

Dec. 11, 1951

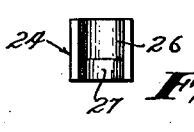
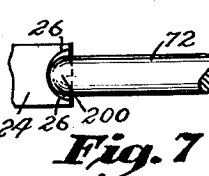
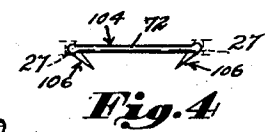
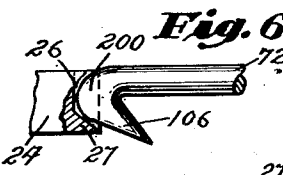
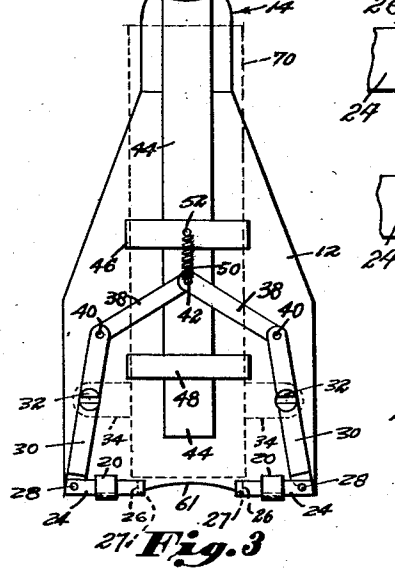
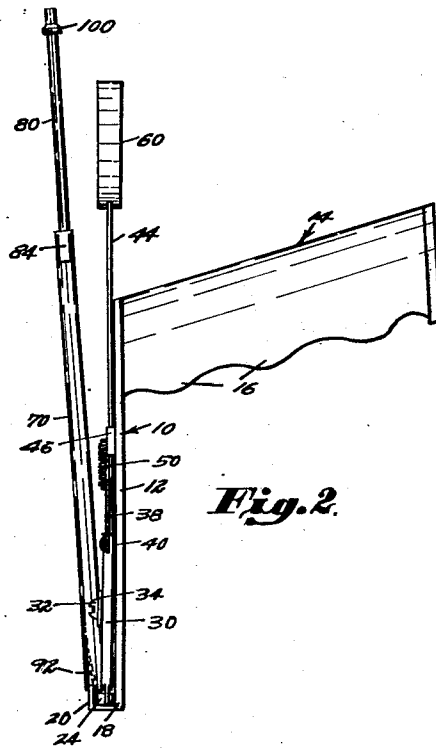
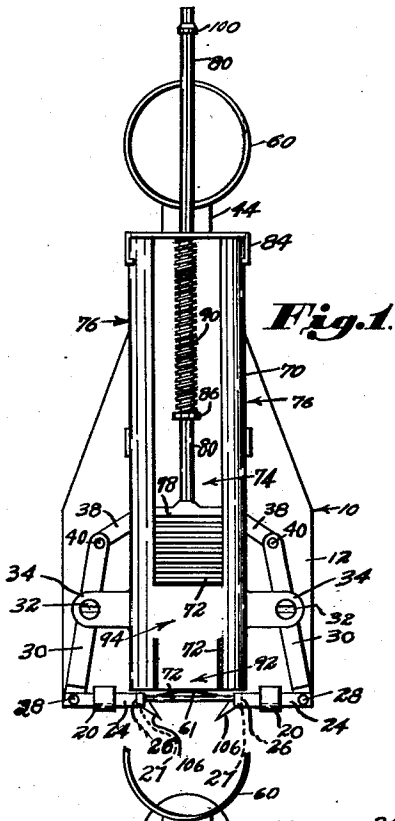
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2,578,212

