

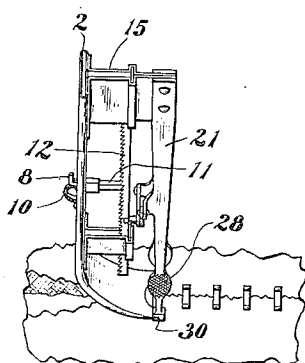
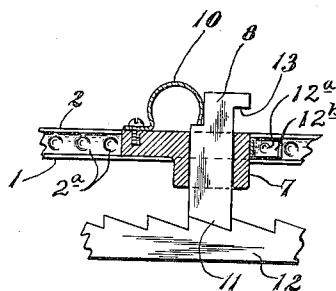
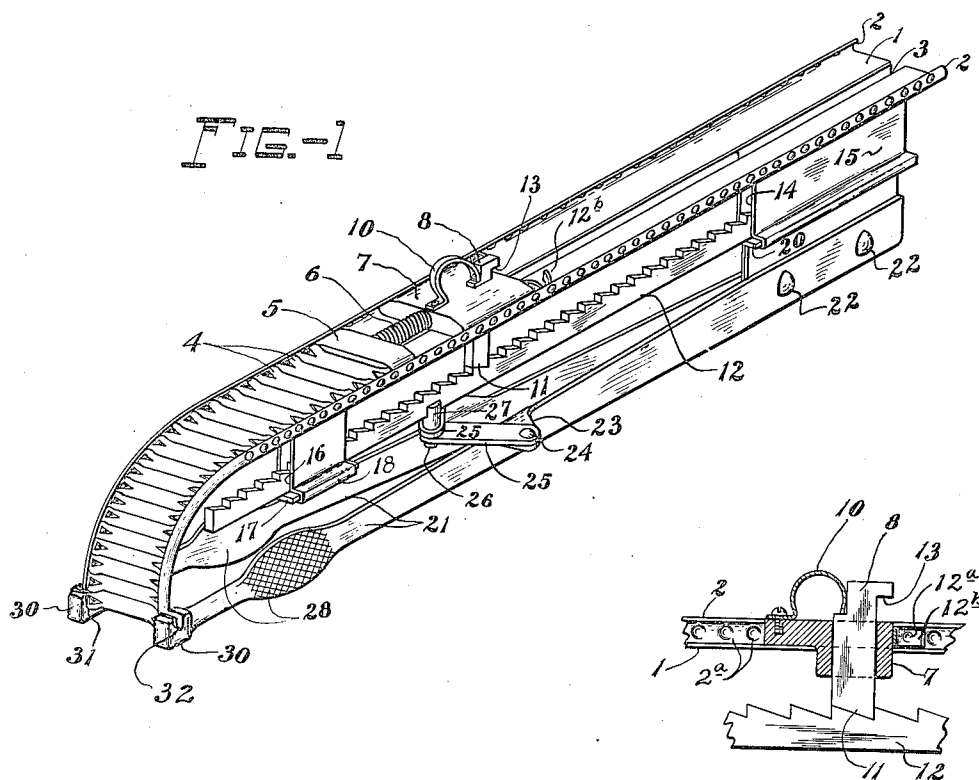
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2,090,831

SURGICAL INSTRUMENT

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SURGICAL INSTRUMENT

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13 Claims. (Cl. 1—49.1)

This invention relates to surgical instruments and in particular to magazine-type wound clip forceps.

5 The invention has for its objects the provision of a simple, durable and reliable instrument of the type described which does not require the employment of a special type of clip and which may be used in exactly the same manner as is the ordinary type of forceps which hold but a single clip and which require the insertion of a new clip each time the forceps are used.

10 Another object of the invention relates to the provision of an instrument of the type described, in which the clips are fed with precision to the jaws of the forceps and fixedly held in place by such jaws when the clip is pressed against the tissue of the wound.

15 A further object of the invention relates to the provision of an instrument of the type described employing a minimum number of parts, the same being arranged so that the instrument may be readily disassembled for sterilizing and for introducing the wound clips into their holder.

