April 21, 1970 A. S. LAERDAL 3,507,272

LARYNGOSCOPE

Filed Feb. 15, 1968 2 Sheets-Sheet 1

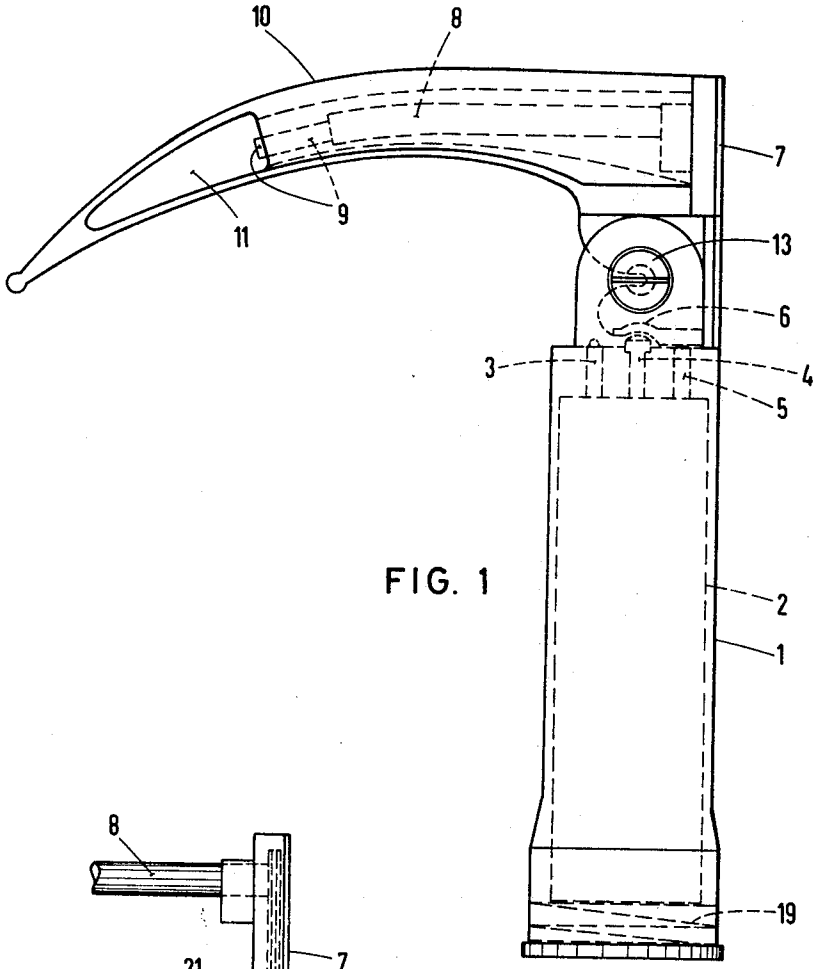

FIG. 1

FIG. 5

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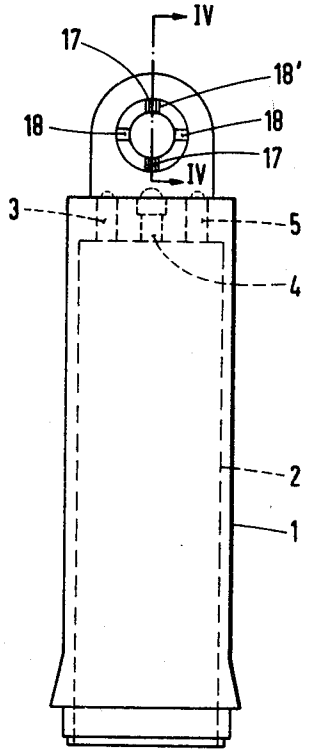

