

Feb. 26, 1963

B. S. BOBROV

3,078,465

INSTRUMENT FOR STITCHING GASTRIC STUMP

Filed Sept. 9, 1959

3 Sheets-Sheet 1

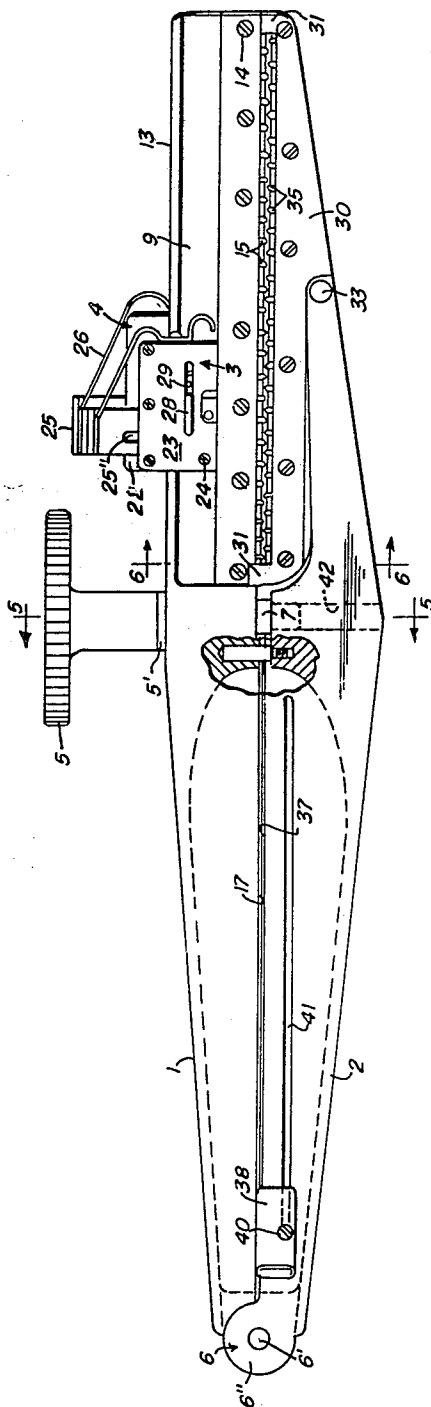


FIG. 1

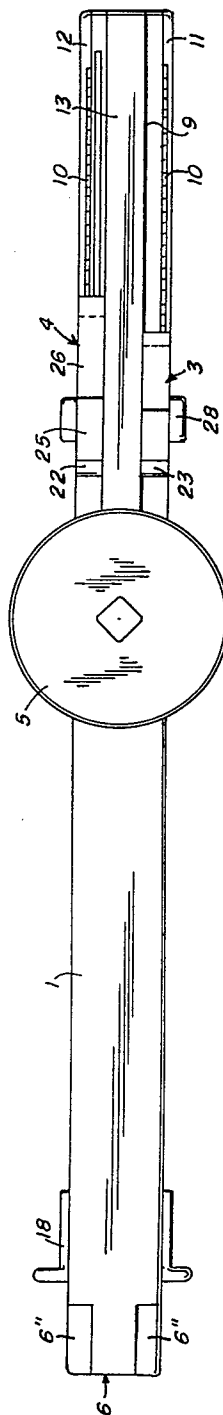


FIG. 2

Feb. 26, 1963

B. S. BOBROV

3,078,465

INSTRUMENT FOR STITCHING GASTRIC STUMP

Filed Sept. 9, 1959

3 Sheets-Sheet 2

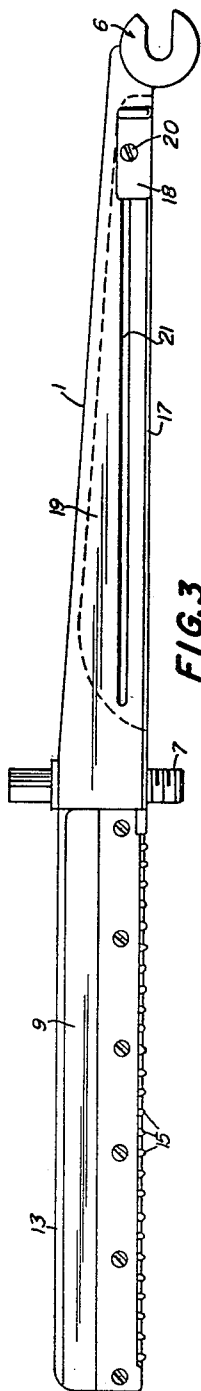


FIG. 3

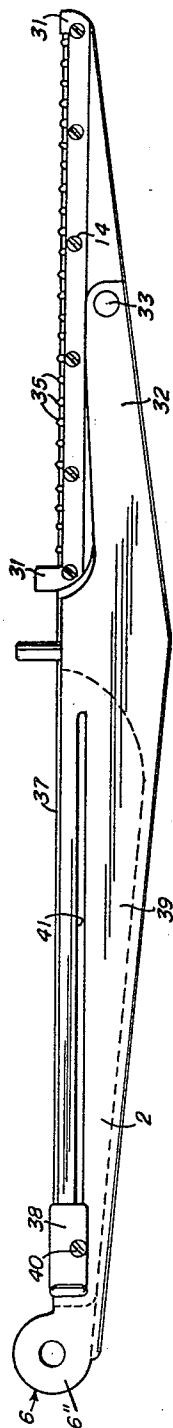


FIG. 4

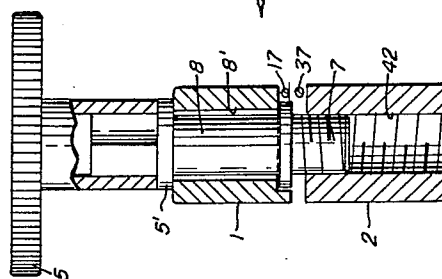


FIG. 5

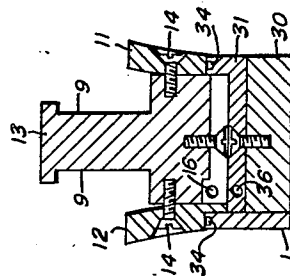


FIG. 6



FIG. 11

Feb. 26, 1963

B. S. BOBROV

3,078,465

INSTRUMENT FOR STITCHING GASTRIC STUMP

Filed Sept. 9, 1959

3 Sheets-Sheet 3

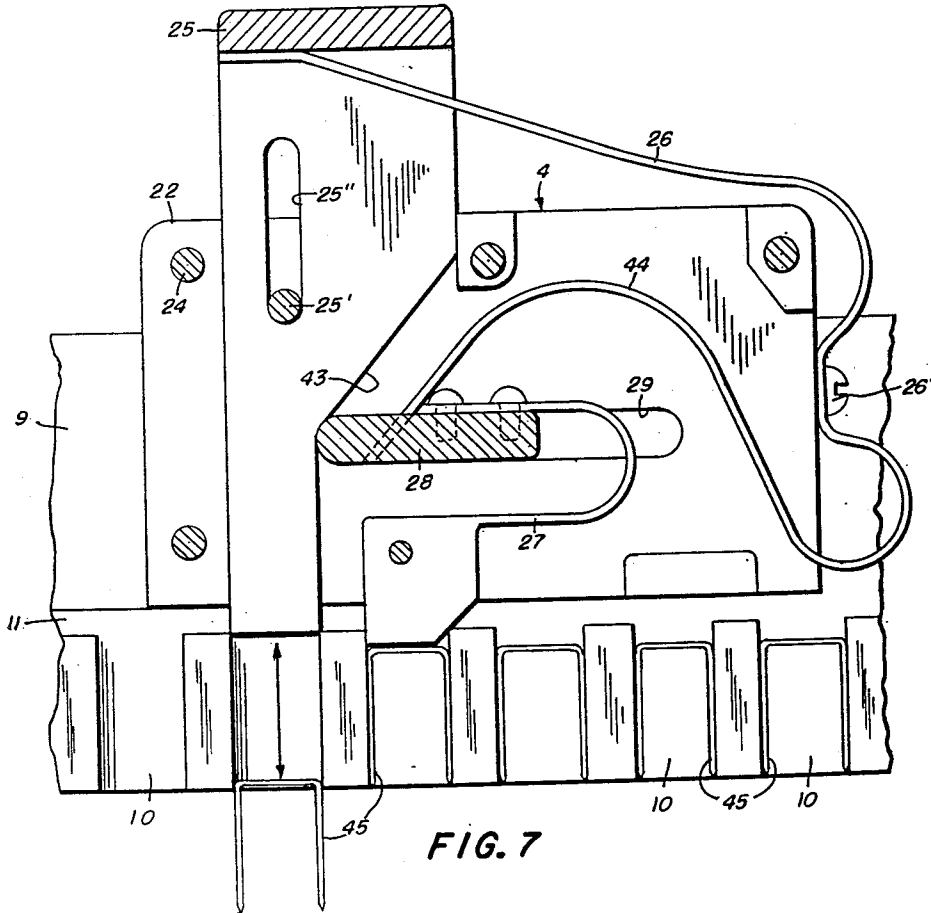


FIG. 7

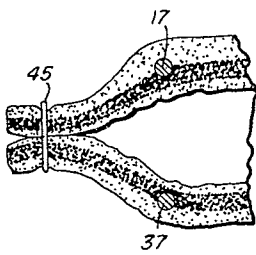


FIG. 8

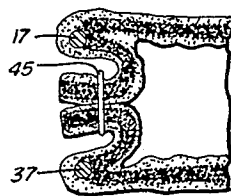


FIG. 9

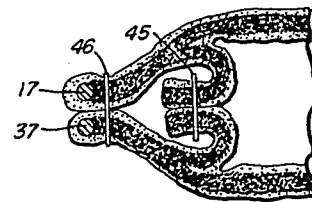


FIG. 10

1

3,078,465

INSTRUMENT FOR STITCHING GASTRIC STUMP
Boris Sergueevitch Bobrov, Oktiabrskaja ul. 40, Apt. 10,
Moscow, U.S.S.R.

Filed Sept. 9, 1959, Ser. No. 840,491

2 Claims. (Cl. 1—50)

This invention relates to an instrument for stitching the gastric stump by means of U-shaped tantalum staples.

