April 15, 1941. L. HUMPHREYS ET AL 2,238,736

AUTOMATIC SKIN CLIP INSERTER

Filed March 13, 1940

FIG. 2.

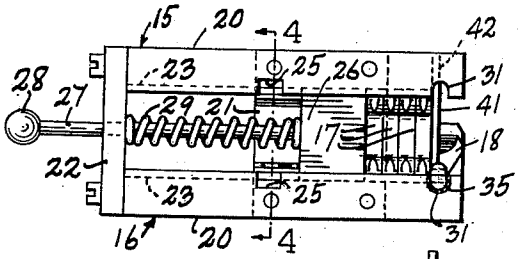



FIG. 3.

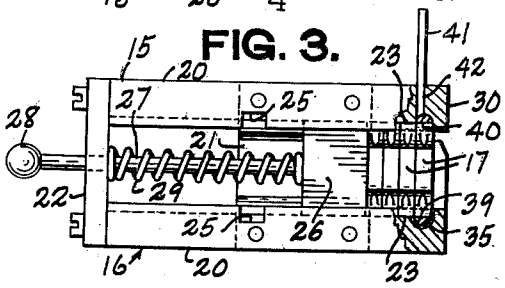



FIG. 4.

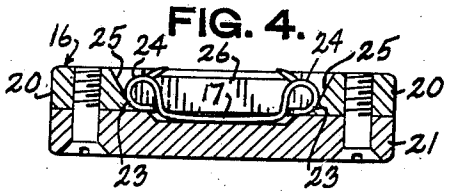



FIG. 5.

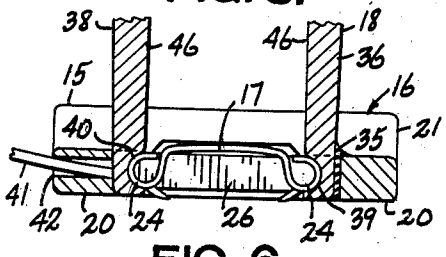



FIG. 6.

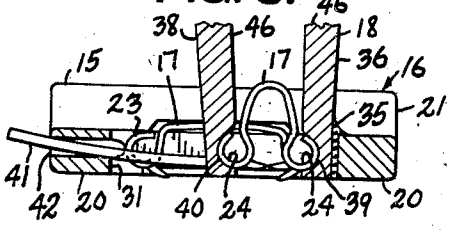
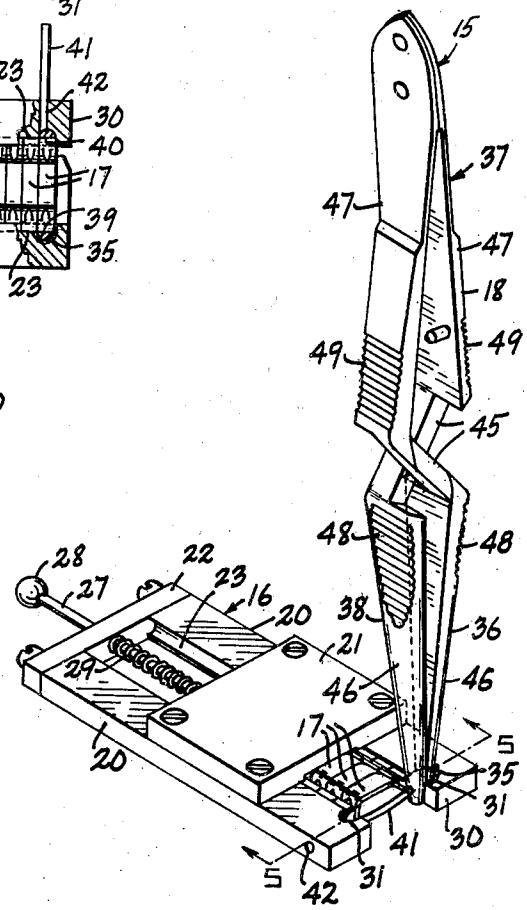



FIG. 1.




INVENTORS.
Lynn Humphreys
Charlcie Humphreys

BY Lancaster, Allwine and Rommel
ATTORNEYS.

Patented Apr. 15, 1941 2,238,736

# UNITED STATES PATENT OFFICE

2,238,736

## AUTOMATIC SKIN CLIP INSERTER

Lynn Humphreys and Charlcie Humphreys,
Knoxville, Tenn.

