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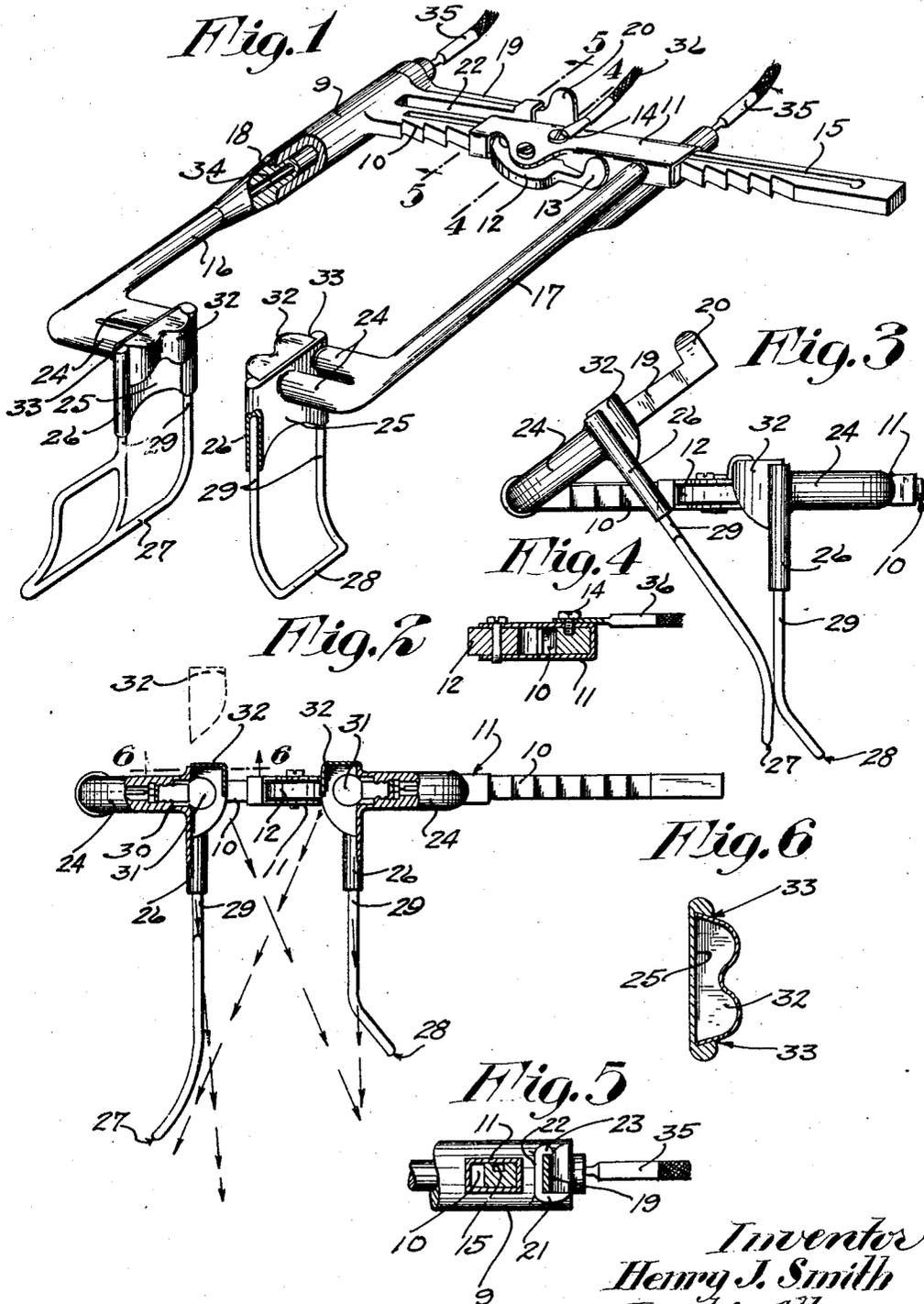
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1,706,500

