

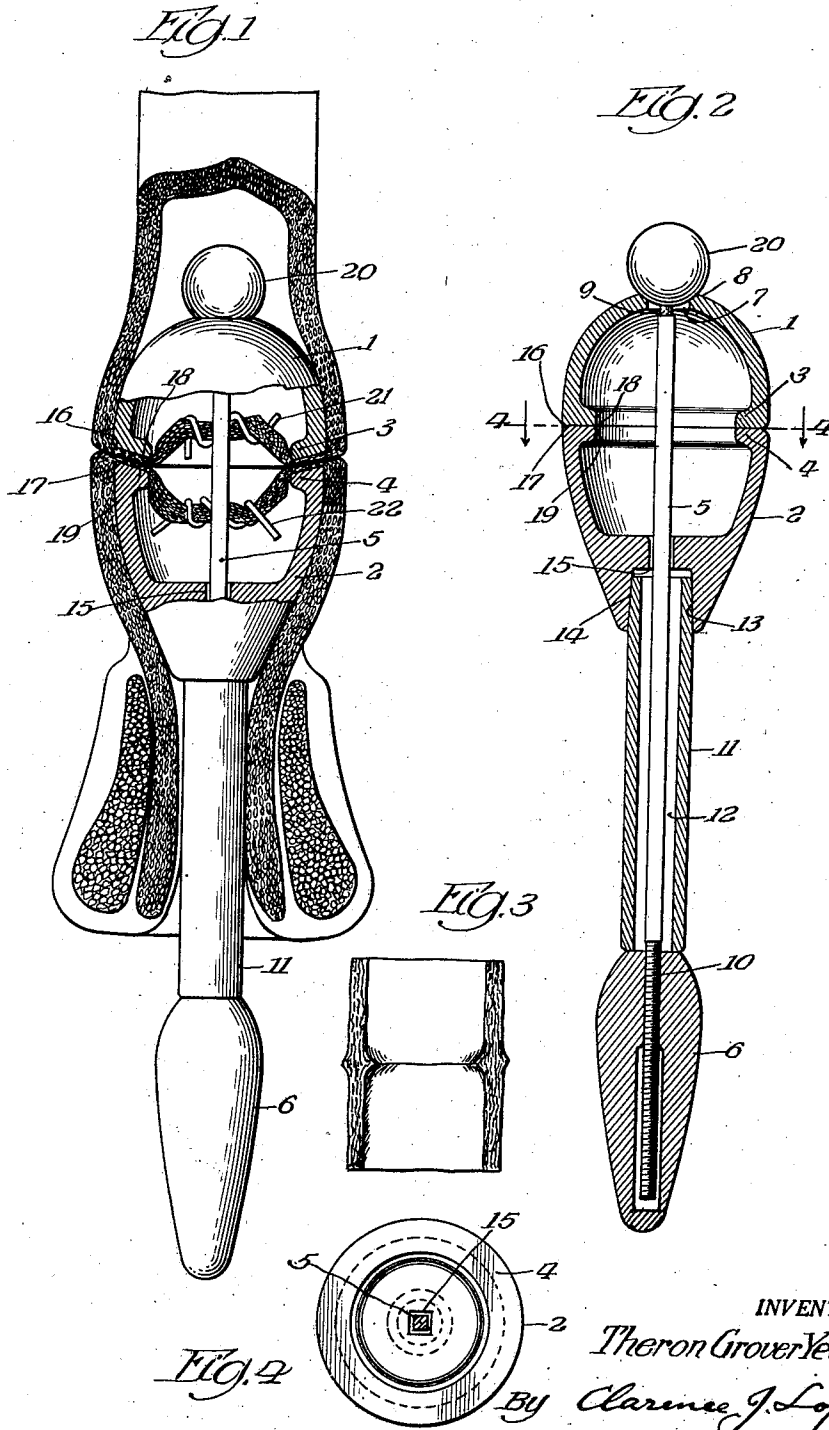
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T. G. YEOMANS

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SUTURELESS METHOD OF RECTO-SIGMOID ANASTOMOSIS AND APPARATUS THEREFOR

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INVENTOR.

*Theron Grover Yeomans*

By *Clarence J. Loftus*  
*att'y.*

# UNITED STATES PATENT OFFICE

2,434,030

## SUTURELESS METHOD OF RECTOSIGMOID ANASTOMOSIS AND APPARATUS THEREFOR

Theron Grover Yeomans, St. Joseph, Mich.

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My invention generally is for a method and apparatus related to the surgical removal of cancerous growths affecting the rectum, for which there is no presently known successful operative procedure for the cure of cancer of the rectum, occurring in its lower half, which does not destroy the rectum.

My invention is applicable to all cases in which the diseased tissues are above the triangular ligaments of the rectum, and such instances constitute a substantial percentage of cancer of the large intestine.