The existing instruments for suturing the gastric stump by means of U-shaped metal staples permit the application of only single-row shallow sutures, piercing all the layers of the gastric walls to be stitched. The jaws of these instruments unevenly grip the gastric walls because of the elastic deformation of the material of which they are made, which lowers the quality of the suture.

One of the objects of the present invention is an instrument which ensures an even gripping of the intestinal walls along the line of the suture.

This object is attained by making the operating part of the supporting jaw in the shape of a rocking arm with stops at the end.

Another object of the present invention is an instrument which has pivotally joined clinching and supporting jaws which are provided with two rows of slots for staples one for each jaw, stitchers for subsequently forcing out staples from the slots of the first and second rows, and recesses for clinching staples. Such design allows stitching of the gastric stump by means of a double row of staple sutures. This aim is attained by the provision on the clinching and supporting jaws of projections set one against the other and displaced at a half pitch, and an opening in the center for needles piercing the upper layers of the gastric wall, fixing the gastric walls to the instrument jaws when driving the first row of sutures into the lumen of the stump and placing the second row of sutures in the sero-muscular layers of the gastric walls.

The further objects and advantages of the present invention are seen from the following description and the attached drawings, in which the preferred embodiment of the invention is shown.

FIG. 1 is a side elevational view of the instrument;

FIG. 2 is a top plan view of the instrument;

FIG. 3 is a view of the clinching jaw without a handle and stitchers along the arrow A in FIG. 2;

FIG. 4 is a view of the supporting jaw along the arrow A in FIG. 2;

FIG. 5 is a cross-section view of the instrument along line B—B of FIG. 1;

FIG. 6 is a cross-section view of the instrument along line C—C in FIG. 1;

FIG. 7 is a longitudinal sectional view of the stitcher;

FIGS. 8 to 10 show three types of sutures provided by the instrument of this invention;

FIG. 11 is an elevational view showing the details of the needle.