SURGICAL RETRACTOR

Filed Aug. 1, 1927

2 Sheets-Sheet 1



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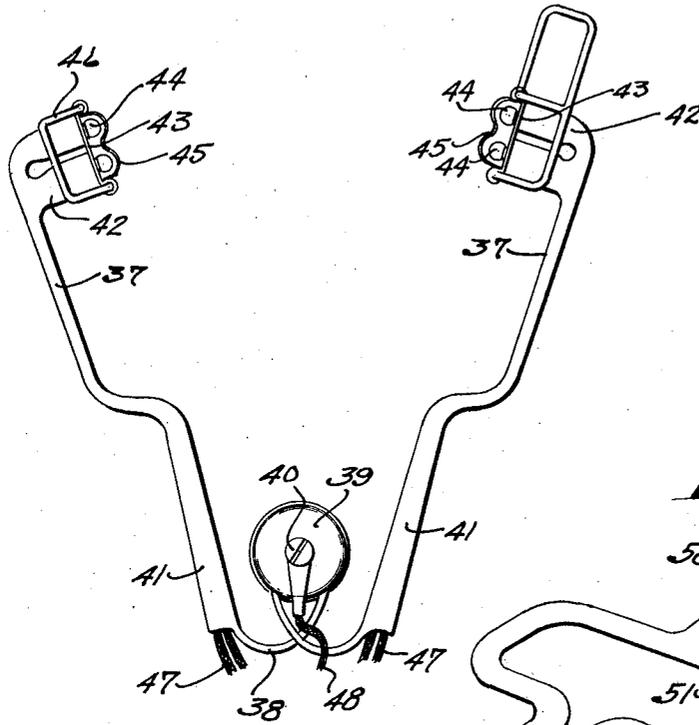
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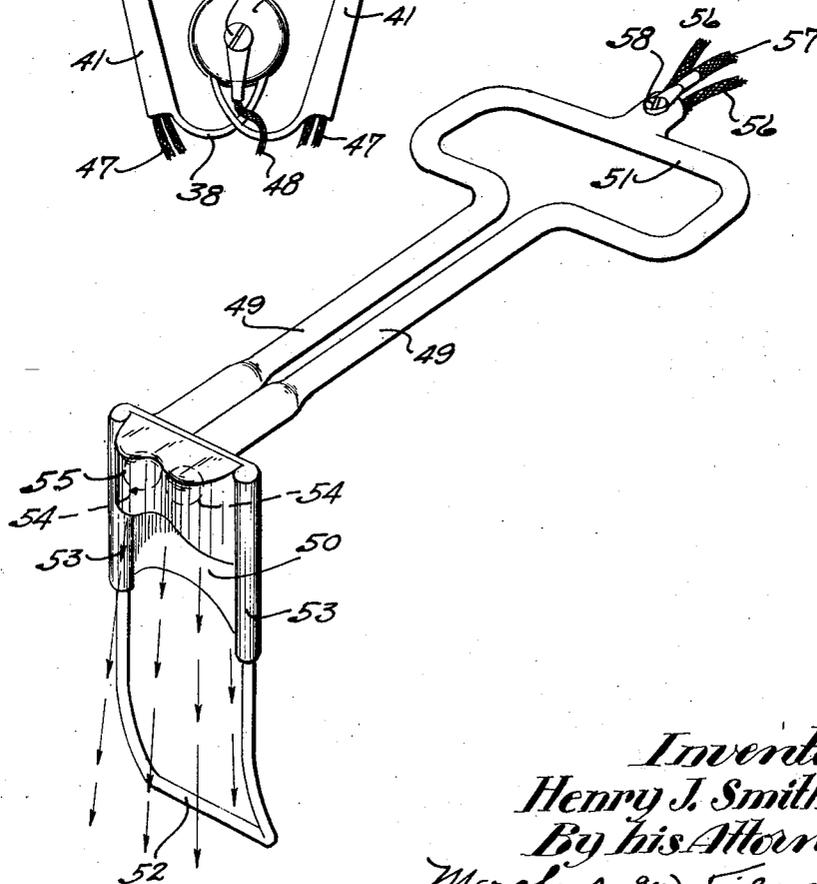
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*Fig. 7*



*Fig. 8*



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# UNITED STATES PATENT OFFICE.

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## SURGICAL RETRACTOR.

Application filed August 1, 1927. Serial No. 209,739.

My invention relates to a surgical retractor intended for general use but especially adapted for use in holding the walls of a body at an incision therein separated or drawn  
5 apart to facilitate the work of a surgeon performing an operation, and has for its object to improve the same, as will hereinafter appear.

To the above end, generally stated, the invention consists of the novel devices and combinations of devices hereinafter described and defined in the claims.

In the accompanying drawings, which illustrate the invention, like characters indicate like parts throughout the several views.