20 With these and other objects in view, the invention consists in the novel construction, arrangement and combination of parts, hereinafter illustrated and described in some of its embodiments in the accompanying drawing, and particularly pointed out in the appended claims.

25 The prior art shows magazine-type, wound clip forceps, as for example the patents to LeWitt 948,456, Bacolini 1,199,653, and Richter Patents 1,203,269 and 1,203,270. In the use of instruments of the type shown in the last three patents, the body of the instrument is held close to and parallel to the wound, thus obscuring a part of the wound and requiring the operator to learn a new technique different from that used in handling the ordinary clip forceps.

30 In magazine fed instruments of the type in which the forceps are held in a vertical position with respect to the wound, as for example, the device illustrated in the LeWitt patent, a special type of clip is employed and the instrument has no positive means for immovably holding the clip which is being applied to the wound in position, and as pressure is being exerted upon the clip before it is clamped there is the danger of the clip moving away from the wound against the force of the spring which is holding it.

35 Stated in general terms, my invention consists in the addition to the ordinary wound clip forceps, of means for automatically feeding, one at a time, to the jaws of the forceps a number of clips sufficient to take care of the repair of any

ordinary wound or incision. The forceps and the clip feeding device provided therefor, are arranged so that the instrument is manipulated and handled in substantially the same manner as for the ordinary single-clip forceps, and the use of the instrument does not require the operator to employ or learn a new technique for its manipulation.

One form of device in which the objects sought may be attained, is illustrated in the accompanying drawing in which:

Figure 1 is a perspective view of the instrument; Figure 2 is an enlarged detail view of a part of the clip-feeding mechanism; and Figure 3 is a perspective view of the instrument in position for use.

The instrument comprises a clip magazine in the form of a guideway 1 with curved or channeled sides 2 and a central slot 3 intermediate the width of the guideway. The guideway is provided for holding edge-to-edge a number of wound clips of conventional type sufficient for repairing an ordinary wound. The clips are carried in the guideway with their prongs facing away from the instrument. It is, of course, obvious that the magazine or guideway may be made longer or shorter if desired. The length of guideway shown is sufficient for all ordinary purposes.

A member 5, guided for movement between the sides 2 of the guideway 1, abuts against the rear-most clip in the magazine. A compression spring 6 urges the member 5 against such clip. The spring 6 at one end engages the member 5 and is maintained in tension by means of a movable spring abutment block 7, which engages with the other end of the spring. The block 7 is slidably mounted in the guideway 1 between the sides 2 of the guideway 1. The abutment block 7 is provided with an opening for slidably receiving a pin or ratchet 8 which projects through the slot 3 and has its inner end 11 cut on an angle and held in place in one or the other of the notches of a ratch or toothed bar 12 by means of a spring 10 carried by the spring abutment block 7.

The inwardly facing surfaces of the sides 2 of the guideway 1 are provided with a series of small depressions 2^a which are adapted to be engaged with similarly formed offset portions 12^a of a spring 12^b, which is secured to the rearward side of the spring abutment block 7. The spring 12^b serves to hold the abutment 7 in its various adjusted positions, the same being advanced in a step-by-step manner by means of mechanism as-

sociated with the ratch 12 which will be described in detail presently.

The ratchet 8 is provided with an offset part 13 at its upper end to facilitate manually releasing the ratchet from the toothed bar or ratch 12, whereupon the abutment 7 and the associated member 5 and spring 6 may be slid along the guideway 1 and removed therefrom for the purpose of filling the magazine with a new supply of clips.

The ratch 12 is slidably received in a T-shaped slot or guideway 14 provided by a fixed member 15 at one end of the instrument. A second T-shaped slot or guideway 16 is provided at the other end of the instrument by a member 18 fixedly secured to the underside of the guideway 1. A plate 17 is fastened to one edge of the ratch 12 at the place where the ratch is received in the slot 16, and in a similar manner a plate 20 is secured at the other end of the ratch at the place where it is guided for movement in the slot 14.