In more detail, and with further reference to the drawings, FIGURE 1 discloses the overall construction of the stitching instrument. The instrument comprises the elongated clinching jaw 1, the similarly elongated supporting jaw 2, the stitcher mechanism 3 slidably mounted on the forward portion of the clinching jaw 1, stitcher 3 being adapted to force out staples for the first row of sutures piercing all lamina of gastric walls. A similar stitcher mechanism 4 is also slidably mounted upon the forward portion of the clinching jaw, at a location laterally adjacent the stitcher mechanism 3, stitcher 4 being adapted to force out staples for the second row of sutures piercing all sero-muscular lamina. The handle 5 is provided intermediate the length of the jaws for opening and closing the clinching jaw and supporting jaw with respect to each other. The clinching jaw and supporting jaw

2

are pivotally connected at their rearward ends 6 by means of the pin 6', and a pair of parallel flange portions 6'' having apertures therethrough for receiving and supporting the pin.

The handle 5 of the stitching instrument, best illustrated in FIGURES 1 and 5, for opening and closing the jaws includes a threaded portion 7 and an intermediate portion 8. The supporting jaw 2 has a hollow, threaded portion 42 for screwing the threaded portion 7 of the handle into the supporting jaw. The intermediate portion 8 of the handle is of reduced size with respect to the interior surface of the hollow opening in the clinching jaw, to provide a spacing 8' therebetween, and thereby accommodate the arcuate movement of the jaws relative to one another, when opening and closing the jaws.

The handle 5, disposed intermediate the length of the jaws, is rotatable for screwing its lower end into the supporting jaw, with its uppermost stem portion 5' being enlarged relative to the intermediate portion 8, so that the enlarged portion will press against the clinching jaw and force it toward the supporting jaw and clamp the gastric stump therebetween.

The side surface of the elongated clinching jaw 1 (FIGS. 1 and 2), along its forward portion 13, is provided with a pair of opposed open guideway slots 9, which extend parallel with the length of the jaws, and provide a slide support for the stitcher mechanisms 3 and 4.

Along the length of the forward portion 13 of the clinching jaw immediately beneath each stitcher mechanism, are a plurality of slots 10, for the staples. These slots 10 are formed by a pair of elongated plates 11 and 12, with vertically extending recesses in the plates forming the slots 10 at spaced intervals along the length of the plates. The elongated plates 11 and 12 are secured to the housing 13 of the clinching jaw 1 by means of screws 14.

To facilitate fixing the gastric stump to the clinching jaw, a plurality of downwardly extending teeth 15 are provided adjacent plate 12, at closely spaced intervals along the length of the forward portion of the clinching jaw. These projections extend toward the supporting jaw, and are each provided with an eye 16. The eye openings are aligned along a path parallel to the length of the clinching jaw. An elongated needle 17 has a rearward portion slidably secured to handle portion 19 of the clinching jaw with the forward needle portion aligned with the eyes 16 of the teeth 15 of the clinching jaw. A finger operated projection 18 is secured to the rearward portion of the needle by a screw 20 which projects into a longitudinal slot 21 in the handle portion 19. Thus, the needle is slidably supported on the handle portion for manual movement into and out of eyes 16.

The stitcher mechanisms 3 and 4 for applying the first and second rows of stitches, respectively, are best illustrated in FIGURES 1 and 7, and are of similar construction. They comprise an upright body portion 22, having grooved portions for slidably supporting the stitcher mechanism in the guideway slots 9 of the clinching jaw. A cover plate 23 is secured to the body portion by means of a plurality of screws. Between the cover plate and the body is a vertically mounted driving plunger 25, slidably mounted in a vertical direction by means of a pin 25' and slot 25''. A return spring 26 for the plunger has one end connected to the plunger and its intermediate portion connected to the body 22 by means of a screw 26'. An elastic stop 27 is connected to a slide 28, by suitable connecting means. The movement of the slide is limited by the length of the slot 29 in body portion 22 and which extends parallel to the length of the jaw.

FIGURES 1 and 4 disclose the structure of the supporting jaw 2, which consists of a rocking arm 30 pivotally mounted to the forward end of the jaw along an

axis transversely of the length of the jaw, and with stops 31 for limiting the pivotal movement of the rocking arm relative to the forward end body portion of the jaw. A pin 33 provides the pivotal joining of the rocking arm 30 to the forward body portion 32 of the supporting jaw.