Referring to the drawings:

Fig. 1 is a perspective view showing one form of the invention, with some parts broken away and other parts sectioned;

20 Fig. 2 is a view in front end elevation with some parts broken away and other parts sectioned, and further illustrating, by means of broken lines, one of the reflectors removed from the respective apron;

25 Fig. 3 is a view corresponding to Fig. 2, but showing the turnable arm operated to bring its tip into close relation with the tip on the other arm;

30 Fig. 4 is a detail view principally in section taken on the line 4—4 of Fig. 1;

Fig. 5 is a fragmentary detail view with some parts sectioned on the line 5—5 of Fig. 1;

35 Fig. 6 is a detail view in section taken on the line 6—6 of Fig. 2;

Fig. 7 is a bottom plan view showing another form of the invention; and

Fig. 8 is a perspective view showing still another form of the invention.

40 Referring first to the invention as shown in Figs. 1 to 6, inclusive, the invention includes a frame comprising a relatively long sleeve bearing 9 having a ratchet bar 10 integrally formed therewith which extends radially therefrom, and a tubular slide 11 mounted on said ratchet bar for longitudinal sliding movement. The slide 11 is rectangular in cross section, closely fits around the ratchet  
45 bar 10, and is held thereby from turning in respect thereto.

Co-operating with the ratchet bar 10 for securing the slide 11 thereto in different ad-

justments, there is pivoted to said slide a dog 12 yieldingly held for engagement with any one of the teeth on said ratchet bar, and  
55 which teeth are arranged to hold the slide 11 against movement toward the sleeve bearing 9, but with freedom for sliding movement therefrom. The dog 12 is provided with a thumb piece 13 by which it may be  
60 operated to release said dog from the engaged tooth of the ratchet bar 10 and permit the slide 11 to be moved toward the sleeve bearing 9. To prevent the slide 11 from being  
65 accidentally detached from the ratchet bar 10, said slide is provided with a screw 14 which works in a longitudinal slot 15 formed in the ratchet bar 10.

The invention further provides a pair of parallel tubular arms 16 and 17, the former  
70 of which is mounted in the sleeve bearing 9 to turn on its longitudinal axis, and the other of which is rigidly secured to the slide 11. An external annular shoulder 18 on the arm 16 engages the forward end of the sleeve  
75 bearing 9 as a stop to prevent rearward movement of the arm 16 in said bearing. To lock the arm 16 from turning movement in the sleeve bearing 9 and in a predetermined set  
80 position, there is rigidly secured to the rear and end thereof a spring lever 19 having on its free end a finger-piece 20. This lever 19 rests on a relatively long stop shoulder 21 on an arm 22 integrally formed with the sleeve bearing 9, extends parallel to the  
85 ratchet bar 10, and is laterally spaced rearward therefrom. Also integrally formed with the arm 22 is a lock lug 23 which overlies the lever 19 and normally holds the same from being lifted from the stop shoulder 21.  
90 Obviously, by a rearward pressure on the finger-piece 20, the lever 19 may be sprung rearward and moved on the stop shoulder 21 from under the lock lug 23 to release the same and thereby permit said lever to be lifted to  
95 turn the arm 16 in the sleeve bearing 9.

Each arm 16—17 is provided with an inverted laterally projecting bifurcated extension 24, the members of which are tubular and open into the respective arms 16—17.  
100 The two extensions 24 are aligned transversely of the arms 16—17 and have rigidly secured thereto a pair of parallel aprons 25 which extend at right angles to said extension

and parallel to the arms 16 and 17. Formed with the longitudinal edges of each apron 25 is a pair of tubular seats 26 which extend into said aprons from the lower edge thereof.

5 The arms 16 and 17 are provided with a pair of interchangeably usable tips 27 and 28, respectively. Each tip 27—28 is provided with a pair of upstanding prongs 29 which are frictionally held in the seats 26 of the respective apron 25. It may be here stated that 10 each pair of prongs 29 require slight springing movement toward each other to insert the same into the seats 26 so that they will be yieldingly and frictionally held in position. 15 It will be noted that the tip 27 is considerably wider than the tip 28 and these tips may be interchanged or tips of various different shapes and sizes may be substituted therefor, depending on the class of work for which 20 they are intended to be used.

