United States Patent [19]

Rudie

[11] **3,771,526**

[45] **Nov. 13, 1973**

[54] **ANASTOMOSIS CLAMP**

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[21] Appl. No.: **223,955**

[52] **U.S. Cl.** ..... **128/334 C,** 128/346

[51] **Int. Cl.** **A61b 17/11**

[58] **Field of Search** ..... 128/303 R, 334 R, 128/334 C, 346

[56] **References Cited**

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Primary Examiner—Dalton L. Truluck
Attorney—Jack W. Wicks et al.

[57] **ABSTRACT**

An anastomosis clamp including a first clamping collar, a second clamping collar, a support rod connected to the first collar with said second collar having a support member slidable on said support rod, each of the opposed edges of said collars being formed with undulations which mate, and means for urging said clamping collars together.

8 Claims, 12 Drawing Figures

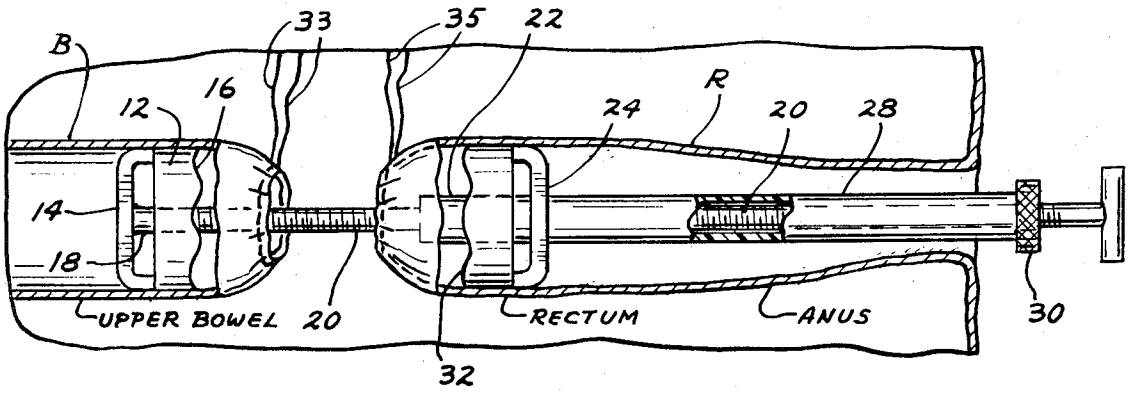


FIG. 1

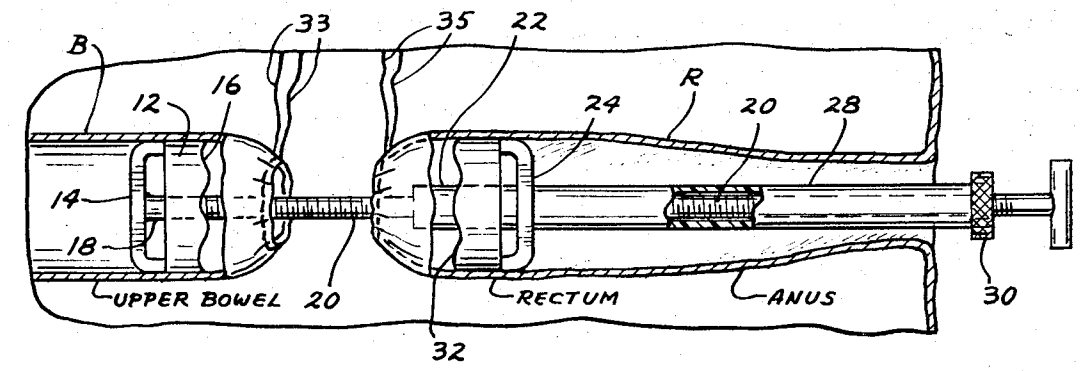
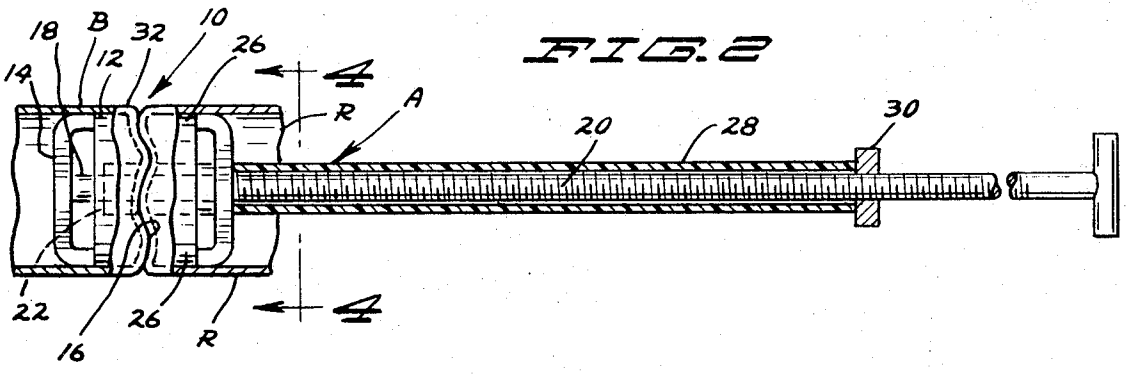