The forceps include a pair of spring arms 21, the adjacent ends of which are fixedly secured by any suitable means such as rivets 22 to the member 15. Intermediate their ends, the spring arms 21 are each provided with a bent-over part 23 for receiving a pin 24 by means of which an end of each of the elements 25 of a toggle joint is pivotally connected to each of the spring arms 21. The adjacent ends of the elements 25 of the toggle joint are pivotally connected to each other by means of a pin 26 having an enlargement 27 which is removably received in a suitable notch formed in the ratch 12. The spring arms 21 are provided with finger-engaging portions or pads 28 by means of which the instrument may be held between the thumb and forefinger of the operator.

From the foregoing, it will be seen that when the spring arms 21 are pressed together, the toggle joints formed by the elements 25 will serve to advance the ratch 12 a distance equal to the width of one clip or the space between two successive notches 2a, whereupon the spring 6 will serve to press the element 5 against the clips 4. It is contemplated in the use of the instrument that the spring 6 will be placed under a slight initial tension so that it always has a tendency to urge the clips along the guideway 1.

The free ends of the spring arms 21 are provided with blocks or jaws 30, the inner faces of which are notched at 31 for receiving the ends of one of the clips 4 and for providing a positive abutment for such clip by means of which the clip may be pressed in place with considerable pressure against the tissue of the wound and then clamped thereon by pressing the spring arms 21 and jaws 30 together. The forward end of the guideway 1 is bent over on an easy radius to form a ninety degree angle in order to feed the clips in proper position for application to the wound, with the instrument in a position normal to the wound. The clip guideway 1 terminates just short of the jaws 30 so as not to be in the way when the jaws are moved together in clamping a clip in place.

Stops 32 fixedly attached to the end of the guideway 1 are provided to prevent the spring arms 21 from separating too far. Ordinarily the spring arms have sufficient tension to hold them against the stops 32, and after the jaws 30 have been used to clamp one of the clips, upon release of the jaws from such clip, they will move against the stops 32 whereupon a fresh clip will move into position between notches 31 of the jaws 30.

The introduction of a new supply of clips may be readily effected in the manner previously described. The instrument may be completely disassembled for sterilizing and cleaning by first removing the parts 5, 6, 7 and 8 and then by pressing down upon the toggle joint elements 25; the portion 27 of the pin 26 may be released from engagement with the ratch 12 whereupon the same may be removed from the instrument.

In Figure 3 the instrument is shown in one of the positions in which it might be held in applying a series of clips to a wound or incision. It is preferred by many to hold the instrument in position with the clip magazine to the rear of the unclipped portion of the incision, as distinguished from the position illustrated. The instrument may be operated from either one of the aforesaid positions and it may be used equally well with either the right or the left hand of the operator.

Furthermore, it is to be understood that the particular forms of apparatus shown and described, and the particular procedure set forth are presented for purposes of illustration and explanation and that various modifications of said apparatus and procedure may be made without departure from the invention as defined in the appended claims.

Having thus described my invention what I claim is:

1. In a surgical device for applying wound clips, means for carrying a supply of clips, and resilient means acting upon said clips with a substantially constant pressure for automatically feeding such clips to one end of the device immediately upon the release of an applied clip, said last-named means including elements at one end of the device for receiving the clips one at a time and positively holding them against movement and for clamping the clips with said device in a position normal to the surface being worked upon.

2. In a surgical device for applying wound clips, a magazine for carrying a supply of clips, said magazine comprising a guideway extending longitudinally of the device and being inturned at one end so as to turn the clips through an angle of substantially ninety degrees, and resilient means acting upon said clips with a substantially constant pressure for automatically feeding such clips to one end of the device immediately upon the release of an applied clip, said last-named means including elements at one end of the device for receiving the clips one at a time and positively holding them against movement and for clamping the clips with said device in a position normal to the surface being worked upon.

3. In a surgical device for applying wound clips, a magazine for carrying a supply of clips, and positively actuated resilient means acting upon said clips with a substantially constant pressure for automatically feeding such clips one at a time to the end of the device immediately upon the release of an applied clip, said last-named means including elements at one end of the device for receiving the clips one at a time and positively holding them against movement and for clamping the clips with said device in a position normal to the surface being worked upon.

