Dec. 17, 1935. H. E. DIERKER 2,024,967

METHOD AND APPARATUS FOR REHABILITATING PERISTALSIS OF THE COLON

Filed Oct. 22, 1932 2 Sheets-Sheet 1

Fig. 1.

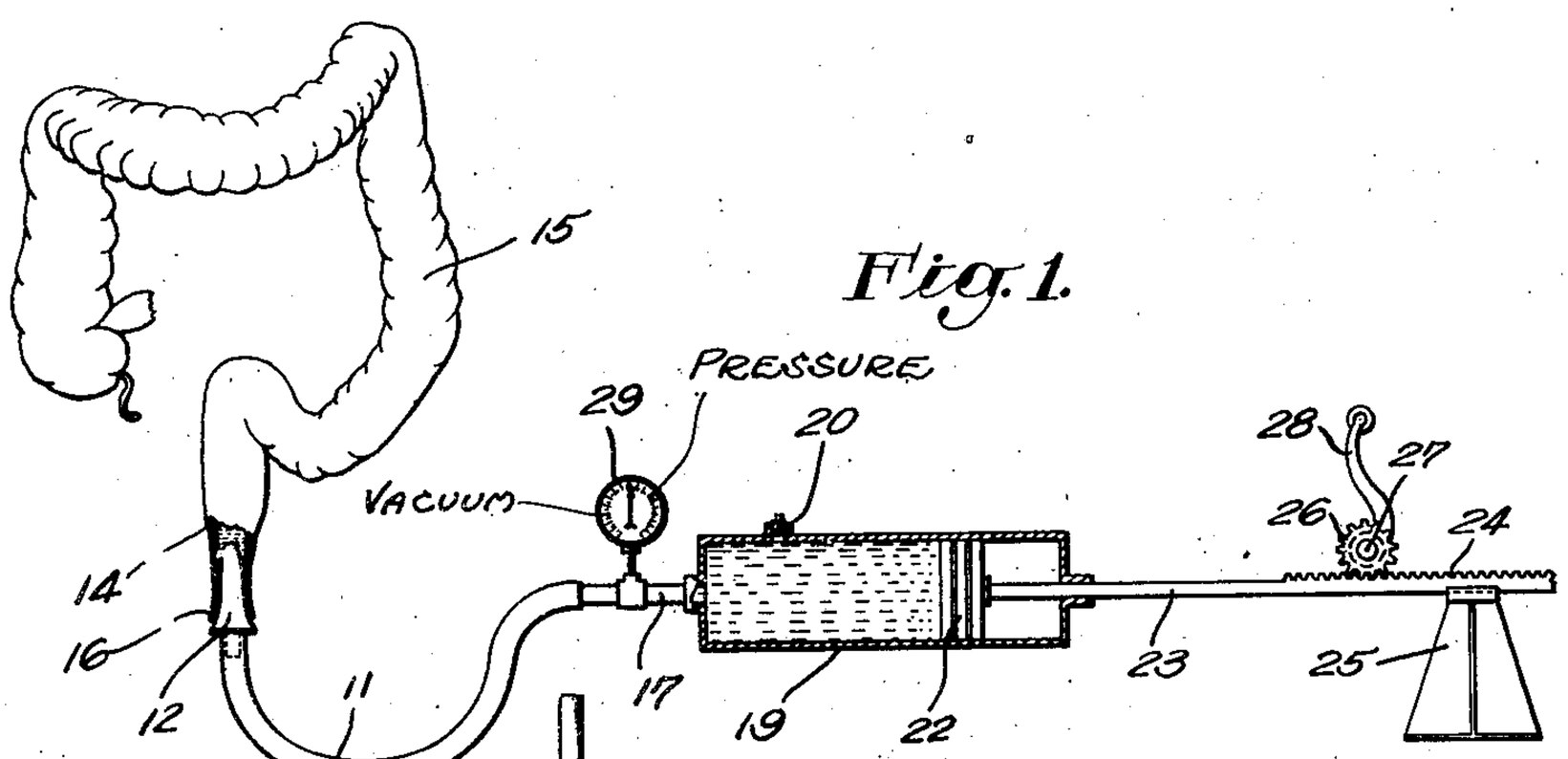
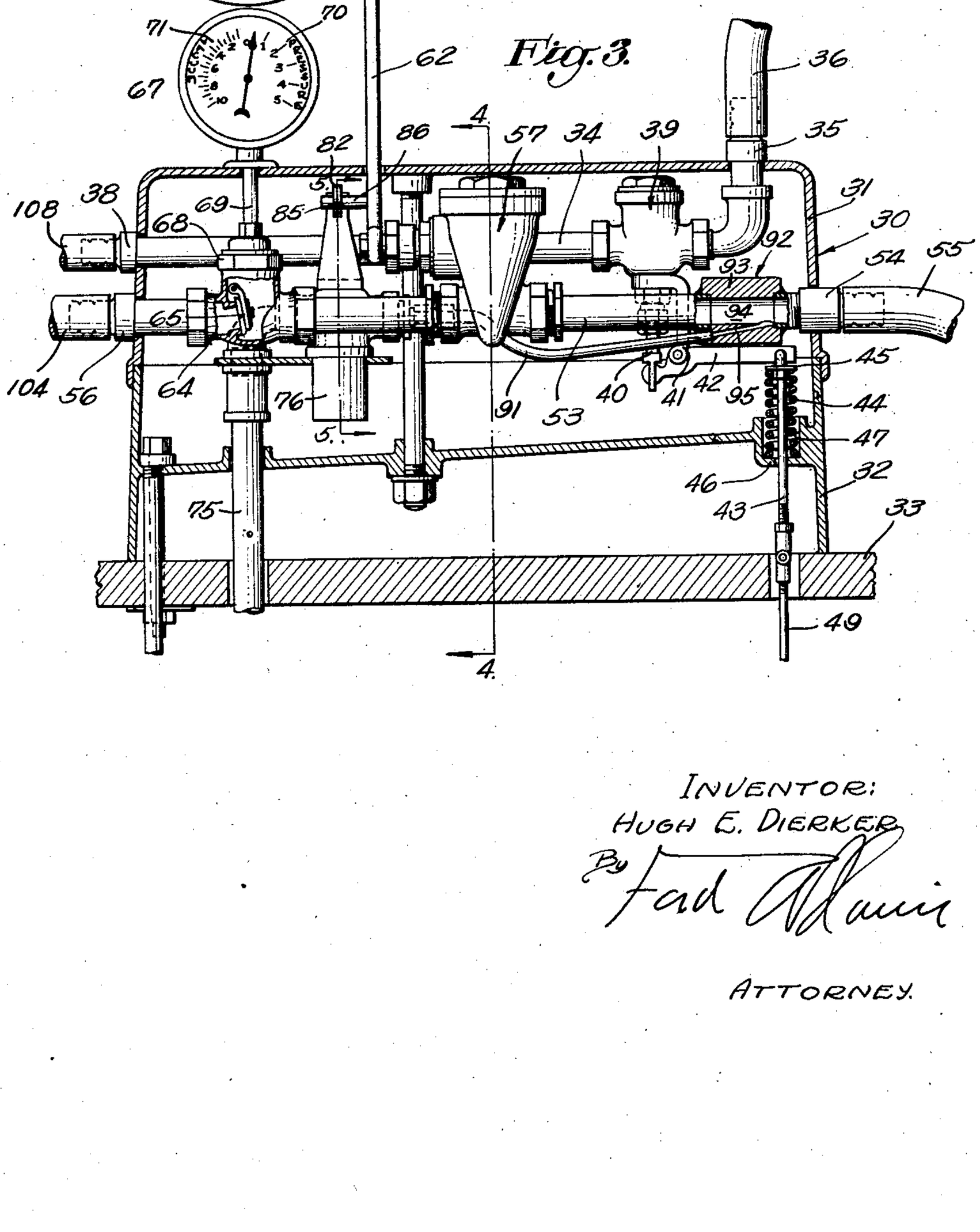