FIG. 2

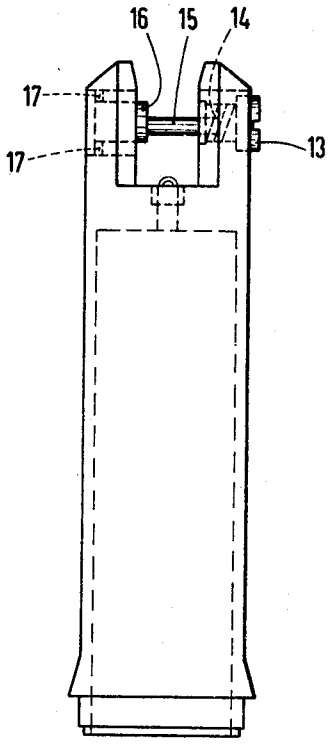

FIG. 3

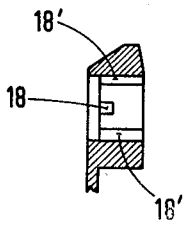

FIG. 4

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LARYNGOSCOPE

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U.S. Cl. 128—16
6 Claims

ABSTRACT OF THE DISCLOSURE

The invention provides a laryngoscope comprising a handle adapted to receive a battery and a spatula removably mountable on the handle and carrying a lampholder and associated contacts which are electrically engaged with contacts in the handle and electrically connected to the battery therein when the spatula is mounted on the handle. The spatula may be fitted on the handle from either of two opposite sides thereof and the lampholder and its associated contacts are removable as a unit from the spatula to facilitate cleaning of the laryngoscope.

This invention relates to laryngoscopes and more particularly to laryngoscopes comprising a handle adapted to contain a battery and a spatula mountable in a working position on the handle and having an electrical lamp which is lit when the spatula is in its working position.

Known laryngoscopes are manufactured from metal and have the spatula pivotally mounted on the handle so as to be movable into, and out of, the working position. The handle includes contacts fixedly mounted thereon and co-operating contacts on the spatula are connected to a lamp within the spatula by conductors arranged in a tube of an expensive construction. These laryngoscopes suffer from the disadvantages that they are difficult to clean; that the contact members readily become moist during cleaning, thus rendering them useless; that the spatula of the laryngoscope must always be "mounted-in" from one specific side of the handle; and that the metal construction makes it difficult to view the tongue and the inner part of the larynx of the patient.

It is an object of this invention, to provide an improved laryngoscope which is simple in construction, inexpensive to manufacture, and disassembled for cleaning without damage to the electrical contacts.

According to this invention, there is provided a laryngoscope comprising a handle adapted to receive a battery therein, a spatula for insertion in a patient's mouth, and co-operating means on the handle and spatula whereby the latter may be removably secured to the handle from either of two opposite sides thereof, the spatula having, as a unit removable therefrom, a lamp holder, electrical leads to such holder and a pair of contacts associated with said leads, and the handle having three contacts, arranged so that, when a battery is fitted in the holder, a first one of said contacts is electrically connected to one pole of the battery and the other two contacts are both electrically connected to the other pole of the battery, the positioning of the contacts on said handle and spatula relatively to the said co-operating means on the handle and spatula being such that, when the spatula is fitted on the handle from one side thereof, the pair of contacts of the spatula engage respectively with the said first contact of the handle and one of said other two contacts thereof, while, when the spatula is fitted on the handle from the other side thereof, the pair of contacts of the spatula engage respectively with the said first contact of the handle and the other of said other two contacts thereof.

In the laryngoscope according to this invention, the

spatula can, by means of the described contact arrangement, be mounted on the handle from both sides with automatic lighting of the lamp and the laryngoscope may be disassembled for cleaning by removing the spatula from the handle, and the unit comprising the lamp holder, leads and associated contacts from the spatula.

According to a further feature of the invention, the spatula contacts comprise two angled plates, separated by insulation and cast in an insulating material so that part of each plate is exposed to provide a contact surface.

This construction of spatula contacts ensures a satisfactory sliding engagement with the contacts of the handle and consequently a good contact. In this way, the "flickering" of the light which often takes place in known laryngoscopes, is avoided.

Advantageously, according to a further feature of the invention, at least the forward part of the spatula is formed from a transparent material. The material used is preferably a plastics material. Use of a transparent material ensures that the patient's tongue may be completely and clearly viewed. Also the remaining non-conducting parts of the laryngoscope, particularly the handle, are preferably manufactured from plastics material. Manufacture of the handle from a plastics material ensures that unintentional discharge of the battery is to a considerable extent avoided, so that the working life of the battery is increased.

The spatula is preferably manufactured from a soft plastics material which does not damage the upper teeth of the patient during insertion in the mouth (when a metal spatula is used, the teeth are frequently damaged). By inserting a folded lint bandage between the teeth and the metal spatula, such damage may be avoided. However, insertion of this kind involves a loss of time and furthermore viewing is detrimentally influenced.