Formed in each member of each extension 24 is a relatively deep light bulb socket 30 which extends through the respective apron 25 perpendicular thereto as well as the respective arm 16—17. Lamp bulbs 31 are removably held in the sockets 30 by screw threads and it will be noted, by reference to 25 Fig. 2, that only portions of their outer ends, in which the light is generated, project beyond the opposing surfaces of the aprons 25. 30 To each apron 25 is removably applied a reflector 32 for the respective pair of light bulbs 31. The reflectors 32 have dove-tailed sliding engagement with the apron 25, as indicated at 35 33, and are removable therefrom by a lifting movement only. The depth of the seats in the aprons 25 for the reflectors 32 is such that the tops thereof are flush with the upper edges of said aprons.

40 A pair of insulated wires 34 for each pair of light bulb sockets 30 are laid in the respective tubular arm 16—17 and their extension 24 and have their inner ends attached one to each socket 30 and their outer ends are separably connected to a lead wire 35. A ground 45 wire 36 for the sockets 30 is attached to the frame by the screw 14. The lead wires 35 and ground wire 36 lead from any suitable source of electrical energy.

50 The operation of the surgical retractor may be briefly described as follows:

The arms 16 and 17 are first adjusted relatively close together and the lever 19 released from the lock lug 23 and operated to turn 55 the arm 16 and bring its tip 27 into contact with the tip 28, as shown in Fig. 3. In this position of the tips 27 and 28 they are inserted into an incision and the lever 19 is then operated to again turn the arm 16 and properly position its tip 27, as shown in Figs. 1 60 and 2. This movement of the lever 19 is limited by its engagement with the stop shoulder 21 and when released, will spring laterally under the lock lug 23 and thereby 65 securely hold the lever 19 against movement.

in either direction so that the tip 27 is positively held in its proper relation to the tip 28.

The arms 16—17 are then drawn apart to spread the walls of the body at the incision and thus hold the same. During this move- 70 ment of the arms 16—17, the dog 12 freely rides over the teeth of the ratchet bar 10, but when stopped will automatically engage one of the teeth and hold said arms where set. 75 By forming the arms 16—17 with the extensions 24 equipped with light bulb sockets 30 that extend perpendicular to the aprons 25, said arms and sockets are positioned outside of the field of the incision so that they are out of the surgeon's way. The mounting of 80 the light bulbs 31 is such as to occupy very little space within the field of the incision and are out of the way.

The reflectors 32 co-acting with the aprons 25 direct the rays of light from the light bulbs 85 31, as indicated by arrows in Fig. 2, throw the light downward where needed, and at the same time prevent the same from being reflected upward into the eyes of the surgeon. Said reflectors 32 also prevent the bulbs 31 90 from becoming coated with blood or other foreign matter and at the same time protect the light bulbs 31 from being hit with an instrument during the operation, and broken. 95 The reflectors 32 are firmly held in position on the aprons 25 so that they cannot be accidentally dislodged, but at the same time they may be easily removed for various different purposes, such as changing the bulbs 31, or for cleansing or sterilizing the retractor. 100

The aprons 25 prevent blood from coming into contact with the light bulbs 31 and, as previously stated, co-act with the reflectors 32 to properly direct the rays of light from the lamp bulbs 31. These aprons 25 also rigidly 105 connect the members of each extension 24 and thereby firmly hold the sockets 31 in position.

By extending the wires 34 through the tubular arms 16—17 they are out of the way and at the same time fully protected so that 110 they cannot be disconnected from their terminals.

Referring now to the instrument illustrated in Fig. 7, the action thereof is the same as that of the instrument just described 115 with the exception that the tubular arms 37 are connected by a sear spring 38, under strain to open said arms and hold the same in diverging relation. The intermediate coil of the spring 38 is inclosed in a two-part case 120 39, the sections of which are detachably connected by a screw 40. The rear-end portions of the arms 37 are laterally offset toward each other to afford a pair of handles 41 adapted to be grasped in the hand of an operator and 125 pressed toward each other to move the arms 37 toward each other against the tension of the spring 38.

The arms 37, at their outer ends, are provided with lateral extensions 42 to which 130

aprons 43 are secured. Light bulbs 44 are mounted in sockets in the members of the extensions 42 and provided with reflectors 45. Interchangeably usable tips 46 are removably mounted in tubular seats in the aprons 43. The elements 42 to 46, inclusive, as shown, are identical with corresponding elements illustrated in the first described instrument. Lead wires 47 for the light bulb sockets are laid the arms 37 and their extensions 42, and a ground wire 48 is attached to the instrument by the screw 40.

