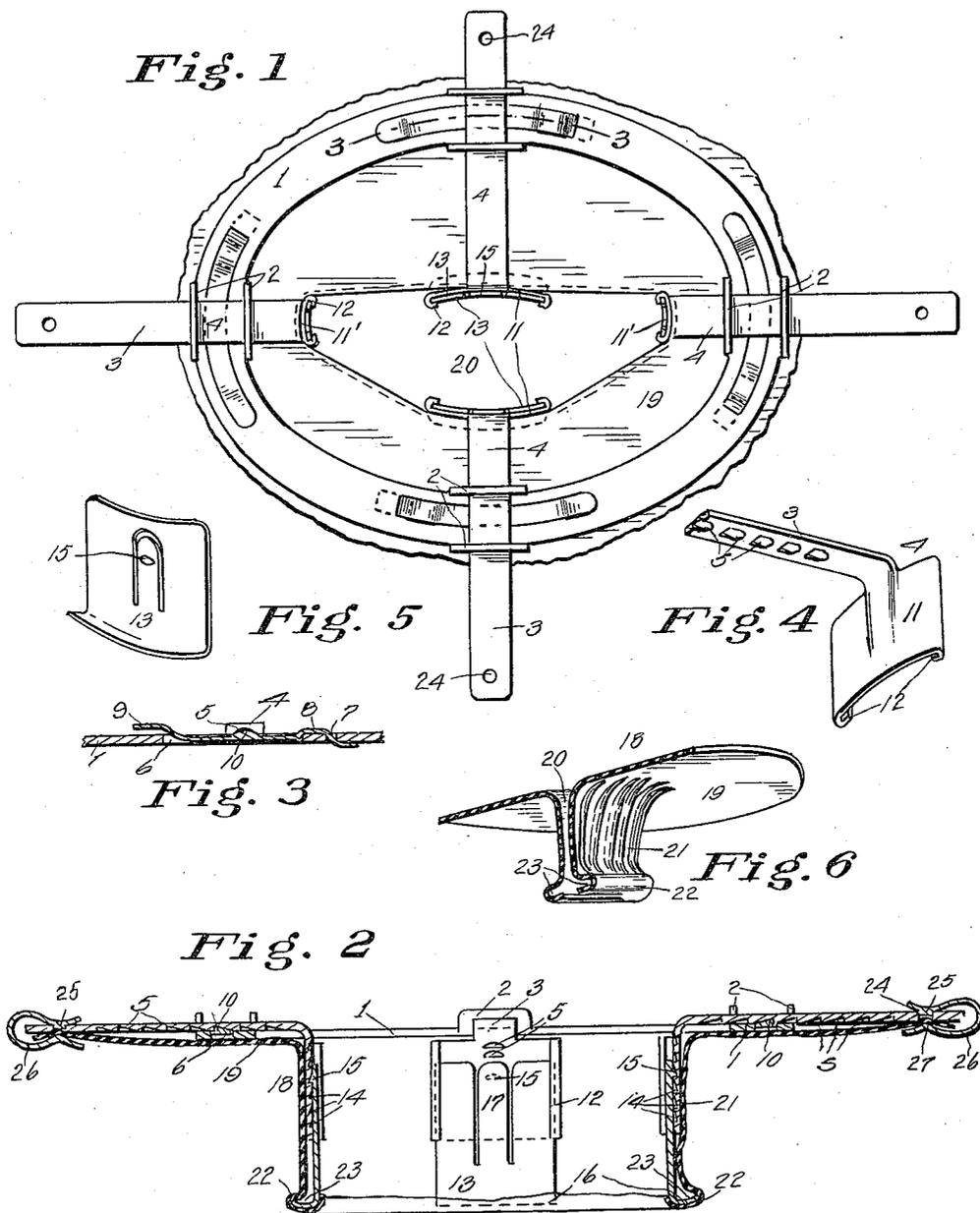


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 SURGICAL APPARATUS.
 APPLICATION FILED OCT. 14, 1913.

1,157,202.

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SURGICAL APPARATUS.

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Specification of Letters Patent.

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To all whom it may concern:

Be it known that we, URI C. BATES and JEROME McLELAND, citizens of the United States, residing at Seattle, in the county of King and State of Washington, have invented certain new and useful Improvements in Surgical Apparatus, of which the following is a specification.

This invention relates to surgical apparatus and particularly to devices for retracting the sides of an incision in the abdominal walls to enable the surgeon to work upon the deeper tissues.

One of the objects of the invention is the provision of novel retractile means whereby the operator may adjustably retain the sides of an incision in suitably open condition.

Another object of the invention is the provision of vertically adjustable elements associated with said retractile means whereby, when retracted and first engaged, the abdominal walls may be raised to assist the insertion of packing gauze to keep the operating field clear of intestines.

A still further object of the invention is the provision of an elastic lining for the opening made by the operator whereby the edges of the incision are protected from infection and a hemostatic effect produced which avoids a large element of danger due from hemorrhage.

The invention consists in the novel construction of the mechanical retractor devices and their combination, together with the adaptation therewith of said elastic lining, which will be fully described in the following specification, illustrated in the accompanying drawings, and finally set forth in the appended claims.