Fig. 3.

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METHOD AND APPARATUS FOR REHABILITATING PERISTALSIS OF THE COLON

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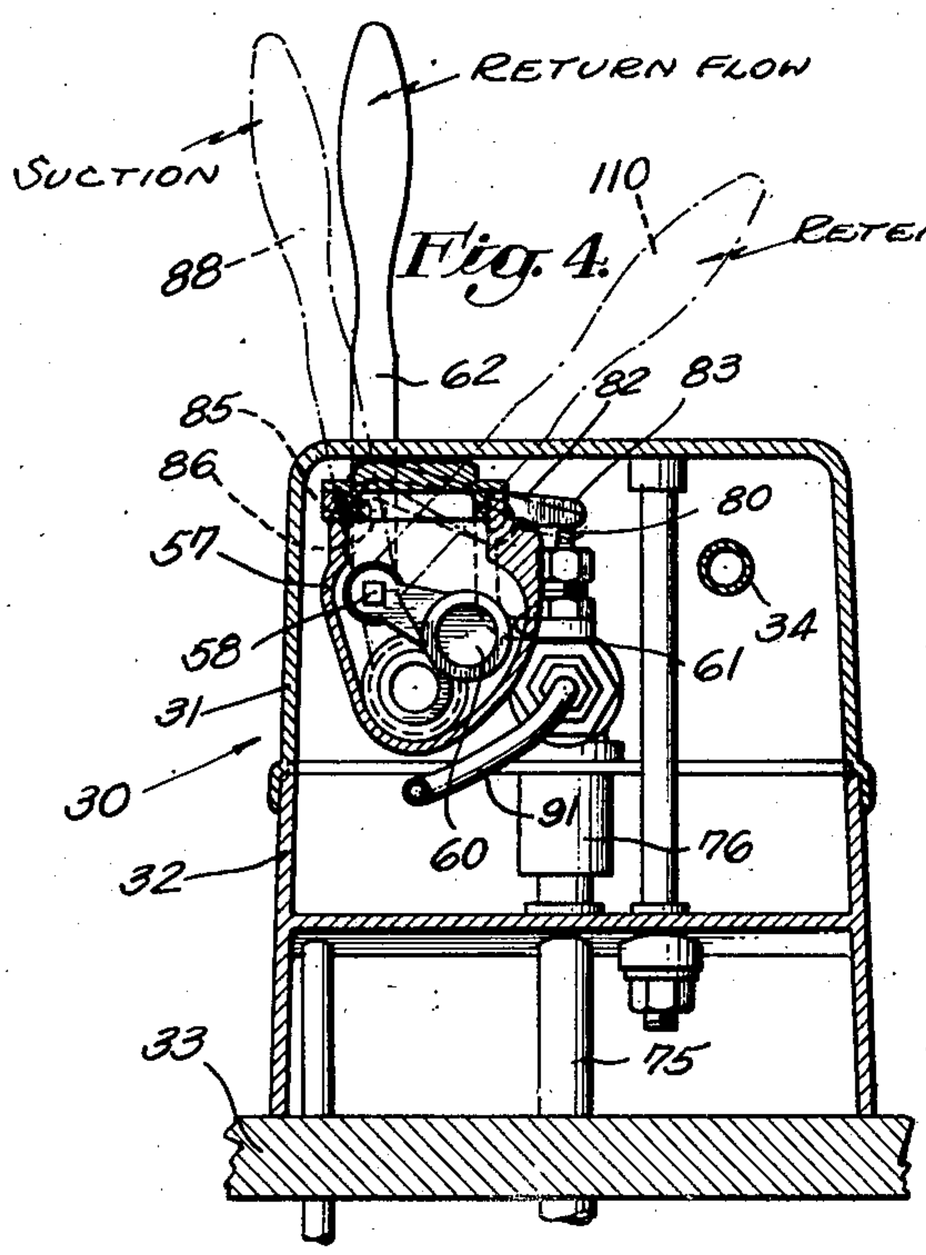


Fig. 4.

