

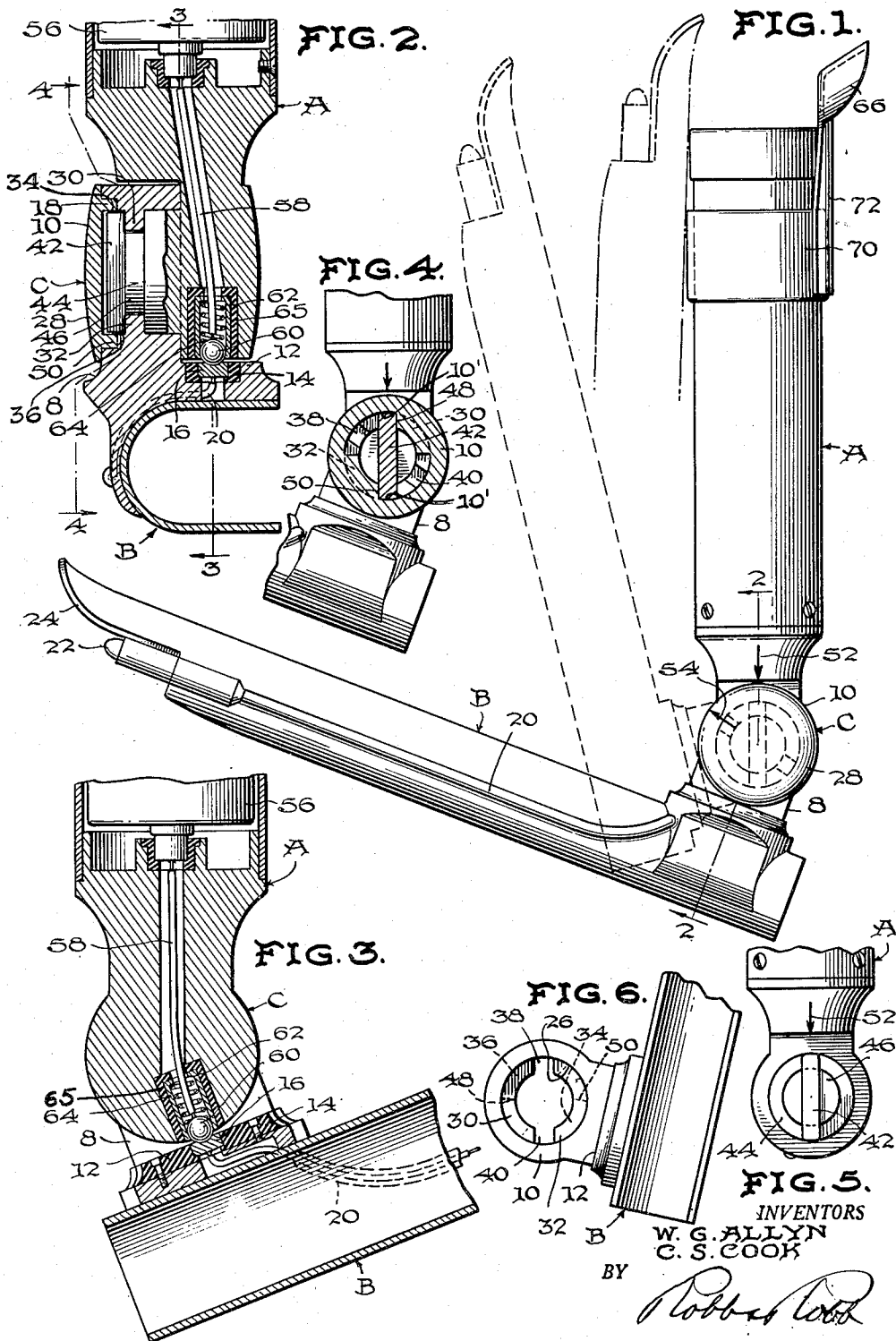
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W. G. ALLYN ET AL

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FOLDABLE AND SEPARABLE LARYNGOSCOPE

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INVENTORS
W. G. ALLYN
C. S. COOK
BY *Robert Cook*
ATTORNEYS

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FOLDABLE AND SEPARABLE
LARYNGOSCOPE

William G. Allyn, Skaneateles, and Charles Sewell
Cook, Sennett, N. Y., assignors to Welch Allyn,
Inc., Auburn, N. Y., a corporation of New York

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The present invention pertains to instruments used in the practice of laryngoscopy, and more especially to folding laryngeal speculums of the general type disclosed in Patent No. 2,289,226, granted July 7, 1942, to Richard Foregger, and in Patent No. 2,433,705, granted December 30, 1947, to Harry E. Palmeter.