FIG. 2



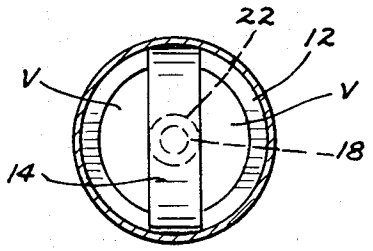


FIG. 3

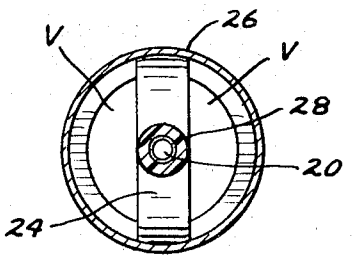


FIG. 4

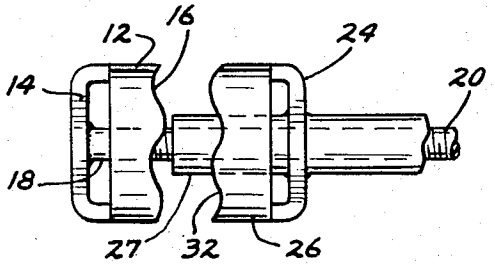


FIG. 5

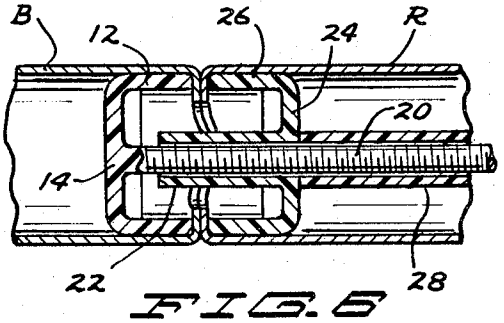


FIG. 6

2 Sheets-Sheet 2

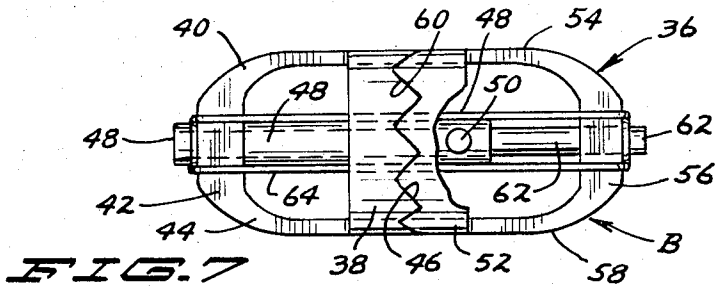


FIG. 7

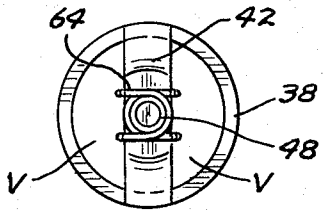


FIG. 9

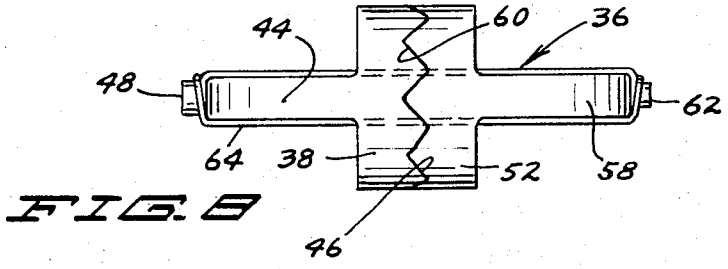


FIG. 8

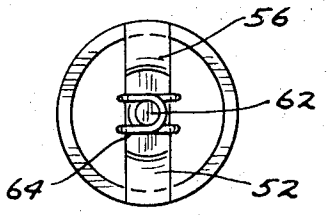


FIG. 10

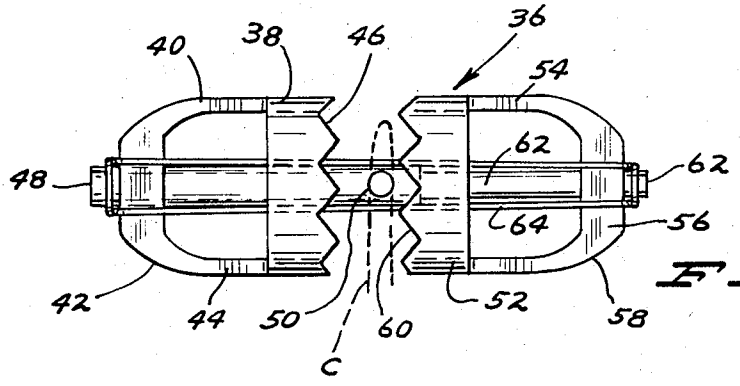


FIG. 11

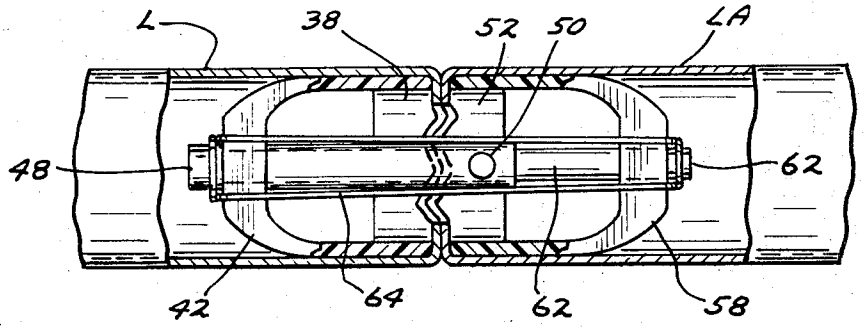


FIG. 12

ANASTOMOSIS CLAMP

SUMMARY OF THE INVENTION

The invention relates generally to surgical clamps and more particularly to an improved rectocolic anastomosis clamp. With the removal of a portion of the bowel the ends must be joined, and it is highly desirable to carry out bowel anastomosis by clamping together inturned ends until agglutination occurs at the periphery of the clamped junction. In known methods of clamping the healed bowel ends usually form a joint that has a diameter less than that of the original thereby resulting in a restriction in the bowel. The amount or area of bowel ends clamped together must be as great as possible to prevent the formation of a restriction. It is also desirable that with the clamp in place within the bowel there may be a ready escape of mucoid contents of the bowel.

The present invention provides a rectocolic anastomosis clamp whereby a maximum of peripheral bowel ends are clamped whereby the inside diameter of the healed bowel is not restricted to a dimension less than that of the original and which allows escape of contents of the bowel through the clamp with the clamp in clamping position. The clamp in one form is adapted to be assembled within the bowel with the parts being extended through the anus. The structure is such that the positioning of the severed ends of the bowel on the clamping faces or edges is readily and positively accomplished. With the device the clamping pressure is established and adjusted by manipulation of the clamp extending outwardly of the anus in one form of the invention used to clamp the end of the upper bowel and the rectum. A further embodiment of the clamp is used to clamp a portion of the large or small bowel, respectively, or to clamp a portion of the small bowel to the stomach as in a gastroenterostomy and in this latter embodiment there is no extension of the clamp outwardly of the anus. In either embodiment the clamp is sluffed off in three or four days outwardly through the anus.