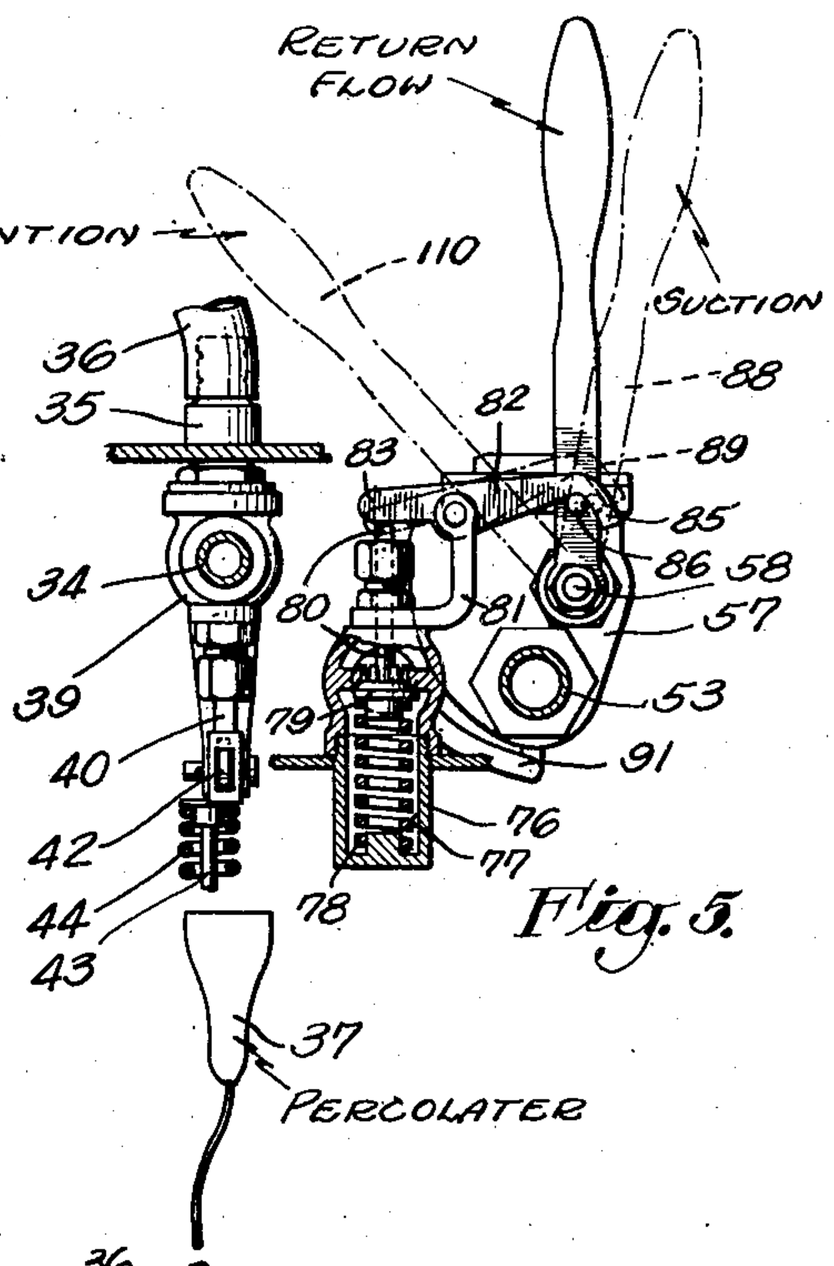


Fig. 5.

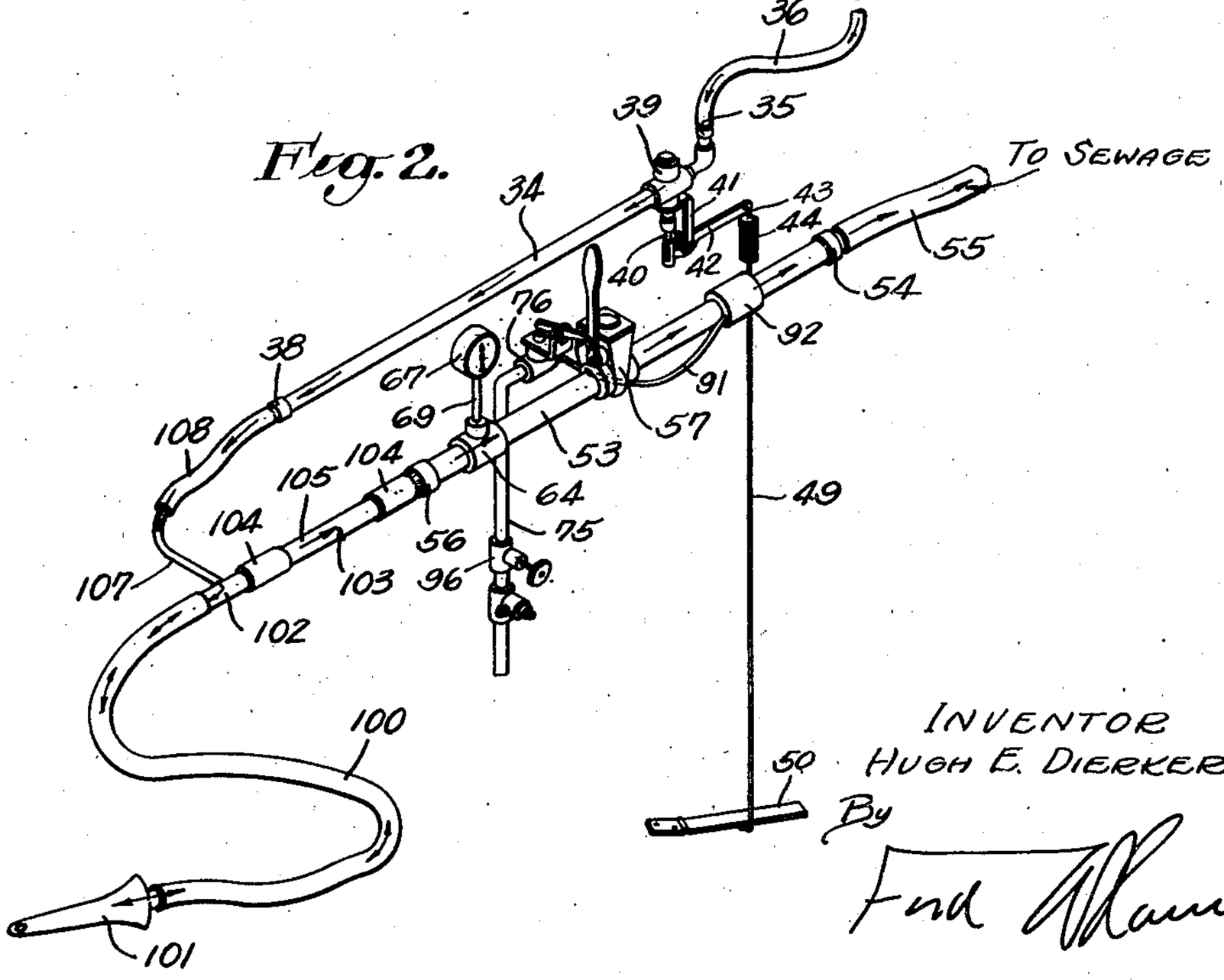


Fig. 2.