In common with the instrument disclosed in this latter patent, the present invention has for one of its general objects the provision of a simple, stronger and otherwise improved detachable hinge joint and associated parts whereby a laryngeal blade may be detachably connected more easily to the usual supporting battery handle of such instruments.

A further object of the invention is to provide a very simple and quickly detachable hinge joint as aforesaid, which allows the laryngeal blade to be folded to a position lying relatively close and parallel to the battery handle or other support, and which permits the blade to be easily detached laterally from the handle and re-attached thereto at will, while also permitting the blade to be swung to and held in an extended position, projecting laterally from the handle as required under normal conditions of use.

Because of the manipulations of the hands that frequently are required on the part of an operator engaged in laryngeal therapy, it is often desirable that the operator's hands be free and as unobstructed as possible, and unencumbered by the need of manipulating the laryngoscope when employed for depressing the epiglottis at the base of the tongue and for illuminating the larynx, thereby leaving the therapist's hands free for the utilization of other instruments, or for performing intra-nasal or intra-tracheal intubation, or for the application of medications to or examination of the posterior oral cavity, larynx, pharynx, or elsewhere, as dictated by the needs of the therapy existing in the individual under treatment. A further object of this invention may be said therefore, to reside specifically in an improved hinge joint which will permit the blade to be moved by gravity from folded to extended positions relative to the handle, and, while permitting easy detachment of the blade from the handle in a lateral direction as aforesaid, for permitting removal of the blade for cleaning and sterilizing, nevertheless enables this to be done when the blade and handle are in only one definite relative position and in the said lateral direction.

A still further object of the present invention is to provide improved accessories of simple char-

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acter for the blade and handle, which accessories include improved electrical contact devices which are sure and certain in operation for enabling a source of light carried by the blade to be actuated positively in response to the gravitational opening of the laryngeal blade, so that there may be no failure in the needed illumination of the oral cavity and upper portions of the respiratory tract, the accessories nevertheless permitting the ready separation of the blade and handle, as aforesaid.

A still further object of the invention is to provide an improved grip member attached to the handle for inhibiting accidental dropping of the instrument by the operator during use, and for otherwise facilitating manipulation of the instrument.

Further objects of the invention will become apparent as the description proceeds, and the features of novelty will be pointed out in particularity in the appended claims.

The improvements of the present construction will be understood more readily by reference to the accompanying drawings, which illustrate one typical embodiment of the improved construction, and show the structural details thereof.

In the drawings:

Figure 1 is a side elevation of the illustrative embodiment of a laryngoscope embodying the present improvements, the view showing the blade in extended operative position in full lines, and in dotted lines in partially folded position, and in dash-dot lines the blade is shown in fully folded position;

Figure 2 is a sectional view showing details of construction of the improved separable joint and improved contact accessories, the view being taken on the line 2-2 of Figure 1, looking in the direction of the arrows;

Figure 3 is a further sectional view of the improved contact accessories of the separable hinge joint of the present construction, the section being taken on the line 3-3 of Figure 2, looking in the direction of the arrows;

Figure 4 is a detailed sectional view through the separable hinge joint, showing details of construction of the hinge joint, the view being taken on the section line 4-4 of Figure 2, looking in the direction of the arrows;

Figure 5 is a fragmentary elevation of a portion of the separable hinge joint that is mounted on the handle portion of the instrument; and

Figure 6 is a fragmentary view of the complementary separable hinge part carried by the blade member, which is adapted to interfit with the

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structure of Figure 5, the constructions of Figures 5 and 6 being considered together as an exploded view of the improved hinge joint of the present construction.

Referring more particularly to the drawings, it will be noted that the improved laryngoscope construction comprises a handle member A and the blade member B, the latter being convexly curved on its upper surface and concave in cross-section on its lower surface when the blade is in extended operating position, this concave surface acting as a tongue-engaging and depressing surface when the instrument is in service. Laterally disposed relative to the blade member B adjacent to its junction with the handle A is a restricted neck or cylindrical stud 8 that enlarges into a cylindrical housing 10 which is the outer member of the hinge joint C which interconnects the blade B and the handle A and in which is embodied certain of the improvements of the present constructions, as will be pointed out in detail hereinafter. This hinge joint C permits the blade B to become extended by gravity from the fully folded position shown by the dash-dot lines in Figure 1 to the fully open position indicated by the full line position of Figure 1 through the intermediate position shown in dotted lines in Figure 1. The gravitational operation of the blade B leaves at least one hand of the operator free for manipulative and therapeutic procedures as may be required. The full line position of Figure 1 shows the parts in operative position, the handle A extending upwardly from the blade B, corresponding to its operative position when the instrument is in use while the patient is in a prone position on his back.