METAL SKIN STITCHER

Filed July 16, 1948

2 SHEETS—SHEET 1



Inventor

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METAL SKIN STITCHER

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2 SHEETS—SHEET 2

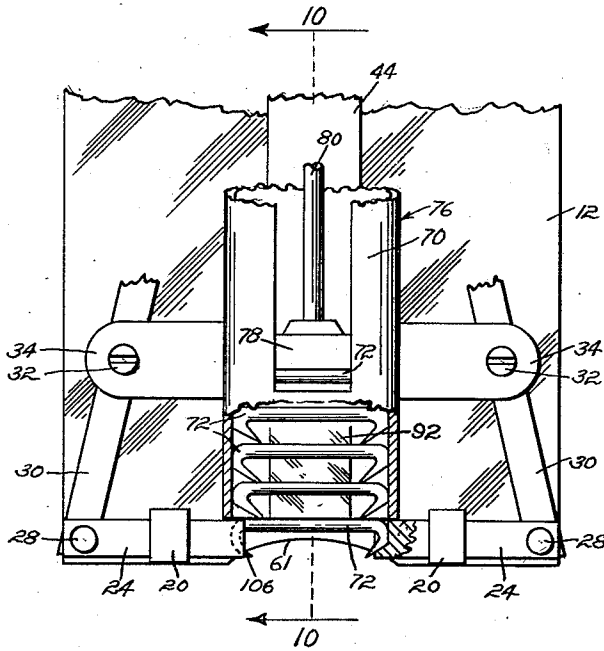


Fig. 9.

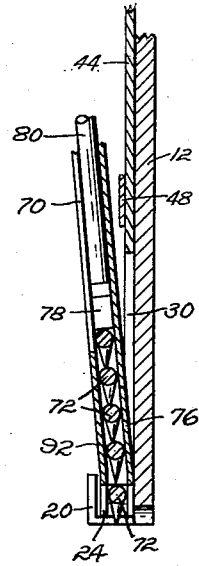


Fig. 10.

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UNITED STATES PATENT OFFICE

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METAL SKIN STITCHER

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3 Claims. (Cl. 1—49.1)

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This invention relates to surgery and more particularly it is an object of the invention to provide a new and improved suturing clip applicator of the self-feeding or magazine type.

Another object of the invention is to provide an improved metal skin stitcher which may be more easily operated than heretofore.

A further object of the invention is to provide a metal skin stitcher for applying suturing clips to wounds more rapidly than heretofore.

Still a further object of the invention is to provide a skin stitcher as described which may be held in such a position during use that the operator may more readily see his work prior to a clipping action as well as during the clipping action.

Another and still further object of the invention is to provide a skin stitcher having fewer parts than skin stitchers in the prior art for reducing both the production cost and the possibility of mechanical failure.

Yet another object of the invention is to provide a clip applicator as described which may be more easily cleaned than applicators of the prior art.

Another object of the invention is to provide a device for the purpose described which is sturdy and durable in construction, reliable and efficient in operation, and relatively simple and inexpensive to manufacture, assemble and utilize.

Other and still further objects and advantages of the invention will become apparent from the following detailed description of a preferred embodiment thereof.

In the drawings:

Figure 1 is a frontal elevation of the skin stitcher of this invention showing a suturing clip held thereby in a position preparatory to stitching.

Figure 2 is a side elevation of the clip applicator as shown in Figure 1.

Figure 3 is a front elevation of an applicator of the invention shown with the clip magazine in dotted lines and with a portion of the actuating lever handle being broken away.

Figure 4 is a side elevation of a suturing clip before use, the ends of the clamping bars being shown in dotted lines.

Figure 5 is the suturing clip shown at the end of a clipping operation, the ends of the clamping bars being shown in dotted lines.

Figure 6 is a detailed view showing the inner portion of a clamping bar of this invention, shown in engagement with an end portion of a clip, a portion of the tip of the bar revealing a clip-supporting nib and recess.

Figure 7 is a top plan view of the parts shown in Figure 6.

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Figure 8 is a right end elevation of the end of the clamping bar shown in Figure 7.

Figure 9 is a detail, on an enlarged scale, showing the front elevational view of the lower part of the skin stitcher with part broken away illustrating the method of retaining the suturing clips in the magazine of the machine.

Figure 10 is a vertical section through the magazine of the machine, taken on line 10—10 of Figure 9.

The metal skin stitcher of this invention includes a frame generally indicated at 10 having a flat backing plate 12. The plate 12 is provided with a handle 14 extending outwardly therefrom on one side thereof.

The handle 14 is inclinedly disposed with respect to the backing plate 12 and is provided on its downward side with a plurality of hand grip protrusions 16.

On the bottom edge 18 of the plate 12 the latter is provided with two or more spaced apart track members 20 which latter extend outwardly from the plate 12 on the opposite side thereof with respect to the handle 14. The track members 20 are preferably of an L-shape having outer sides in parallelism with the plate 12 and bottom sides disposed at a right angle with respect to the plate 12.

The track members 20 may be formed integrally with the plate 12 or attached thereto as desired.