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Patented Dec. 17, 1935 2,024,967

# UNITED STATES PATENT OFFICE

2,024,967

## METHOD AND APPARATUS FOR REHABILITATING PERISTALSIS OF THE COLON

Hugh E. Dierker, Hollywood, Calif.

Application October 22, 1932, Serial No. 639,105

10 Claims. (Cl. 128—227)

My invention relates to colonic therapy and consists of a method and apparatus for rehabilitating peristalsis of the colon. This application is a continuation in part of my application entitled Colon irrigation, Serial No. 474,784, filed Aug. 12, 1930, and which issued as Patent No. 1,910,756 on May 23, 1933.

In order that the principles of my invention and its manner of operation may be more lucidly understood, I will briefly refer to the actions which occur in the alimentary canal and particularly the colon, and the various abnormal conditions which exist in the colon.

It is the general object of my invention to provide a method and apparatus for stimulating or rehabilitating normal peristalsis in order that the colon may function properly and in order that the residual products of digestion may be properly emptied from the colon.

It is an object of my invention to provide a method and apparatus whereby the colon may be internally massaged, preferably by hydraulic means in order that the muscles thereof may be exercised and vitalized, thus encouraging these muscles to function in accordance with the usual laws of nature controlling the peristaltic action which occurs under normal conditions.

It is a further object of my invention to provide a method and apparatus whereby the colon may be expanded and contracted within its normal limits in order to exercise same and in order to stimulate and rehabilitate the muscles of the colon in order that the same may be reeducated to perform the peristaltic action.

It is a very important object of my invention to provide a method and an apparatus whereby the entire colon may be expanded and contracted. As pointed out heretofore, this action will massage and exercise the colon and the muscles thereof and will reeducate the colon to perform its normal peristaltic action.

In the preferred form of my invention I connect suitable pressure-producing means to the colon. This is preferably accomplished by using a flexible hose and an applicator on the end thereof which is inserted in the rectum a short distance beyond the rectal sphincter. The applicator and the flexible hose are preferably of a relatively large diameter and form a continuation of the colon. This flexible hose is connected to a means whereby a positive pressure or a negative pressure may be produced or, in other words, whereby a positive pressure (above zero), or a negative pressure (a vacuum) may be produced.

In the preferred form of my invention I utilize a liquid, such as water, which is injected into the colon through the flexible hose and is caused to entirely fill the colon. The pressure producing means is then actuated in order to develop a suitable pressure and in order to expand the colon to its normal expanded size. It is not the purpose of my invention to dilate the colon by over-expansion, but merely to expand same to its normal expanded size. This is very effectively accomplished in my method and by the apparatus which I provide as a part of my invention due to the fact that when a pressure is applied to the liquid in the pressure-applying means, this same pressure is automatically transferred throughout the entire body of liquid which extends through the flexible tube and throughout the entire length of the colon. It is well known in physics that the pressure of a liquid is equal in all directions; therefore, by placing this liquid under pressure I am able to produce a pressure throughout the entire length of the colon which is substantially equal at all points and equal in all directions. I have found by performing numerous tests that from four to eight ounces of pressure are sufficient to properly expand the colon. In my method, therefore, I apply to the liquid by the pressure-producing means a pressure of not more than eight ounces. The next step in my method is to contract the colon, thus contracting it or reducing it to its smallest size which it ordinarily occupies when it is contracted by the normal peristaltic action. This is accomplished by operating the pressure-producing means in such a manner that the pressure in the colon is reduced to below zero pressure. This, in the form of my invention which utilizes the liquid as the pressure-transmitting medium, is accomplished by withdrawing the liquid from the colon and by causing a vacuum to exist therein. In experimenting my invention and in using same over a period of time, I have determined that the colon may be contracted by use of a vacuum of substantially four inches of vacuum. When this operation is performed the entire colon is contracted and the muscles which ordinarily perform the peristaltic action are caused to contract. In other words, by internal means the muscles which control or produce the peristaltic action are caused to move in the same manner in which they move when they function of their own accord and under normal conditions. Upon contracting the colon, it is then expanded, and this treatment is continued and the colon

is alternately expanded and contracted.. This thoroughly massages the entire colon, stimulates the circulation thereof and exercises the muscles which produce peristalsis. It has been found that by performing this process, an atonic colon during the process can actually be stimulated or reeducated so that it will of its own accord produce the peristaltic action. The rehabilitation of peristalsis is often accomplished without the removal of feces. This is due to the fact that the peristaltic action is induced by the exercising action produced by expanding and contracting the colon.