Detailed reference now may be made to the construction of the connecting hinge joint C. As has been indicated above, this joint comprises a cylindrical housing 10 which projects laterally from the blade B at right angles thereto, this housing 10 being a part of a mounting stud 8, which stud defines a substantially planar surface 12 adjacent to the cylindrical housing 10, upon which surface 12 is mounted a strip 14 of insulating material that has a contact 16 thereon that is insulated thereby from the planar surface 12 and mounting 8. Contact 16 connects with a lead 20 which is housed in a side of the blade B and terminates in a source of light 22 which is adjacent to the concave end 24 of the blade B for affording unobstructed illumination of the oral cavity or larynx in which the instrument is being used.

The cylindrical housing 10 is substantially circular in vertical cross-section, one side 26 of the housing 10 being open, the opposite side 28 thereof being closed by means of a closure cap, the closure cap being provided with an inwardly directed, annular flange frictionally secured in the circular housing 10. Spaced from the closed side 28 interiorly of the housing 10 are complementary arcuate flanges 30, 32 that are integral with the inner periphery of the housing 10, and define similar arcuate key tracks or slots 34, 36 intermediate these flanges and the closed side 28 of the housing 10. The internal flanges 30, 32 have diametrically opposite spaced ends forming oppositely disposed lateral keyways 38, 40 that communicate with the peripheral slots 34, 36, and form bayonet slots therewith for the reception of a key 42 that is extended diametrically across the complementary cylindrical closure member 44 that is mounted on the handle A and which is

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inserted in the open side 26 of the housing member 10, forming a lateral closure therefor. The key 42 is spaced from the closure portion 44 by an annular restricted portion 46 which forms a retaining groove for receiving and retaining the internal flanges 30, 32 of the housing member 10. A pair of spaced laterally projecting stops 48, 50 that are oppositely disposed and limit rotation of the key 42 as the blade B reaches fully extended position are respectively carried by the arcuate flanges 30, 32. The inner peripheral face of the housing 10 may be made slightly eccentric as at 10' (see Fig. 4), so as to project slightly radially inwardly adjacent to the stops 48, 50 for effecting a wedging action on the key 42 to hold the key frictionally in the slots 34, 36 and secure the blade B in fully extended position and to guard against accidental closing of the blade during use, i. e., this wedging action will prevent the blade from swinging towards the handle when the instrument is turned with the blade or hinge end up, which is the reverse of the position shown in Figure 1, but it should be understood that normally, during therapeutic, diagnostic, or other related uses, the instrument is so manipulated that the pressure and strain on the connecting joint is exerted in a direction that maintains the blade and the handle in the relative positions shown in full lines in Figure 1. The arrangement is such that the handle A and blade B may be separated only laterally, and only when the key 42 comes into registry with the diametrically opposed spaces 38, 40 between the internal flanges 30, 32, the key 42 maintaining the flanges 30, 32 locked in the groove 46 in every other position. The handle A and blade B may be reassembled only when the parts are in like position. In order to facilitate the location of this exact position, indicating arrows or pointers 52, 54 may be provided on the handle member A and on the closed side 28 of the housing 10, the registering of the arrows 52, 54 visually indicating registry of the key 42 with the said spacings 38, 40, thereby showing to an operator that the handle and blade are in proper relative position to permit separation or assembling thereof, with the parts being interlocked subsequently to relative rotation thereof so as to bring the arrows or pointers 52, 54 out of registry.

In the foregoing manner, the blade B is opened by gravity to fully extended position and frictionally held in such fully extended position during use.

It has been said above that the improvements of the invention comprise certain accessories to the improved hinge joint described above. Thus, the handle A may be made hollow for the reception of standard flash light cells 56 for actuating the light 22 on the end 24 of the blade B. For this purpose, a lead 58 may extend from the cells 56 to a ball contact 60 which is mounted on a coil spring 62 positioned in a cup 64 in the end of the handle A adjacent to the hinge joint C, the cup 64 being insulated by a bushing or sleeve 65 of insulating material, and the spring 62 constantly urging the ball contact 60 into engagement with contact 16 to which is connected blade lead 20 to the light 22. The other side of the circuit to the light 22 is grounded through the blade B and handle member A.