In the drawings forming part of this application:

FIG. 1 is an elevational view of an anastomosis clamp embodying the invention in position in the upper bowel and rectum prior to clamping.

FIG. 2 is a longitudinal sectional view of the clamp in clamping position.

FIG. 3 is an upper end view thereof.

FIG. 4 is a sectional view on the line 4—4 of FIG. 2.

FIG. 5 is a view similar to that of FIG. 2 but with the clamping portions separated and portions broken away.

FIG. 6 is a sectional view through the clamping portions in clamping position on the lower end of the upper bowel and the upper end of the rectum.

FIG. 7 is an elevational view of a further embodiment of the invention.

FIG. 8 is a view similar to that of FIG. 6 but rotated 90°.

FIG. 9 is an end view of the embodiment of FIGS. 7 and 8.

FIG. 10 is an end view opposite to that of FIG. 9.

FIG. 11 is an elevational view similar to that of FIG. 7 but with the clamp in open position.

FIG. 12 is a sectional view of the embodiment of FIGS. 7–11 through the clamp on the bowel ends.

Referring to the drawings in detail, the anastomosis clamp A includes the clamping head 10. The head 10 includes the upper clamping collar 12 to which is connected the cross bar member 14 and which lies in a plane of a diameter of the collar. The lower peripheral edge of the upper clamping collar 12 is formed with the undulations 16.

A rod-like support 18 extends from the inner surface of the cross bar 14 axially of the upper clamping collar 12 and terminates in the flexible threaded rod portion 20. Further provided is the hollow cylindrical portion 22 connected at its lower end to the inner surface of the cross bar 24 connected to the lower clamping collar 26 which lies in a plane of a diameter of the collar 26 and axially of the collar. The inside diameter of the hollow cylindrical portion 22 is sufficient for slidable motion on the rod-like support 18.

The numeral 28 designates a flexible tube through which the flexible threaded rod 20 extends and threadedly mounted on the lower end of the rod 20 is the nut 30. With the tube and rod flexible the same can adapt to extended condition from the anus as a result of movement of the patient. The upper peripheral edge of the lower collar 26 is formed with undulations 32 which mate with the undulations 16 of the upper clamping collar 12 in clamping relation as particularly shown in FIGS. 2 and 6.

The upper and lower clamping collars 12 and 26 are brought into clamping relation by screwing up on the nut 30 which forces the upper end of the tube 28 against the cross bar 24 of the lower clamping collar.

To join the lower end of the upper bowel B with the upper end of the rectum R after cancerous portions of the bowel have been removed, the lower open end of the upper bowel B is sewn loosely with the thread 33. Next the clamp collar 12 is inserted into the lower end with the end extending into and upon the undulations 16 due to the restrictiveness of the end of the bowel due to the aforesaid sewing, particularly as in FIGS. 1, 2, and 6. Then the upper end of the rectum R is sewn loosely by means of thread 35 and the lower clamping collar 26 forced upwardly into the rectum to the loosely sewn end thereof with the end extending into and upon the undulations 32. The clamping collars 12 and 26 are then brought together upon the lower end of the upper bowel B and the upper end of the rectum R in clamped together relation, particularly FIGS. 2 and 6. The threads 33 and 35 are then removed. After the passing of about three days time, the clamped bowel end and rectum end agglutinate or grow together, and the entire clamp A is removed through the anus as a result of a sluffing off action of the flesh of the parts. The voids V between the collar portions and the cross bars 12 and 24 allow bowel movement therethrough from the upper bowel B to and through the rectum when the device A is in place.

The complementary undulations 16 and 32 increase the extent of the clamping edge surface of the collars 12 and 26 as compared to purely cylindrical end surfaces of collars. With this additional clamping edge surface the inside diameter of the bowel and rectum at the point of joining is as large as originally and not restricted as a result of the joining.