In the preferred form of my invention, as previously pointed out, I utilize liquid as a pressure-transmitting means. I prefer to use liquid, due to the fact that it is easy to inject, that the pressure thereof is equal in all directions in order that the entire colon may be treated and that the liquid may be readily removed, and furthermore, that the liquid is absolutely unharmful to the colon.

As previously pointed out, the applicator is inserted but a short distance beyond the rectal sphincter. This is an important part of my invention, and my invention is to be clearly distinguished from the ordinary devices for colon irrigation in which a flexible tube is extended through the colon and the outlet end thereof placed, if possible, in the caecum. My invention is not an irrigating apparatus, but a method and apparatus for exercising the colon and for rehabilitating peristalsis. In order that the entire colon may be treated, it is highly desirable that the applicator extend but a minimum distance into the colon, thus subjecting the entire colon to the treatment of the hydraulic massage. In order that there may be a free flow of liquid into the colon and out of the colon, during the performance of my invention the flexible tube is relatively large and may be said to form a continuation of the colon. Obviously, however, a smaller size tube might be used if desired.

By performing my invention, as previously pointed out, it is possible to loosen old encrustations of mucus and feces and to work free the contents of pockets and diverticula, which as is well known in colon therapy, adhere to the walls of the colon and constitute a source of parasitic life and toxemia.

It very often occurs during the treatment of a patient that the entire colon is not free for treatment, but is clogged and has obstructions either at the lower part, central part, or near the upper part thereof. Before the method of my invention may be fully performed it is necessary to remove these obstructions.

It is therefore an object of my invention to provide a method and apparatus for stimulating or rehabilitating normal peristalsis in which obstructions in the colon may be removed prior to the actual performance of the hydraulic massage on the entire colon.

In view of the fact that it is frequently necessary to remove such obstructions from the colon, the preferred form of my invention includes steps of the process and means in the apparatus whereby a supply of liquid may be inserted in the colon and the portion of the colon up to the obstruction expanded. The colon is then contracted and a vacuum of approximately four inches is applied to the colon in an attempt to remove the obstruction. This liquid removed from the colon at this time is delivered to a drain and when the obstruction is removed, the obstruction will also be delivered to the drain. It is found that in the performance of this form of my invention a consecutive expansion and contraction of the colon will break away the obstruction, and in a short period of time the obstructions in the colon may be removed. Many case records are available to prove that by my method and apparatus old incrustations of mucus, contents of pockets and diverticula, and definite bowel obstructions may be worked loose. When the colon has had all obstructions removed therefrom and the liquid may pass to the upper end of the colon, the hydraulic massage of my invention may be performed, as pointed out heretofore.

It is highly desirable to control the amount of expansion and amount of contraction of the colon. In some cases it is absolutely necessary. For example, where the colon is infected or otherwise weakened, an over-expansion or contraction might cause a rupture thereof.

It is therefore an object of my invention to provide a method and apparatus in which the expansion and contraction of the colon may be controlled and over-expansion or over-contraction prevented.

This object of my invention is accomplished by the use of a pressure and vacuum gauge which is connected to a column of liquid which extends through the flexible tube and into the colon. By controlling the pressure of the liquid or the vacuum placed on the liquid it is possible to control the expansion or contraction of the colon. It is found that in the usual run of cases, a patient may stand eight ounces of pressure and at least four inches of vacuum. A patient may stand more than eight ounces of pressure without considerable pain, but I have determined that eight ounces of pressure is sufficient to properly expand the colon. If a greater pressure is used, the colon may be over-expanded and this may in certain cases cause temporary paralysis or atonicy of the colon and may increase rather than eliminate constipation.

As suggested heretofore, it is possible to stimulate and rehabilitate peristalsis, and in the usual course of the method such peristalsis is rehabilitated before the process is stopped.

It is an object of my present invention, therefore, to provide a method and apparatus whereby peristaltic action of the colon may be induced and the strength of the peristaltic action may be measured. In the preferred form of my invention I provide a gauge which determines the pressure, either positive or negative, of the column of liquid which extends into the colon. By filling the colon with liquid and then opening the outer end of the flexible tube in order that the colon may of its initiative force liquid therefrom, I am able to observe by the action of the gauge whether or not any peristalsis occurs. If peristalsis occurs in the colon it will occur by alternate contractions and expansions. As the colon contracts and expands a pressure is applied to the liquid, and since this pressure is equal in all directions the pressure is transmitted through the gauge. As this pressure changes, an indication is made on the gauge and therefore the operator may observe whether or not the colon has been massaged and exercised to such an extent that peristalsis has been rehabilitated.