Advantageously, according to a still further feature of the invention, the said co-operating means on the spatula and handle comprises a hook-like recess in the spatula and a pin mounted on the handle and adapted to be received in said recess, such pin having an enlarged portion which locks the spatula on the handle and being axially displaceable against a resilient biasing to retract the enlarged portion to enable the pin to be engaged in, and disengaged from, said recess. This feature provides for rapid mounting of the spatula on the handle, or removal therefrom.

The laryngoscope according to the invention has the additional advantage that, when the contacts become worn, it is not necessary to change the entire spatula, but merely to replace the part carrying the contacts by another part.

Further features and advantages of the invention will become apparent from the following detailed description of one embodiment of laryngoscope according to the invention given with reference to the accompanying drawings, in which:

FIGURE 1 is a side elevation of this embodiment of laryngoscope, the spatula of the laryngoscope being shown in the working position;

FIGURE 2 is a side elevation of the handle of the laryngoscope, with the closure cap of the handle removed, the elevation being taken from the opposite side of the handle from the view of FIGURE 1;

FIGURE 3 is another side elevation of the handle but with the handle turned through 90° as compared with its position in FIGURE 2;

FIGURE 4 is a section taken along the line IV—IV of FIGURE 2; and

FIGURE 5 is a fragmentary elevational view of the contact part of the laryngoscope.

The illustrated laryngoscope according to the inven-

tion consists substantially of a handle or grip **1**, which contains a battery **2**, and of a spatula **10** removably mountable on the grip **1**. Provided at the upper end of the handle **1** is a securing fork having a transverse bore in which a pin or bolt **15** is secured for the purpose of engaging and disengaging the spatula **10**. Associated with the battery **2** are three contacts **3**, **4** and **5**, i.e. a central contact **4** of one polarity and two contacts of the opposite polarity disposed one each side thereof. The provision of three contacts in this way, enables the spatula to be engageable on the handle from either side thereof. When the spatula is engaged as shown in FIGURE 1 conductors **20** and **21** in a part **6** associated with the spatula engage the contacts **5** and **4** respectively of the handle, while when the spatula is engaged on the handle from the opposite side thereof, the conductors **20** and **21** will engage the contacts **3** and **4** respectively. The conductors **20** and **21** of the spatula are provided by angled plates which are separated from each other by insulating means **22** and are cast in a member which is also of angular form, such member comprising the part **6** previously referred to and a part **7** extending upwardly from one end of the part **6**. The member formed by the parts **6** and **7** is removably connected to the spatula **10** by fitting into a resilient snap seating on the spatula. Outwardly from the part **7** at a position remote from the part **6**, but in the same direction as the latter projects, extends a tube **8** which carries leads connected to the conductors **20** and **21** and at the forward end of which a lamp holder **9** is attached.

Formed in the forward portion of the spatula **10** is an aperture **11** to provide access to the lamp holder **9** for fitting a lamp therein or removing a lamp therefrom. The spatula itself is manufactured from a transparent material, preferably a plastic material, so that, in addition to low weight, it has the advantage that the tongue may be observed without difficulty.

The pin **15** has at one end a head **13** and at the other end a thickened portion **16** provided with two oppositely-extending conical pins **17**. That limb of the securing fork in which the thickened portion **16** is to be received, i.e. the lefthand limb as viewed in FIGURE 3, has therethrough in the wall defining the transverse bore through the limb two diametrically opposed grooves **18** of a size which will pass the pins **17**. At the outer face of the limb the bore has in its wall two further grooves **18'** arranged at positions angularly spaced 90° from the grooves **18**, these grooves **18'** extending only part way through the limb. The other limb of the securing fork, i.e. the righthand limb as viewed in FIGURE 3, has its transverse bore of a size to pass the portion **16** of the pin **15**, but not the head **13** thereof. The inner end of such transverse bore is reduced to provide a shoulder against which a spring **14** on the pin **15** adjacent the head **13** may bear.