In said drawings, Figure 1 is a top plan view of apparatus embodying our invention. Fig. 2 is a longitudinal vertical sectional view of the same. Fig. 3 is a curved sectional view through 3-3 of Fig. 1. Fig. 4 is a detail detached perspective view of one of the retractile elements. Fig. 5 is a similar view of a vertical slide attached to each said retractile element, slightly modified from the form shown in Fig. 2. Fig. 6 is a perspective view of an elastic lining for the instrument, shown in end section.

Referring to said views, the reference numeral 1 designates a frame of any suitable configuration, but preferably formed as shown, as an oval or an ellipse, comprised of a continuous plane metal strip, flat in cross-

section. The opposite inner and outer edges of the frame have apertured up-turned integral lugs 2 arranged in pairs to afford supporting guides for the horizontally arranged bars 3 of retractile elements or retractors 4. Said retractors may be of any desired number but are here shown as four in number having their said bars radiating from the vertical axis and those oppositely disposed in the major and minor axes of the frame, respectively. The underside of each said bar 3 engages the upper side of said frame-strip and is formed with a plurality of ratchet-notches 5. Said frame-strip is formed with an arcuate slot 6 subjacent said retained bar 3 and spaced from said slot at one end is an aperture 7. A bent spring 8 is secured at one end in said aperture and is extended symmetrically with said frame into said slot pressing resiliently upward upon said bar 3 and thence extends by an upward bend 9 above the frame and beyond said slot. A tooth 10 extends from the upper face of said spring and engages with said ratchet notches 5 of the bar and secures the retractor in predetermined retracted position. To advance the retractors, the end 9 of the spring 8 is depressed to disengage the tooth 10 from said notches. The inner end of said retractors comprises a shield 11 arranged at right angles to said bars and having a curvature substantially corresponding to that of the adjacent portion of the frame. As indicated in Fig. 1 the shields 11 of said retractors in alinement with the major axis of the frame may be of less width than those laterally adjacent. The lateral vertical edges of each said shield are formed to provide guideways 12 for the slidable reception of an extension-plate 13. Said shield is further provided with ratchet notches 14 on its inner concave face adapted to coact with engaging devices upon said extension. Referring to Fig. 2, said extension is seen to comprise a vertical curved plate having its side edges adapted to engage within said guideways 12 and a horizontally extending integral ledge or foot 16 along its bottom edge. Said plate 13 is vertically slotted to afford a spring-tongue 17 formed with a tooth 15 adapted to engage in said notches 14 and retaining the extension in adjusted vertical positions. In Fig. 5 is shown a modified form of said extension plate.

A lining 18 of elastic material, preferably rubber, is provided to complete the appara-

tus comprising a diaphragm 19 of similar superficial configuration as said frame and of somewhat larger dimensions in the horizontal plane. An elongated opening 20 is formed in its middle portion with its length in alinement with the major axis of the frame. The material of said lining is extended downwardly integrally from the diaphragm to form an elongated tubular neck 21, which may be vertically ribbed, as shown in Fig. 6, to obtain greater elasticity, and terminates at its bottom edge in an outwardly directed fold 22 furnishing a continuous internally opening crease 23 for the reception of the respective extension-feet 16. A circular hole 24 is formed near the outer extremity of each said bar 3 to afford a seat for a pin 25 upon one end of a spring-metal bow-clip 26 which straddles each said bar extremity. Said clip is further provided with a projection 27 upon its opposite end adapted to protrude within the underside of said hole and yieldingly pinch the peripheral edge of the diaphragm 19 and secure the same in plane condition by slight tension.

The apparatus is assembled by engaging the retractors with the frame, as described, and adjusting the lining 18 therewith so that the diaphragm 19 will underlie the frame strip and said bars 3 of the retractors while the shields 11 are extended downwardly within the tubular neck 21 and the foot 16 of each extension-plate thereof is entered said crease 23, as clearly shown in Fig. 2. Upon making an incision in the abdominal wall of a patient, the surgeon introduces the neck 21 and the contained dependent portions of said retractors therein while the latter are in their advanced positions and the neck under slight, if any, tension. The major axis of said frame will be, of course, in alinement with the length of the incision. The extension plates 13 may then be depressed to extend below the abdominal wall whereby the several layers of said wall, including skin, fascia, muscle and peritoneum, are included between the rubber-incased foot 16 and the lining diaphragm. The several retractors are then slidably moved in outward directions against the pressure of the elastic lining, stretching the edges of the incision to any suitable degree to obtain the necessary opening for convenient work within the abdominal cavity. Before the operator proceeds with his work it may be desirable to closely engage the lower extending fold 22 of the neck 21 with the under portion of the peritoneal surface of the abdominal cavity to fully isolate the margins of the wound from any source of infection. This is accomplished by the operator extending his fingers beneath the respective feet 16 and pressing the plate 13 upward where it is retained by the laterally extending ratchet-devices, thus closely associating the portion of

the tubular neck 21 with the peritoneum and allowing space for the insertion of packing gauze to insure a clear operating field.