Other objects and advantages of my invention reside in the details of construction in the apparatus of my invention. These details relate to various mechanical improvements and in various elements connected together in such a manner

that the apparatus is always operated with safety to the patient. These additional objects and advantages will be clearly pointed out in the description of the details of my invention.

Referring to the drawings in which I have illustrated the construction of my invention:

Fig. 1 is a view illustrating partly in section a form of my invention which is utilized solely for performing the massaging operation on the colon.

Fig. 2 is a diagrammatic view illustrating another form of my invention which may be utilized not only for massaging the colon, but also for the purpose of removing obstructions from the colon in order that the entire colon may be treated with my apparatus.

Fig. 3 is a sectional view taken through a part of my invention which includes the various control mechanisms.

Fig. 4 is a section taken on the line 4—4 of Fig. 3.

Fig. 5 is a section taken on the line 5—5 of Fig. 3.

I will now refer to Fig. 1 of the drawings and describe the form of my invention disclosed therein, and also the process of my invention which is performed thereby.

Referring to this figure, the numeral 11 represents a flexible tube having an applicator 12 secured to the end thereof. This applicator 12 is adapted to be inserted into the rectal portion 14 of a colon generally designated by the numeral 15. It will be noted that the applicator is relatively short and extends but a slight distance beyond the rectal sphincter 16. The flexible tube 11 is connected by a short pipe 17 to a liquid supply means 19 which is in the form of a cylinder. The cylinder may be re-supplied with liquid through an opening 20 which is ordinarily closed by a plug, as shown. Operable in the cylinder 19 is a piston 22 having suitable sealing means in order that liquid or air may not leak past the piston in the cylinder. The piston 22 is connected to a piston rod 23 having a rack 24 on the outer end thereof which is slidably supported by a suitable bearing 25. Adapted to operate the rack 24 is a gear 26 which is connected by means of a shaft 27 to a crank 28. It will be seen that by rotating the gear 26 in a suitable direction the piston 22 may be moved to the left or to the right, as desired.

Connected to the pipe 17 is a pressure indicating means 29 which is adapted to indicate a positive pressure or a negative pressure of the fluid in the pipe 17, and consequently to indicate the pressural condition in the colon. This pressure indicating means is in the form of a gauge having mechanism whereby a positive pressure or a negative pressure or vacuum may be indicated thereon.

In this form of my invention the colon is ordinarily previously cleansed of all obstructions in order that the entire colon may be accessible for the massaging treatment of my invention. After the applicator has been inserted, as previously explained, the crank 28 is operated to move the piston 22 in a leftward direction in order to force liquid through the pipe 17, the flexible tube 11, the applicator 12 and into the colon 15. As this action continues the colon is gradually filled with liquid, and when the colon is completely filled a further movement of the piston 22 places a pressure on the liquid, this pressure being indicated on the pressure indicating means 29. The pressure at the pipe 17 is substantially the same as the pressure in any part of the colon. This is due to the fact that the pressure applied in the cylinder 19 is immediately transmitted through the liquid in the pipe 17 and the tube 11 to the liquid in the colon. Furthermore, due to the fact that a pressure of the liquid is equal in all directions, the pressure in all parts of the colon is substantially the same. As the pressure increases on the liquid in the colon 15 the colon is gradually expanded. When a pressure of substantially eight ounces is indicated on the pressure indicating means 29 the colon will have been expanded to its normal outer limit, and it will be undesirable to place additional pressure on the liquid, since it might result in an over-expansion of the colon. The crank 28 is then operated in a reverse direction and the piston 22 is moved to the right. The effect is to withdraw liquid from the colon and suck same into the cylinder 19. When all the liquid has been withdrawn from the colon a further rightward movement of the piston 22 will produce a vacuum on the colon and will contract same. The vacuum or negative pressure produced on the colon will be indicated by the pressure indicating means. Upon completing this negative pressure operation one cycle of the process has been performed. The colon has been expanded and has thereafter been contracted. The colon therefore has been caused by artificial means to first expand and thereafter to contract in substantially the same manner as this expansion and contraction is normally performed by reason of the peristaltic action. This operation of my apparatus is continued for a number of times, and the colon is alternately expanded and contracted. As pointed out heretofore, it is sometimes possible to rehabilitate or stimulate peristaltic action during the treating of the colon. In the apparatus of my invention it is possible to determine whether or not such peristaltic action has been rehabilitated or stimulated. This is accomplished by moving the piston 22 in a rightward direction in order to relieve the pressure thereon. In other words, the piston 22 may be moved in a rightward direction until the gauge 29 indicates a substantially zero pressure. At this time there is no artificial pressure on the liquid in the colon and if any peristaltic action occurs the colon will of itself tend to force the liquid from the colon, thus increasing the pressure of the liquid, which pressure is immediately transmitted through the tube 11 in the pipe 17 and will be indicated on the pressure indicating means 29. If the pressure indicating means 29 is closely observed and if any peristaltic action occurs fluctuations will be noted thereon.