A further embodiment of the invention is found in FIGS. 7–12 wherein the clamp B includes the clamping head 36. The head 36 includes the first clamping collar 38 to which is connected the first side arm 40 which terminates in the end bar 42. The end bar 42 terminates in the second side arm 44 which is connected to the

collar **38.** The lower peripheral edge of the collar **38** is formed with the undulations **46.**

The numeral **48** designates a hollow support rod anchored at its outer end to the end bar **42** and extending axially through and outwardly of the collar **38.** The wall of the rod **48** is formed with the opening **50.** Further provided is the second clamping collar **52** to which is connected the first side arm **54** which terminates in the end bar **56.** The end bar **56** terminates in the second side arm **58** which is connected to the collar **52.** The peripheral edge of the collar **52** is formed with the undulations **60** complementary to the undulations **46** for clamping engagement therewith.

Also provided is the rod **62** anchored at its outer end to the end bar **56** with the inner end of the rod slidably positioned within the hollow support rod **48.** The collars **38** and **52** are urged together in clamping engagement by means of the elastic member **64** positioned upon the end bars **42** and **56** and around the outer end of the hollow rod **48** and the outer end of the rod **62** while extending substantially axially through the collars **38** and **52** and parallel to the members **48** and **62.**

To join one end of a large bowel illustrated as L to the end to be joined illustrated as La after an intermediate portion of the bowel has been removed, the lower open end of the bowel portion L is sewn loosely. A surgical clamp C is clamped upon the rod **62** at the opening **50** of the hollow support rod thereby holding the collars separated as in FIG. **11.** In this condition the collars are held apart. Then the collar **38** is inserted into the lower end of the bowel L with the end extending into and upon the undulations **46** due to the restrictiveness of the end of the bowel due to the aforesaid sewing, particularly as in FIG. **12.** Then the upper end of the bowel portion La is sewn loosely and forced upon the collar with the end extending into and upon the undulations **60.** The clamp C is then released and as a result the collars are urged together by the elastic member **64** and upon the ends of the bowel portions.

After the passing of about three to four days time, the bowel ends agglutinate or grow together and the entire clamp B sluffs off and automatically passes out the anus. The voids V between the collar portions and the bars **42** and **56** allow bowel movement therethrough when the clamp B is in operative clamping position. As in the case of the embodiment of clamp A the complementary undulations **46** and **60** increase the extent or length of the clamping edge surface of the collars **38** and **52** as compared to purely cylindrical ends. With this additional clamping edge surface, the inside diameter of the bowel at the point of joining is substantially as large as originally and not restricted as a result of the joining which restrictiveness occurs where the edges of the collars are purely cylindrical.

I claim:

1. An anastomosis clamp comprising:

a. a first open ended clamping collar having a substantially constant diameter and a relatively thin wall,

b. a second open ended clamping collar having a substantially constant diameter and a relatively thin wall,

c. a relatively narrow cross bar formed on each of said collars adjacent one end thereof extending across the open area defined by the collar on a diameter thereof, said collars having opposite clamping edges on the collar ends opposite said cross bars,

d. means carried axially of said collars by said cross bars for guiding and holding said clamping collars together in clamping engagement, and

e. means for urging the opposed clamping edges of said clamping collars together in clamping engagement wherein the open spaces in collars permit flow axially through the clamping collars.

2. The device of claim **1** in which said means carried axially of said collars by said cross bars for guiding and holding said clamping collars includes

a. a support rod connected to said first clamping collar and extending axially therefrom, and

b. said second clamping collar having a support member slidable on said support rod.

3. The device of claim **2** in which said means for urging said clamping collars together includes elastic means connected to said first and second clamping collars.

4. The device of claim **2** in which said means for urging said clamping collars together includes

a said support member of said first clamping collar being threaded with draw-up means thereon adapted to act against said second clamping collar to urge said collars together.

5. The device of claim **2** in which said support member of said second clamping collar is flexible to allow movement of the patient using the clamp.

6. The device of claim **4** in which said draw-up means includes a tube slidably mounted on said threaded support member of said first clamping collar which is drawn up against said second clamping collar by means of a nut member.

7. The device of claim **2** further including means for maintaining said collars in spaced apart relationship against said urging means for allowing securement thereto of parts for clamping.

8. The device of claim **7** in which said means for maintaining said collars in spaced apart relationship includes an opening formed in said support member of said first clamping collar whereby said support members may be clamped together.

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