The bottom edge of the plate 12 is preferably disposed at a right angle with respect to the plane of the handle 14 and the track members 20 are disposed spaced apart along the bottom edge 18. The upper sides of the L-shaped track members 20 are open.

The purpose of the track members 20 is to slidably receive two oppositely disposed clamping bars 24, permitting the bars 24 to slide in the guide tracks 20 in parallelism with the plate 12.

The clamping bars 24 are provided with notches 26 on their inner ends for purposes later described. The notches 26 are of U-shape in cross section and are elongated extending transversely of the bars 24 and in parallelism with the plate 12.

Each clamping bar 24 is provided with a nib 27 protruding outwardly from the curved inner wall of its notch or recess 26. The nibs 27 each are disposed on the lower end of the respective recess or notch 26, the upper portion of the recess 26 opening on the upper side of its bar. The upper surface of each nib 27 extends downwardly transversely of the respective elongated

bar 24 at times when the bars 28 are in the positions shown in Figure 1.

The outer ends of the bars 24 are pivotally secured by means of pins 28 to a pair of legs 30 which are disposed on either side of the plate 12 and extend in parallelism with the plate 12 upwardly and inwardly from the pins 28.

The legs 30 are each pivotally secured to the plate 12 by means of one of two screws 32 which latter extend through suitable apertures in a pair of tabs 34.

The screws 32 extend through the legs 30 approximately medially of the ends thereof. The upper ends of the legs 30 are attached to a pair of arms 38, pivot pins 40 being employed for attaching each leg 30 to one of the arms 38.

The other ends of the arms 38 are pivotally secured by means of a pin 42 to a plunger or trigger member 44.

The plunger 44 is elongated and preferably of a flat construction, being held in slidable parallelism with the plate 12 by means of two guide bands 46 and 48, the latter being disposed transversely of the elongated plunger 44 and being longitudinally spaced apart along the plunger 44.

Resilient means are employed for connecting the plunger 44 to the frame plate 12 in a manner causing the plunger 44 to return to a normal position after a later described clipping operation. Such means comprises a spring 50 secured to the frame 12 at one end by a bolt 52 and the upper guide band 46.

The lower end of the spring 50 is secured to the plunger 44 by means of the pin 42. The pin 42 is itself secured to the plunger 44 at a point between the guide bands 46 and 48.

The upper end of the plunger 44 extends beyond the upper end of the plate 12 and a thumb ring or trigger 60 is provided and secured to the top of the plunger 44.

The thumb ring 60 is disposed in a plane in parallelism with the plunger 44, the hole through the ring 60 being disposed transversely to the plane of the plate 12.

The plate 12 is provided with an arcuate concave recess 61 in the lower edge thereof between the inner ends of the bars 24. This is for permitting the sides of the incision to be received in the recess 61 and for permitting the ends of the bars 24 to be disposed closer to the skin of the patient.

The invention further includes a magazine 70 for slidably receiving and storing a plurality of suturing clips 72. The magazine 70 is provided with a flat back surface 74 and curled longitudinal edges 76 which latter turn back and terminate in positions spaced apart from each other and from the back surface 74 of the magazine 70.

The magazine 70 is provided with a piston 78 slidably disposed between the curled edges 76. The piston 78 is secured to a piston rod 80 which extends upwardly from the piston 78 in parallelism with the elongated magazine 70.

It will be noted in Figure 2 that a plane parallel to the back 74 of the magazine and extended through the centers of the curled edges 76 substantially intersects a plane through the centers of the U-shape notches 26 at the lower end of the stitching machine, whereby as the clips arrive at the lower end of the magazine they drop into the notches of the clamping bars or clenching jaws.

At the upper end of the magazine 70 the piston rod 80 passes through an aperture in a magazine

cap 84, the piston rod 80 extending upwardly of the cap 84.

A shoulder 86 is provided on the rod 80 between the piston 78 and the cap 84 and a spring 90 is provided between the shoulder 86 and the cap 84 for urging the piston 78 downwardly from the cap 84.

At the lower end of the magazine 70 a resilient member or spring 92 is provided, the latter being formed by a portion which is spaced apart from the terminal intumed longitudinal edges 76 of the magazine 70.

The portion 92 is adapted to bear against the clips 72 thereunder in order to prevent the latter from falling outwardly of the magazine 70 except at times when the spring portion is overcome by the downward force of the plunger 44.