Of the advantages resulting from the use of our apparatus, we particularly indicate its functions as an abdominal incision or wound-retractor wherein the incision is distended to enable the surgeon to work upon the deeper tissues. Again, as a wound protector the elastic lining is employed to cover the edges of the incision including the various layers of which the abdominal wall is composed—from contact with infective matter from without or within, thus keeping the wound aseptic; and lastly as a hemostatic, where, by means of pressure on the sides of the incision exerted through the rubber or other material by the retractors, the hemorrhage is controlled, thus saving the time of the surgeon and preventing the loss of blood and the leaking of the blood into the abdominal cavity where it may do damage to the patient.

What we claim as our invention, is—

1. In apparatus of the class described, a frame having an interior space, an elastic lining adapted to underlie said frame and formed with an opening arranged symmetrically relative to said frame-space, and means slidably connected to said frame and extending through said opening whereby the said opening may be adjustably distended.

2. In apparatus of the class described, a frame having an unobstructed interior space, an elastic lining adapted to underlie said frame comprised of a diaphragm having a centrally disposed opening having a tubular connection, and means slidably connected to said frame and extending into said tubular portion whereby the latter may be distended.

3. In apparatus of the class described, a frame having an unobstructed interior space, an elastic lining adapted to underlie said frame comprised of a diaphragm having a centrally disposed opening having a tubular connection, a plurality of retractors slidably connected to the frame having their inner end extending within said space, each said end adapted to engage said tubular portion and adjustably retain the same in distended condition.

4. In apparatus of the class described, an annular frame provided with radially directed guide apertures, retractor devices each comprising a bar slidably receivable in said apertures and formed with a downwardly directed shield on their inner ends, a lining adapted to be interposed between said frame and the patient having an opening therein arranged symmetrically relative to said frame, said lining adapted to be engaged by said shield to adjustably distend said opening.

5. In apparatus of the class described, an annular frame provided with radially di-

rected guide apertures, retractor devices each comprising a bar slidably receivable in said apertures and formed with a downwardly directed shield on their inner ends, spring-pressed means securing said devices in adjusted positions, a lining adapted to be interposed between said frame and the patient having an opening therein arranged symmetrically relative to said frame, said lining adapted to be engaged by said shield to adjustably distend said opening.

6. In apparatus of the class described, an annular frame provided with radially directed guideways therein, retractors slidably mounted in said guideways and formed with downwardly directed shields on their inner ends, extension plates slidably connected to said shields each provided with a laterally extending foot, an elastic lining having a diaphragm underlying said frame and formed with an opening in its central portion, an integral tubular neck extending downwardly from said opening and provided with means in its lower portion engageable with said extension-foot.

7. In apparatus of the class described, an annular frame provided with radially directed guideways therein, retractors slidably mounted in said guideways and formed with downwardly directed shields on their inner ends, extension plates slidably connected to said shields each provided with a laterally extending foot, means to secure said extension in adjusted vertical positions, an elastic lining having a diaphragm underlying said frame and formed with an opening in its central portion, an integral tubular neck extending downwardly from said opening and provided with means in its lower portion engageable with said extension-foot.

8. In apparatus of the class described, an annular frame provided with radially directed guideways therein, retractors slidably mounted in said guideways and formed with downwardly directed shields on their inner ends, extension-plates slidably connected to said shields each provided with a laterally extending foot, means for retaining said retractors in adjusted retracted positions, an elastic lining having a diaphragm underlying said frame and formed with an opening in its central portion, an integral tubular neck extending downwardly from said opening and provided with means in its lower portion engageable with said extension-foot.

9. In apparatus of the class described, an

annular frame provided with radially directed guideways therein, retractors slidably mounted in said guideways and formed with downwardly directed shields on their inner ends, extension-plates slidably connected to said shields each provided with a laterally extended foot, means to secure said extension in adjusted vertical position, means for retaining said retractors in adjusted retracted positions, an elastic lining having a diaphragm underlying said frame and formed with an opening in its central portion, an integral tubular neck extending downwardly from said opening and provided with means in its lower portion engageable with said extension-foot.

10. In apparatus of the class described, an elliptical frame provided with radially directed guideways therein, retractors slidably mounted in said guideways and formed with downwardly directed shields on their inner ends, extension-plates slidably connected to said shields each provided with a laterally extending foot, an elastic lining having a diaphragm underlying said frame and formed with an elongated opening in the major axis of said frame, an integral tubular neck extending downwardly from said opening and provided with means in its lower portion engageable with said extension-foot.

11. In apparatus of the class described, an elliptical frame provided with radially directed guideways therein, retractors slidably mounted in said guideways and formed with downwardly directed shields on their inner ends, extension-plates slidably connected to said shields each provided with a laterally extending foot, means to secure said extension in adjusted vertical positions, means for retaining said retractors in adjusted retracted positions, an elastic lining having a diaphragm underlying said frame and formed with an elongated opening in the major axis of said frame, an integral tubular neck extending downwardly from said opening and provided with means in its lower portion engageable with said extension-foot.

Signed at Seattle, Wash., this 9th day of October, 1913.

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