Application March 13, 1940, Serial No. 323,830

7 Claims. (Cl. 1—49.1)

This invention relates to improvements in surgical instruments of the character shown and described in U. S. Patent 1,199,653 granted to Bacolini, and more specifically to improvements in automatic surgical skin clip inserting devices to be filled with series of Michel surgical skin clips for use in the closure of surgical incisions and wounds.

In the Bacolini patent, the skin clips are slidably supported by parallel rods of a clip carrier and feeder within a channeled housing, the arrangement requiring removal of the clip carrier and feeder from the channeled housing in order to replenish the supply of skin clips.

An important object of the present invention is to provide a generally improved and simplified automatic skin clip inserting device, the clip supply of which may be readily replenished without the necessity of dismantling or removal of parts.

Another important object of the invention resides in the provision of a device of the character described, including a clip carrier and feeder to be disposed adjacent the skin surface in straddling relation to an incision or wound to be closed, and a clip manipulating or clamping instrument fixed to the clip carrier and feeder so as to be disposed substantially perpendicular to the skin surface against which the clip carrier and feeder is positioned.

A further object of the invention is to provide means for automatically feeding skin clips to clip manipulating tweezers of the character including arms that are crossed intermediate their end portions so that the tweezers may be positively opened and closed by pressing together different portions of the outer faces of the tweezer arms.

Other objects and advantages of the invention will become apparent during the course of the following detailed description, taken in connection with the accompanying drawing, forming a part of this specification, and in which drawing:

Figure 1 is a perspective view of the automatic skin clip inserting device and showing the clip manipulating tweezers in their closed position.

Figures 2 and 3 are bottom plan views of the device and showing the clip manipulating tweezers in their closed and open positions, respectively.

Figure 4 is a cross-sectional view taken substantially on the line 4—4 of Figure 2.

Figure 5 is a fragmentary cross-sectional view taken substantially on the line 5—5 of Figure 1 and showing the tweezers in their open position.

Figure 6 is a view similar to Figure 5 and showing the tweezers in partially closed position.

In the drawing, which for the purpose of illustration shows only a preferred embodiment of the invention, and wherein similar reference characters denote corresponding parts thruout the several views, 15 generally designates the automatic skin clip inserting device, including a carrier and feeder 16 for supplying a series of clips 17 to a clip manipulating instrument 18.

Referring first to the carrier and feeder 16, the same comprises a pair of guide bars 20 secured in spaced parallel relation by a transverse yoke plate 21 and a cross piece 22. The guide bars 20 along their inner sides are provided with longitudinal substantially semi-cylindrical grooves 23 for slidably supporting the clips 17 at their opposite end eye portions 24, and in their bases the guide bars 20 are beveled to form niches 25 laterally communicating with the grooves 23 and providing for the insertion of the clips 17 thereinto. Slidably supported in the grooves 23 behind the series of clips 17 is a follower block 26 having a stem 27 slidably extending thru the cross piece 22 and terminating in a spherical knob 28. Encircling the stem between the cross piece 22 and the follower block 26 is an expansion coil spring 29 urging the follower block away from the cross piece 22 and thereby tending to feed the skin clips 17 toward the discharge end portion 30 of the carrier and feeder. Instead of inserting the clips one at a time thru the niches 25, an entire wire or series of clips may of course be placed in the carrier by removing the cross piece 22 and associated parts including the follower block 26. From an inspection of Figures 1–3 of the drawing, it will be noted that the grooves 23 terminate at the discharge end portion 30 of the carrier and feeder slightly inwardly of the ends of the parallel bars 20 and that the inner sides of these bars 20 are provided with notches 31 transversely of the terminal ends of the grooves 23.

Fixedly secured in one of the notches 31, as by welding 35, is one arm 36 of a pair of clip manipulating tweezers 37, the other arm 38 of which is swingable between the notches 31 across the path of travel of the clips. The arm 36 is provided with a channel 39 forming a continuation of one of the grooves 23 and the arm 38 is formed with a similar channel 40 forming an extension of the other of said grooves 23 only upon opening of the tweezer arms to the position illustrated in Figures 3 and 5. Extending laterally from the arm 38 is a wire 41 lying in an arc described by swinging of the arm 38, and slidably accommodated in a passageway 42. This wire 41 constitutes an abutment normally disposed in the path of travel of the skin clips 17, as shown in Figures 1 and 2, but movable with the swinging arm 38, upon opening of the tweezers, as shown in Figures 3 and 5, to a position laterally of the path of travel of the clips.

The tweezer arms 36 and 38 include crossed portions 45 intermediate the plying end portions 46 and the shank end portions 47, the latter being formed of spring material for biasing the tweezers toward their closed position. The outer sides of the plying end portions 46 and the shank end portions 47 include corrugated surfaces 48 and 49 adjacent the crossed intermediate portions 45.

