socket intended to receive the spigot rail 9 of spatula 6, the guide surfaces 15 of the groove 21 being slightly inclined each in the same direction towards the plane bisecting the groove longitudinally, so that the groove is tapered from one end to the other and the slide-in or plug-in fitment of the spatula to the handle part can be effected in one direction only, the spigot rail 9 being appropriately shaped so that there is no free play between the two when the spatula is fitted to the handle.

The spatula 6 and the spatula stock 7 with the spigot rail 9 are preferably of a black-coloured plastics material or the like, all the surfaces being matt. Black colouring has proved its quality as a contrast surface against the red mucosa of mouth and throat, for the illuminating operation. The elastic insert 3 may be formed with a slight lateral bulge 3a as an additional protection of the lips.

In the embodiment of the laryngoscope of Figs. 5 and 6 in which elements identical to those of the Figs. 1 to 4 embodiment are denoted by reference numerals with a prime index mark, the spatula 6' as a piece dispensable after a single use is also fitted with an insert of elastic material, the insert 3' being anchored in place in the same way as in the previous embodiment. Bulb 2' is in the stock 7' of the spatula 6' and is firmly fitted in a socket 24, e.g. is soldered therein, the socket at the same time serving as a contact part for the co-operating contact 16' in the handle part 18'. The spatula 6', 7' is capable of being coupled with the handle 18' by means of thread 25. It is also possible to couple the spatula and handle together by means of a bayonet joint. From the light bulb 2' a light conductor 26 leads to the front part of spatula 6' so that a good illumination of the rear throat cavity and the like is ensured. Also in this embodiment, the spatula 6' with all the elements which are arranged therein, in particular with the elastic insert 3' and the firmly fitted lamp 2' as well as the light conductor 26, is a single disposable unit ensuring a high functional efficiency.

WHAT I CLAIM IS:—

1. A laryngoscope for visual observation



- of the larynx cavity, comprising a handle and a spatula detachable from the handle, the spatula having a longitudinal part laterally offset from a stock part and serving as a
- 5 tongue deflector at the rear part of which is a separate insert of elastic material, the handle incorporating equipment for supplying electrical power, and the spatula including a socket in which a light bulb to illuminate the
- 10 larynx cavity is fast in position, the handle and the spatula being capable of being coupled mechanically and electrically, and the spatula with the light bulb forming a disposable unit.
- 15 2. A laryngoscope according to claim 1, in which the elastic insert is anchored in the laterally-offset part of the spatula by means of undercut grooves extending both transversely and longitudinally of said laterally-
- 20 offset part.
3. A laryngoscope according to claim 1 or 2, in which the stock of the spatula can be coupled to the handle by a plug-in or slide-in movement transverse of the stock.
- 25 4. A laryngoscope according to claim 3, in which the stock of the spatula has a spigot

rail and the handle has an undercut groove, both the spigot rail and the undercut groove tapering from one end to the other and electrical contact being established between the two by means of a contact tongue in the stock and a contact pin in the handle.

5. A laryngoscope according to claim 1 or 2, in which the stock of the spatula and the handle are adapted to be connected together by means of a screw or bayonet joint.

6. A laryngoscope substantially as hereinbefore described with reference to Figs. 1 to 4 of the accompanying drawings.

7. A laryngoscope substantially as hereinbefore described with reference to Figs. 5 and 6 of the accompanying drawings.

FITZPATRICKS
Chartered Patent Agents,
14-18 Cadogan Street,
Glasgow G2 6QW
— and —
Warwick House,
Warwick Court,
London WC1R 5DJ.