Also, since the instrument is designed to be preferably used in the position shown in Figure 1, with the handle member A upstanding from the blade B, it is desirable to provide on the handle means a grip or thumb stop for pre-

venting the operator from dropping the instrument during use, and for otherwise facilitating manipulation of the instrument in depressing the epiglottis, etc. This thumb stop is indicated at 66 in Figure 1, and is shown as being carried by attaching sleeve 70, that is suitably mounted on the handle member A and connected by connecting bar 72 to stop 66 and forming a continuation of the stop 66. If desired, this sleeve 70 and handle member A may be knurled to form grip portions or members in an evident manner.

While the foregoing detailed description and accompanying drawings set forth a typically illustrative embodiment of construction embracing the improved features of the invention, it will be apparent that the structural details may be modified from those specifically shown and described without departing from the inventive concept, and accordingly it will be understood that it is intended and desired to embrace within the scope of the invention such modifications and changes as may be necessary to adapt the construction to varying conditions and uses, as defined by the appended claims.

We claim:

1. A laryngoscope comprising a handle member, a blade member, and a rotary hinge joint connecting the blade member and handle member, and enabling the blade member to be shifted by gravity between a folded inoperative position adjacent to and substantially parallel with the handle member and an extended operative position relative to the handle member, the said hinge joint including relatively rotatable, laterally disposed complementary joint parts abutting on a plane extending axially with respect to said handle member, one of which parts is mounted on the blade member and another of which parts is mounted on the handle member, coacting means on the complementary joint parts for operatively interlocking the said members together, a source of light on the blade member, a source of current mounted in the handle member, a contact member mounted on the complementary hinge joint part carried by the handle member and laterally offset from said co-extension plane, a second contact mounted on the complementary hinge joint part carried by the blade member and also laterally offset from said co-extensive plane so as to be engageable with the first-mentioned contact when the blade member is in its operative position, lead means interconnecting the source of light on the blade member and contact member, and lead means interconnecting the contact on the handle member and the source of current mounted in the handle member.

2. A laryngoscope comprising a handle member, a blade member, and a rotary hinge joint connecting the blade member and handle member, including complementary, laterally disposed coacting joint parts carried by the blade member and handle member and interconnecting the blade and handle members together, the said joint parts respectively having separable means freely interengaged with each other for enabling the blade to be freely shifted by gravity between a folded inoperative position relative to the handle and an extended operative position project-

ing from the handle, and said coacting joint parts having means frictionally engaging each other for holding the blade member in its extended operative position.

3. A laryngoscope comprising a handle member, a blade member, and a hinge joint separably connecting said members together, said hinge joint including cooperatively interengaged laterally disposed complementary joint parts, said joint parts being freely engaged one within the other for enabling said blade member to move by gravity to an operative position projecting outwardly from the handle member from an inoperative folded position adjacent to the handle member, means in said joint for interlocking said joint parts together against relative lateral movement when said members are in said operative and inoperative positions, said last-mentioned means being provided with means for unlocking said joint parts when said members are in a position intermediate said operative and inoperative positions for allowing lateral separation of said members.

4. A laryngoscope as defined in claim 3, wherein one of said joint parts is provided with a transversely extended bore, said bored part having an annular flange projecting radially into said bore and providing an annular key-track between said flange and the end of said bore, the other of said joint parts having a lateral projection complementary to the bore aforesaid, said projection having a key radially projecting into said key-track in joint interlocking relation with said flange, and said interlocking means comprises a key-way provided in said flange through which said key may pass.

5. A laryngoscope as defined in claim 3, wherein said interlocking means includes cooperatively engageable friction means in the respective joint parts for frictionally holding said members in said operative position.

6. A laryngoscope as defined in claim 3, wherein one of said joint parts is provided with a transversely extended bore, said bored part having an annular flange projecting radially into said bore and providing an annular key-track between said flange and the end of said bore, the other of said joint parts having a lateral projection complementary to the bore aforesaid, said projection having a key radially projecting into said key-track, and said key-track having a slightly eccentric portion frictionally engageable with said key for frictionally holding said members in said operative position.

WILLIAM G. ALLYN.

CHARLES SEWELL COOK.

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