In the utilization of the clip inserting device, the operator holds the clip manipulating tweezers 37 perpendicular to the incision thus disposing the clip carrier and feeder 16 directly above and parallel to the incision. The carrier and feeder 16 may be turned to or from the operator, depending on the character of the wound or incision. Pressing together the upper corrugated surfaces 49 will open the tweezers and the foremost suture or skin clip 17 will slide between the arms thereof. With the two walls of the incision temporarily drawn together, as by surgical forceps, the operator, by pressing together the lower corrugated surfaces 49, closes the tweezers so as to buckle the slightly bowed intermediate portion of the clip and force the prongs thereof into the walls of the incision in clamped relation. The foregoing operation is repeated until sufficient clips have been inserted to completely close the incision, the number used depending on the length of the cut.

Various changes may be made in the form of invention herein shown and described without departing from the spirit of the invention or the scope of the following claims.

We claim:

1. In a surgical device, a pair of tweezers having first and second relatively movable arms crossed intermediate their plying and shank end portions so that pressing the outer faces of the shank end portions will tend to open the tweezers and so that pressing the outer faces of the plying end portions will tend to close the tweezers, said tweezers being biased toward their closed position, and means secured to said first tweezer arm for feeding skin clips, upon successive openings of the tweezers, between the plying end portions thereof.

2. In a surgical device, a pair of tweezers having first and second relatively movable arms crossed intermediate their plying and shank end portions so that pressing the outer faces of the shank end portions will tend to open the tweezers and so that pressing the outer faces of the plying end portions will tend to close the tweezers, said tweezers being biased toward their closed position, means secured to said first tweezer arm for feeding skin clips, upon successive openings of the tweezers, between the plying end portions thereof, and an abutment carried by the second tweezer arm to normally prevent feeding of the skin clips, said abutment, upon opening of the tweezers, being carried out of the path of feed of the skin clips.

3. A surgical instrument comprising a frame provided with first and second parallel grooves forming a guideway for slidably supporting a series of skin clips at their opposite end portions, said guideway having a discharge end portion provided with a notch transversely of said first groove, spring means for urging said series of clips toward said discharge end portion, and a clamping arm carried by the frame for movement between said notch and said second groove, said arm being provided with a channel aligning with said first groove upon disposition of said arm in said notch, whereby a skin clip will be fed between the clamping arm and the second groove upon disposition of said arm in said notch.

4. A surgical instrument comprising a frame provided with first and second parallel grooves forming a guideway for slidably supporting a series of skin clips at their opposite end portions, said guideway having a discharge end portion provided with first and second notches transversely of said first and second grooves respectively, spring means for urging said series of clips toward said discharge end portion, an instrument having a first arm fixedly secured in said first notch and a second arm movable between said first arm and said second notch, said first arm being provided with a channel aligning with the first groove and said second arm being provided with a channel aligning with the second groove upon disposition of the second arm in the second notch, whereby a skin clip will be fed between the arms of said instrument upon disposition of the second arm in the second notch.

5. A surgical device comprising a skin clip applying instrument, a guide for directing skin clips toward the instrument including parallel members provided with grooves for slidably supporting the skin clips at their opposite ends, said members being provided with niches communicating with said grooves and forming a lateral entrance for skin clips, clip follower means reciprocable along said guide, and means urging said follower means toward said clip applying instrument for feeding the clips thereto, said follower means being retractible to permit replenishment of the supply of clips by insertion of the clips thru said lateral entrance into the guide in advance of the follower means.

6. In a surgical device, a pair of tweezers having first and second relatively movable arms crossed intermediate their plying and shank end portions so that pressing the outer faces of the shank end portions will tend to open the tweezers and so that pressing the outer faces of the plying end portions will tend to close the tweezers, and means secured to said first tweezer arm for feeding skin clips, upon successive openings of the tweezers, between the plying end portions thereof.

7. In a surgical device, a pair of tweezers having first and second relatively movable arms crossed intermediate their plying and shank end portions so that pressing the outer faces of the shank end portions will tend to open the tweezers and so that pressing the outer faces of the plying end portions will tend to close the tweezers, means secured to said first tweezer arm for feeding skin clips, upon successive openings of the tweezers, between the plying end portions thereof, and an abutment carried by the second tweezer arm to normally prevent feeding of the skin clips, said abutment, upon opening of the tweezers, being carried out of the path of feed of the skin clips.

LYNN HUMPHREYS.
CHARLCIE HUMPHREYS.