4. In a surgical device for applying wound clips, a magazine for carrying a supply of clips, and means including a ratchet for feeding such clips to one end of the device, said last-named means including elements at one end of the device for receiving the clips one at a time and positively holding them against movement and

for clamping the clips with said device in a position normal to the surface being worked upon.

5. In a surgical device for applying wound clips, means for carrying a supply of clips, means for feeding such clips to one end of the device, said last-named means including elements at one end of the device for receiving the clips one at a time and positively holding them against movement and for clamping the clips with said device in a position normal to the surface being worked upon, said clip feeding means including mechanism which is positively advanced each time a clip is clamped.

6. In a surgical device for applying wound clips, means for carrying a supply of clips, means for feeding such clips to one end of the device, said last-named means including elements at one end of the device for receiving the clips one at a time and positively holding them against movement and for clamping the clips with said device in a position normal to the surface being worked upon, said clip feeding means including spring arms associated with said elements and positively connected to a mechanism which is positively moved a distance equal to the width of a clip each time a clip is clamped.

7. A device for applying wound clips comprising, a magazine arranged to receive a number of clips, means for forcing the clips toward the mouth of the magazine including spring clamp arms located alongside of the magazine and mechanism associated with said arms for advancing the clips in a step-by-step manner, said arms having jaws with recesses located at opposite sides of the magazine and arranged to receive from the magazine and retain a clip in position for application to a wound or incision.

8. A device for applying wound clips comprising, a magazine arranged to receive a number of clips in side-by-side relation, said magazine comprising a channeled guideway arranged to temporarily retain the clips therein, and means associated with the magazine for forcing the clips toward the mouth thereof, said means including a pair of spring clamp arms fixedly secured at one end to the magazine and arranged at the other end to engage the clips to manipulate them.

9. A device for applying wound clips comprising, a magazine open at one end and arranged to hold a number of clips with their adjacent sides in contact and their prongs facing outwardly of the magazine and away from the device, means for forcing the clips toward the open end of the magazine and at the same time turning said clips through an angle of approximately ninety degrees, and a pair of manually

engaged and operated forceps having clamping jaws arranged to receive the clips one at a time from the open end of the magazine in position for application and to attach them in place upon movement of the forceps in a direction parallel to the general plane of the surface being worked upon, successive clips of the magazine being automatically fed to the jaws of said forceps upon application of each clip.

10. Wound clip forceps comprising, forceps members and a relatively stationary magazine, the latter having a guideway alongside of the forceps members for receiving the clips with their backs parallel to the forceps, and holding means at the front of the guide constructed and arranged to receive the foremost clip with the plane of the clip arranged at right angles to said forceps members for permitting the bending in place of such clip by compression of the forceps members with the forceps in a position normal to the surface being worked on, said means operating to hold the clips in a non-yielding manner in position for application to the wound prior to any compression of the forceps.

11. In an instrument of the class described comprising, a clip magazine and guide member and a pair of spring forceps members permanently mounted thereon in parallel relation to said member, a clip positioning member at the forward end of said magazine, and a pusher in the magazine operatively connected to said forceps members and adapted to advance the clips into said clip positioning member where they may be subjected to bending action of the forceps members.

12. An instrument of the class described comprising, a pair of forceps having clamping jaws at one end adapted to receive and positively hold a wound clip in position for application to the wound, means for preventing separation of the clamping jaws of the forceps sufficiently to release a clamp prior to its being bent, and magazine means for automatically feeding clips to the jaws of said forceps in position for application to the wound.

13. An instrument of the class described comprising, a pair of forceps having clamping jaws at one end adapted to receive and positively hold a wound clip in position for application to the wound, means for preventing separation of the clamping jaws of the forceps sufficiently to release a clamp prior to its being bent, and magazine means for automatically feeding clips to the jaws of said forceps in position for application to the wound immediately upon the release of an applied clip.

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