To insert the tips 46 into an incision, the arms 37 are pressed together by handles 41 to bring their tips 46 close together and after being inserted into an incision, said handles are gradually released to allow the spring 38 to swing the arms 37 apart and thereby cause the tips 46 to engage the walls of the body at the incision and draw the same apart and hold the same spread.

Referring now to the retractor illustrated in Fig. 8, the same is a very simple structure and has only one tip for contact with one of the walls of the body at an incision therein, and is intended to be manually held when in use. However, this retractor may be used singly or in pairs and if desirable, suitable means may be provided for holding the same operative.

This retractor includes a frame comprising a tubular member folded upon itself to afford a pair of parallel arms 49 rigidly connected at their free ends by an apron 50 that extends at right angles thereto. The frame, at its transverse portion, is expanded to afford a handle 51 by which the instrument may be held. The tip 52 like the tip 28 is mounted in tubular seats 53 in the apron 50 and light bulbs 54 are removably mounted in light bulb sockets in the outer ends of the arms 49 and extended through apertures in the apron 50. Removably mounted on the apron 50 is a reflector 55. The elements 50 to 55, inclusive, are identical with those shown in the other illustrations of the instrument with the exception that the light bulbs 54 are axially aligned with the longitudinal axes of the arms 49 instead of extending perpendicular thereto. Lead wires 56 for the light bulb sockets are extended through the tubular frame and a ground wire 57 is attached by a screw 58 to said frame.

What I claim is:

1. A surgical retractor including an arm having a pair of tubular seats, extending transversely of the arm and laterally spaced longitudinally thereof, and a tip having a pair of prongs removably held by friction in the seats.

2. A surgical retractor including an arm having a laterally offset apron extending substantially parallel thereto, said apron having a pair of tubular seats extending transversely of the arm and laterally spaced

longitudinally thereof and a tip having a pair of prongs removably held by friction in the seats.

3. A surgical retractor including a pair of arms having laterally and inwardly offset aprons on their outer ends, and tips applied to the aprons and forming lower end extensions thereof.

4. The structure defined in claim 3 in which the tips have prongs removably held by friction in tubular seats in the aprons and removably securing the tips to the aprons.

5. A surgical retractor including a frame, a pair of arms on the frame, one of which is mounted to turn on its longitudinal axis, and a pair of co-operating tips on the arms.

6. The structure defined in claim 5 in further combination with latch-acting means for holding the turnable arm with its tip in a predetermined position in respect to the tip on the other arm.

7. The structure defined in claim 5 in which the frame is adjustable to impart reverse movements to the arms.

8. A surgical retractor including a frame having a bearing sleeve, a laterally projecting ratchet bar on the sleeve, a slide on the ratchet bar having a dog for cooperation therewith, a pair of arms, one of which is mounted in the bearing sleeve to turn on its longitudinal axis and the other of which is rigidly secured to the slide, and co-operating tips on the arms.

9. A surgical retractor including a tubular arm having a depending tip and a lamp bulb socket above the tip, an electric wire for the socket laid in the tubular arm, and a lamp bulb in the socket.

10. The structure defined in claim 9 in further combination with a reflector for the lamp bulb.

11. A surgical retractor including an arm having a laterally offset extension, a depending apron on the extension extending substantially parallel to the arm, a tip forming a lower end extension of the apron, a light bulb socket in the extension, a light bulb in the socket projecting through the apron, and a reflector mounted on the apron for the light bulb.

12. A surgical retractor including a pair of arms connected for reverse lateral movements and having lateral extensions that project toward each other, a pair of depending aprons on the extension, tips forming lower end extensions of the aprons, light bulb sockets in the extensions, a light bulb in the socket extending through the aprons, and reflectors mounted on the aprons for the light bulbs.

13. The structure defined in claim 12 in further combination with electric wires for the sockets laid in the tubular arms, and a ground wire connected to the arms.

14. A surgical retractor including a frame having a sleeve bearing, a laterally project-

ing ratchet bar on the bearing, a slide on the ratchet bar having a dog for cooperation therewith, a pair of tubular arms, one of which is mounted in the bearing to turn on its longitudinal axis, and the other of which is rigidly secured to the slide, said arms having a pair of lateral extensions that project toward each other, a pair of aprons on the extensions, light bulb sockets in the extensions, light bulbs in the sockets extending through the aprons, reflectors on the aprons for the light bulbs, electric wires for the sockets laid in the tubular arms, and a ground wire attached to the slide. 10

In testimony whereof I affix my signature.  
HENRY J. SMITH.