Reliable current medical statistics show that the percentage of cancers of the colon to which my invention is applicable range over the age period of thirty to eighty years and have a greatest incidence of forty percent in the period of fifty-one to sixty years, falling as low as twenty-five percent in the period of forty-one to fifty, and amounting to thirty-two percent in the period of sixty-one to seventy years.

A major object of my invention is to permit anastomosis of the colon to the lower rectum, which is not possible by usual surgical methods in the space available.

Another object of the invention is to obviate the necessity for permanent colostomies in certain cases of rectosigmoid carcinoma.

A still further object of the invention is to materially reduce the time of the operation incidental to any removal of the cancerous growth from this region of the large intestine.

Another object of the invention is to obviate the continued annoyance and discomfort of the patient, throughout remaining life, in cases where a permanent colostomy is otherwise necessary.

Another object of the invention is to materially reduce the present mortality rate in operations involving removal of cancerous growths of the rectum.

Another object of the invention is to provide a simple, sure, and easy way to preserve the normal functions of the rectum in such cases, without its destruction, and without resort to the difficult, unsatisfactory, and more dangerous so-called "pull through" operation sometimes attempted, in which an effort is made to bring the severed colon down through the sphincter.

The metastasis of the disease producing agency from its location, in this segment of the bowel, is invariably upward, and never downward, and it is unnecessary to remove more than three centimeters of the bowel below the margin of the neoplasm.

A larger margin of safety is permissible above

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the boundaries of the neoplasm, without detriment.

In most cases, the only reason for removing the last few inches of rectum is the mechanical impossibility of making a satisfactory anastomosis when the distal remnant is relatively short.

Another object of the invention is to provide a clamp adapted to hold the severed ends of the bowel together, without sutures, during anastomosis, and to be removed through the anus when anastomosis is completed.

Another object of the invention is to provide a clamp for holding the severed ends of the bowel together, without sutures, which lies wholly within the bowel, and the operating means for which are outside the anus, the clamp acting as a container for surplusage of bowel tissues killed and sloughed off the living tissues during anastomosis.

Other objects and advantages will become apparent in the following description and from the accompanying drawings in which:

Figure 1 is a longitudinal view of the rectum severed below the sigmoid colon, in non-distended and operative condition, shown principally in section, and with a portion of the rectum removed and the distal and proximal ends abutting and held together by my clamping apparatus;

Figure 2 is a longitudinal view of a clamping apparatus, fully closed, and with all parts, excepting the clamping bolt and its ball head, shown in section embodying one form of the apparatus of my invention;

Figure 3 is a short, longitudinal sectional view of that portion of a rectum in which anastomosis has been accomplished; and

Figure 4 is a cross-sectional view on the line 4—4 of Figure 2 showing the lower clamping cup and the clamping bolt passing therethrough.

While the invention is susceptible of various modifications, and alternative constructions of the apparatus, which is a part thereof, I have shown in the drawing and will herein describe in detail, the preferred embodiment, but it is to be well understood that I do not thereby intend to limit the invention to the specific form of apparatus disclosed, or to the exact method described, but intend to cover modifications of the method and apparatus, falling within the spirit and scope of the invention as expressed in the appended claims.

The apparatus which I use for carrying out my method is essentially a circular clamp comprised of two cup members 1 and 2, having opposing flanges 3 and 4, which are adapted to be mutually

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advanced toward each other by means of the ball-headed, square-bodied tie bolt 5 and its nut 6.

The cup member 1 is provided with a round clearance hole 7, through which the tie-bolt 5 may pass freely, and a spherically formed ball seat 8 is marginally constituted about the hole 7.

The cup member 2 is provided with a square clearance hole 15 through which the square bodied tie bolt 5 is adapted to be passed freely.

Surrounding the square clearance hole 15 and in the lower end of the cup member 2 is a tapered socket 14, adapted to interchangeably receive body tubes 11, of varying lengths, which are provided at one end with a tapered portion 13 which mates with the tapered socket 14 and is adapted to seat the tube 11 in the socket 14 of the cup member 2.

The opposed, in-turn, annular flanges 3 and 4 of the respective cup members 1 and 2 have been found satisfactory for the desired clamping purpose when not less than one quarter inch in width and the inner edges 18 and 19, as well as the outer edges 16 and 17, are best adapted for the purpose when provided with smoothly rounded corners of approximately one sixty-fourth inch radius.

The square bodied tie-bolt 5 is provided with an integral spherical head 20, and the portion 9 directly adjacent the ball is necked down to a round section for a short distance in order to permit equal ball and socket action of the ball 20 in the socket 8 in all directions. The opposite end of the tie-bolt 5 is provided with threads 10 adapted to engage the internal threads of the hand nut 6. The total length of the tie-bolt 5 is so related to the total length of the body tube 11 that when the apparatus is assembled, as shown in Fig. 1, clamping pressure may be exerted between the opposed faces of the annular flanges 3 and 4.