To fit the pin **15** in the transverse bore in the securing fork, this pin is introduced from the righthand side as viewed in FIGURE 3 and the pins **17** are pushed through the longitudinal grooves **18** until they emerge from the lefthand ends of these grooves. In this condition, the spring **14** is compressed between said shoulder and the head **13**. The pin **15** is then rotated so that the conical pins **17** move away from the grooves **18** to a position registering with the grooves **18'** and the pin is released. The spring **14** then acts to move the pin to the right as viewed in FIGURE 3 and the pins **17** are drawn into the groove **18'**. The part of the spatula adapted to be fitted to the handle has, as shown, a hook like recess for receiving the pin **15**. At each end, this recess is provided with an enlargement capable of receiving the thickened portion **16**. The mouth to the recess however, cannot pass the portion **16**. To engage the spatula **10** on the handle, the pin **15** is displaced inwardly, i.e. to the left as viewed in FIGURE 13, by pressure on its head **13** against the force of the spring **14** until the portion **16** is within the lefthand limb of the fork. The pin **15** is then engaged in the recess in the spatula and the pressure on the head **13** released so that the spring **14** moves the pin **15** to the right and the thickened portion **16** engages in said enlargement at the appropriate end of the hook-like recess in the spatula and the spatula thereby becomes locked against unintentional removal from the pin **15**. To release the spatula **10**, it is merely necessary once again to press the pin **15** inwardly.

For cleaning purposes, the described laryngoscope may readily be disassembled. Thus, the spatula may be removed from the handle; the pin **15** may be removed from the handle by pushing the head **13** inwardly and rotating the pin **15** to bring the pins **17** into registration with the grooves **18**; and the angular member formed by parts **6** and **7** may be removed, with the contact plates **20** and **21** and the tube **8**, from the spatula. The spatula can then be cleaned, without any danger of harmful moistening of the contacts.

The spatula **10** is preferably manufactured from a soft plastics material and is transparent, so as to improve viewing. The tube **8** leading to the lamp forms a reinforcement of the spatula, so that this has sufficient strength respite the use of soft plastics material.

The handle **1**, including the fork for receiving the spatula may also be manufactured from a plastics material. The battery **2** is preferably received by a metal sleeve (not shown in detail) within the handle, the sleeve having an upper lid formed with a central bore through which contact **4** extends, the two contacts **3** and **5** being secured in electrically conductive relationship to the sleeve. Arranged internally on a closure cap at the bottom of the handle **1** is a spring **19** having a spiral and a helical part. The spring **19** has a double function; on the one hand, it establishes a conducting connection between the lower contact of the battery **2** via the metal sleeve with the contacts **3** and **5** and, on the other hand, it provides for the springing of the contacts **3**, **4** and **5**.

I claim:

1. A laryngoscope comprising: a handle; a two-pole battery received in a space in said housing; a first electrical contact on said handle electrically connected to one pole of said battery; second and third electrical contacts on said handle both electrically connected to the other pole of said battery; a spatula for insertion in a patient's mouth; co-operating means on the handle and spatula for mounting the spatula removably on the handle, said means being constructed so that the spatula can be mounted on the handle from either of two opposite sides thereof; a lamp holder in the spatula; electrical leads to such holder; and two contacts associated one with each of said leads, said lamp holder, leads and two contacts forming a unitary structure removably mounted in the spatula, the contacts on said handle and spatula being positioned relatively to the said co-operating means on the handle and spatula to cause engagement of the contacts of the spatula respectively with said first contact on the handle and said second contact on the handle when the spatula is mounted on the handle from one side thereof and to cause engagement of the contacts of the spatula respectively with said first contact on the handle and said third contact on the handle when the spatula is mounted on the handle from the other side thereof.

2. The laryngoscope specified in claim **1** and including a first angled plate having a contact surface forming one of said two spatula contacts, a second angled plate having a contact surface forming the other of said two spatula contacts and located adjacent said first plate, insulation between said contacts and a cast insulating material around said plates and insulation, but leaving said contact surfaces exposed.

3. The laryngoscope specified in claim **1** in which said spatula has a rearwardly opening recess into which said unitary structure is received.

4. The laryngoscope specified in claim **3** in which said unitary structure includes a tube through which said leads pass, such tube carrying the lamp holder at its forward

end and extending from the rear of the spatula to the forward part thereof and forming a reinforcement for the spatula.

5. The laryngoscope specified in claim 1, in which the spatula has a forward part formed from a transparent material.

6. The laryngoscope specified in claim 1, in which said co-operating means on the spatula and handle comprise a pin on the handle, a hook-like part on the spatula constructed to hook over said pin from either of opposite sides thereof, an enlarged portion on said pin locking the spatula thereon, said pin being axially displaceable to move the said enlarged portion from said spatula for release thereof, and resilient biassing means tending to hold the pin in its position in which it locks the spatula on the handle.

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U.S. Cl. X.R.

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