The spring member 92 is integral with a connecting portion 94 which latter extends between and is integral with the adjacent terminal edges 76 of the magazine 70.

It will be seen that the elongated magazine 70 extends along side and is closely spaced apart from the plate 12 but that the magazine 70 is inclined slightly with respect to the plate 12, being disposed closer to the plate 12 at the lower end of the magazine 70 than at the upper end thereof.

The rod 80 is provided with a shoulder 100 at its upper end for preventing the passage of the piston rod 80 through the cap 84.

The suturing clips preferably employed are best shown in Figures 4 and 5. Prior to application the clips 72 are provided with straight main body portions 104 having points 106 at either end. The points 106 preferably both extend away from the main body portion 104 on the same side of the said main body portion, the points slanting slightly towards each other.

In operation, the device is gripped around the handle 14 with the operator's thumb in the thumb ring 60. The device is then in the position such that the incision to be stitched is disposed between and beneath the inner ends of the bars 24.

At this time a clip 72 will be disposed between the ends of the bars 24 with one of the bent portions adjacent its ends disposed in the notches 26. The clip 72 will be prevented from falling downwardly by the protrusions 27, which latter are so spaced apart with respect to the clips 72 that when the bars 24 are in the Figure 1 positions, the protrusions 27 extend inwardly of and under the rounded portions 200 adjacent its ends, as best seen in Figure 6. Without the protrusions 27, the clip 72 would be pushed outwardly from the notches 26 under the pressure of the spring 90 and of the remaining clips 72.

The operator then pushes downwardly on the ring 60 and plunger 44 causing the latter to force the ends of the bars 24 together, causing the clip 72 disposed therebetween to assume an arcuate shape as shown in Figure 5. The points 106 will then come closer together for pulling the sides of the incision together.

During the period in which the clip is bent into the shape shown in Figure 5, the next adjacent upper clip is prevented from escaping from the magazine or track 76 because the said next upper clip engages the top of that clip which is being applied.

After application of a clip, the plunger 60 is released, permitting the next clip to move downwardly into the recesses 26.

A plurality of the clips 72 may be used on the

same incision and the number of clips used is in direct proportion to the length of the incision.

From the foregoing description, it is thought to be obvious that a suturing clip applicator constructed in accordance with my invention is particularly well adapted for use by reason of the convenience and facility with which it may be assembled and operated, and it will also be obvious that my invention is susceptible of some change and modification without departing from the principles and spirit thereof, and for this reason I do not wish to be understood as limiting myself to the precise arrangement and formation of the several parts herein shown in carrying out my invention in practice, except as claimed.

I claim:

1. In an applicator for applying suturing clips to wounds: two clip-engaging members, said clip-engaging members having oppositely-disposed ends, said clip-engaging members each having a recess in its said oppositely-disposed end for receiving a suturing clip while said ends are in normal positions, said recesses each having a portion opening from one side of its said members; and means for causing relative movement of said opposite ends toward each other in a straight line from said normal positions.

2. In a suturing clipping machine, the combination which comprises a backing plate having a handle extended from the upper end, a plunger having a finger ring on the upper end slidably mounted for vertical travel on the face of the backing plate, a pair of opposed clenching jaws slidably mounted on the lower edge of the backing plate and positioned to travel in a plane perpendicular to the line of travel of the plunger, a pair of parallel clip holding channels extended upwardly and outwardly from the lower end of the said backing plate and positioned to feed clips to the said clenching jaws, and toggle acting levers

connecting the said clenching jaws to the plunger whereby the jaws are actuated inwardly as the plunger is forced downwardly.

3. In a suturing clip applying machine, the combination which comprises a vertically disposed backing plate having a handle extended from the upper end thereof, a plunger having a finger ring on the upper end slidably mounted for vertical travel on the said backing plate, a pair of opposed clenching jaws slidably mounted on the lower edge of the backing plate and positioned to travel in a plane perpendicular to the line of travel of the plunger, said clenching jaws having vertically disposed recesses in the opposed inner ends thereof with clip retaining protrusions in the lower ends of the recesses, a pair of parallel clip holding channels extended upwardly and outwardly from the lower end of the said backing plate and positioned to feed clips to the recesses in the inner ends of the said clenching jaws, and means actuating the said clenching jaws by the plunger whereby the jaws are forced inwardly to close a clip as the plunger is moved downwardly.

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