The hand nut 6 may be provided with coarsely fluted grooves to provide more secure gripping surfaces for the fingers.

While a number of metals may be used in the construction of the apparatus, aluminum has proven very satisfactory for the cup members, the body tube and the hand nuts, on account of its light weight, while the tie-bolt is best made from steel in order to secure sufficient strength in a bolt of small diameter.

The maximum diameters of the cup members 1 and 2 must not be too small, lest the stoma be too narrow, nor should they be too large to remove through the anus, unless the sphincter is to be divided and later repaired.

One and one-half inches has been determined in use to be a median of satisfactory diameters.

The body tube 11 must be selected of such length that it will project sufficiently beyond the anus to be grasped and held against turning by suitable shaped forceps or pliers, but not enough to be clumsy.

The entire apparatus must have all exterior surfaces smooth and highly polished, but such finish is not necessary on such concealed surfaces as do not contact the bowel.

The opposing faces of the flanges 3 and 4 may be perpendicular to the longitudinal axis as shown in Fig. 2, or they may be disposed angularly with respect to the longitudinal axis, as shown in Fig. 1, in order to facilitate their concentric axial alignment.

In practice of my method the operating surgeon, having severed the bowel and removed the section containing the neoplasm, places the cup member 1 upon the tie-bolt 5 and inserts it into the proximal bowel where it is secured by a purse

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string suture 21, whipped over the cut edge of the bowel and tied around the tie-bolt.

The cup member 2 is then placed in the distal segment of the rectum with the body tube 11 protruding from the anus, where it is held steady by an assistant.

A purse string suture 22 is then placed in the cut edge of the rectum. The cup member 2 and tube 11 are slipped over the tie bolt 5.

The rectal purse string 22 is then tied around the tie-bolt 5, the two segments of bowel are brought together, with the square portion of tie-bolt 5 entering and freely engaging the square clearance hole 15 and the threaded portion extending through and beyond the body tube 11.

With the cup members 1 and 2 manipulated into positions of approximate alignment, the assistant screws the hand nut down against the projecting end of the body tube 11, which he at the same time restrains from any tendency to turn, by means of shaped jaw forceps, and thereby clamps the intumed bowl walls between the opposing faces of the flanges 3 and 4 of the cup members 1 and 2.

The tightening of the nut is continued until the clamped portions of the bowel walls are sufficiently thinned and compressed so that no blood is thereafter supplied to the clamped portions between the flanges.

The apparatus and the bowel in its then condition are as shown in Fig. 1, with the serous coats in good contact outside the clamped area, and union proceeds at once, occurring first by adherence of the serous coats in contact within approximately six hours and then extending across the muscular coats.

In due course, union will be entirely effected and the tissues between the opposed clamping surfaces of the flanges 3 and 4, with all of that portion within the apparatus, will have become dead and have sloughed off and separated from the living tissues.

The apparatus may then, in its entirety, be lubricated and removed through the anus and, after its removal, the mucous membrane grows across the united junction and anastomosis of the colon to the lower rectum has been completed.

The operation is rapidly and safely performed without the use of sutures other than the temporary purse strings, which can be eliminated also by the use of any satisfactory internal, expanding clamp within the inner margins of the flanges.

The appearance of a section of the rectum after anastomosis, with thickened scar tissue, is shown in section in Fig. 3.

Having thus described my invention, I claim:

1. A clamp for recto-sigmoid anastomosis for temporarily retaining the intumed ends of both sections of a severed bowel and adapted to be inserted and removed through the anus, comprising in combination, an upper cup-shaped clamping member, a lower opposed cooperating cup-shaped clamping member, each of said clamping members being provided with inwardly extending opposed clamping flanges, a hollow body member, a tie rod extending through said hollow body member and said clamping members, one end of said tie rod extending beyond the hollow body member and manually operated means cooperating with said extending end for drawing said clamps tightly together, substantially as and for the purposes set forth.

2. A clamp for recto-sigmoid anastomosis for temporarily retaining the intumed ends of both sections of a severed bowel and adapted to be

inserted and removed through the anus, comprising in combination, an upper cup-shaped clamping member, a lower opposed cooperating cup-shaped clamping member, each of said clamping members being provided with inwardly extending opposed clamping flanges, a hollow body member, a tie rod extending through said hollow body member and said clamping members, one end of said tie rod extending beyond the hollow body member, the opposite end of said tie rod having an external ball and socket connection with the upper clamping member, and manually operated means cooperating with said extending end for drawing said clamps tightly together, substantially as and for the purposes set forth.

THERON GROVER YEOMANS.

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