The upper portion of the rocking arm is provided with a working surface which includes two rows of recesses 34 for bending the staples forced out of recesses 10 in the stitching operation. For fixing the gastrix stump to the supporting jaw, upward extending teeth 35 are provided on the working surface of the rocking arm having eye openings 36 in the center. The teeth 35 are formed in the same manner as the teeth 15 of the clinching jaw. The teeth 35 serve for fixing the rear gastric wall to the supporting jaw. The teeth-like projections 35 project toward the downwardly extending teeth 15 of the clinching jaw in generally opposed relation. However, the projections 35 are displaced at half pitch as regards the projections 15 of the clinching jaw. Inside the eyes 36 of the projections 35 freely passes a needle 37, which needle has a finger operated projection 38 which slidably moves along the handle 39, and have a construction and operation similar to the projection 18 and needle 17 of the clinching jaw. The projection 38 is slidably secured to the handle 39 by means of the screw 40, which enters the longitudinal slot 41.

To bring the instrument jaws together, it is necessary to compress the handles 19 and 39 with one hand, and at the same time to rotate the turnable handle 5 with the other hand; the screw 7 connected to the turnable handle is turned into the threaded opening 42 of the supporting jaw.

Stitching of the gastric stump with the instrument is carried out in the following way.

The gastric walls are clamped by the instrument jaws along the line of a supposed resection; by bringing them together until the stops 31 of the rocking arm engage the surface of the clinching jaw. Therefore, the teeth 15 of the clinching jaw and the teeth 35 approach each other and will engage the gastric walls. The gastric tissue fills spaces between the teeth of the clinching jaw and rocking arm. Then, by manual pressure on the projections 18 and 38 the needles 17 and 37 pierce the gastric walls and enter the eyes 16 and 36.

To place the first row of sutures it is necessary to press the pusher 25 of the stitcher 3 with the thumb. When doing this, the pusher will enter the corresponding slot 10 and push the staple out of it. The staple with its sharp tips pierces the tissue clamped between the jaws, and is clinched by recess 34.

Downward movement of pusher 25 causes bevel surface 43 thereon to move slide 28 along slot 29 till elastic stop 27 enters the next staple slot 10.

After this the thumb should be removed from the pusher. Under the action of the return spring 26 the

pusher rises to its upper position and is disengaged from the staple slot 10. The compressed portion 44 of the return spring 26 brings the entire mechanism to the next slot, after which the next staple is forced out by the pusher.

The operation is repeated until a suture of a desired length is obtained.

After the first row of sutures has been placed by stitcher 3, the affected section of the stomach is cut off along the instrument jaws with the aid of a scalpel. By turning the handle 5 in the reverse direction the jaws are opened 5-7 mm.; through the slit thus formed is pushed the lumen of the stump as shown in FIG. 8, the needles 17 and 37 holding the remaining portion of the stomach in place. Then the jaws are brought together to the initial position, and sero-muscular sutures 46 as shown in FIG. 8 are applied by the stitcher 4.

I claim:

1. An instrument for stitching a gastric stump including clinching and supporting jaws, means hingedly connecting said jaws together, said supporting jaw having longitudinal guides thereon, said jaws having facing surfaces, the supporting jaw having recesses therein, the clinching jaw having slots therein facing said recesses, staple stitchers movable in the longitudinal guides of the supporting jaw and adapted to drive U-shaped tantalum staples out of the slots in the clinching jaw for clinching in the recesses in the supporting jaw, said stitchers having levers adapted to be pressed to drive the staples, said supporting jaw including an operating part comprising a rocking arm, stops at the ends of said arms adapted to contact the clinching jaw and said stops being disposed parallel to the clinching jaw.

2. An instrument for suturing a gastric stump including clinching and supporting jaws, means pivotally connecting the jaws together at one end thereof, staple stitchers carried by said supporting jaw for applying staples in a suturing operation, said jaws having facing surfaces having teeth thereon spaced longitudinally along the jaws and displaced at a half pitch from one another so as to corrugate the gastric wall when the jaws are moved toward one another, said jaws having longitudinal slots therein, needles in said slots, manually operated means adjustably positioned in the slots, said teeth having eyes in the central portion thereof and said needles being adapted to freely enter the eyes to fix the stomach wall by the sero-muscular layers when the first row of sutures is applied to the lumen of the stump and to place a second row of sutures on the sero-muscular layers of the gastric walls.

References Cited in the file of this patent

UNITED STATES PATENTS

960,300	Fischer	June 7, 1910
2,344,071	Wilson	Mar. 14, 1944