The form of my invention which I have just described in detail does not include any means whereby obstructions may be removed from the colon, although the same is capable of removing incrustations of mucus and the contents of pockets or diverticula.

I will now describe a form of my invention which is designed to remove obstructions from the colon and which is particularly designed for treating various colon disorders in which a constriction exists in the colon, so that it is necessary by massaging the colon to gradually relieve the constriction so that the entire colon may be treated. This condition often exists in cases of atonic constipation, spastic constipation, ptosis or bowel adhesions.

Referring to Figs. 2 to 6 inclusive the numeral 30 represents a housing in which various parts of the control mechanism of this form of my invention are located. This housing consists of a

cover portion 31 and a base portion 32 which may be mounted on any suitable table 33. Situated in the upper part of the housing 30 is an inlet pipe 34 which constitutes a part of the inlet of this form of my invention. The right end of the inlet pipe 34 has an upwardly extending nipple 35 which is located exterior of the housing 30, and adapted to be connected thereto is a flexible hose 36 which is connected to a suitable percolator 37, as shown in Fig. 5. The left end of the inlet pipe 34 has a horizontally extending nipple 38 which projects from the left end of the housing 30. Located in the inlet pipe 34 is an inlet valve 39 which has a valve stem 40 extending downward therefrom, which valve stem is connected to a closure member on the interior of the inlet valve. Supported by a bracket 41 is an operating lever 42 which is connected at one end to the valve stem 40 and at the other end to a vertically extending rod 43, which is normally supported in a raised position by means of a spring 44 which is compressed between a flange 45 at the upper end of the rod 43 and a wall 46 provided by a socket 47 of the housing 30. Extending downwardly from the rod 43 is another rod 49, which is connected as shown in Fig. 2 to a foot pedal 50. By depressing the foot pedal 50 the rods 49 and 43 are moved downwardly against the action of the spring 44, and the lever 42 is moved in a clockwise direction in order to open the inlet valve and to allow liquid to flow through the inlet of the apparatus.

Also positioned in the housing 30 is an outlet pipe 53 which forms a part of the outlet of the invention. This outlet pipe 53 has an outwardly extending nipple 54 at the right end thereof, which projects to the exterior of the housing 30 and is adapted for connection to a discharge hose 55 which is preferably connected to a sewer. The left end of the outlet pipe 53 has a nipple 56 which projects outwardly in a horizontal direction from the housing, as shown. Included in the outlet pipe 53 is an outlet valve 57, the internal construction of which is shown in Fig. 4. Pivoted on a shaft 58 is a gate 60 which is movable in the chamber 61 of the outlet valve from a closed to an open position. The movement of the gate 60 is accomplished by swinging a lever 62 which is secured to the shaft 58 on the exterior of the outlet valve 57. Also located in the outlet pipe 53 to the left of the outlet valve 57 is a check valve 64 which will permit a flow of liquid in an outward or rightward direction, but which has a gate 65 which closes to prevent a flow of liquid in a leftward or inward direction. Connected to the check valve 64 so as to be in communication with the outlet 53 is a pressure indicating means in the form of a gauge 67. The gauge 67 is connected to the upper part of the check valve body 68 by means of a small pipe or tube 69. The gauge 67 is of common design in which the pressure and vacuum may be indicated. Pressure indications 70 appear on one side of the face of the gauge, while vacuum indications 71 appear on the opposite side thereof. This gauge 67 will indicate all positive and negative pressures which may be caused to exist in the outlet pipe 53.

Extending upwardly into the housing 30 is a pipe 75 which is preferably a water pipe. The upper portion of this water pipe is extended horizontally and is connected to an injector control valve 76 which is shown best in Fig. 5. This injector control valve includes a relatively large chamber 77 in which there is positioned a spring 78 for holding a valve member 79 against a seat. Extending upwardly from this valve member 79 to the exterior of the body of the valve is an operating stem 80. By depressing the operating stem 80 the valve is opened. Supported by an arm 81 is an operating lever 82 having an end 83 adatepd to engage the operating stem 80. The other end of this operating lever 82 is provided with a downwardly extending cam formation 85 which extends around a cam pin 86 connected to the lever 62. When the lever 62 is moved from full line position in Fig. 5 into a position indicated by broken lines 88 the operating lever 82 is swung into a position indicated by dotted lines 89, thus depressing the stem 80 and opening the valve member 79. The injector control valve 76 has connected to the outlet side thereof a relatively small pipe or tube 91 which is connected to an injector 92 positioned in the outlet pipe 53. This injector 92 includes a body 93 having a passage 94 therethrough. Connected to the passage 94 is a small injector passage or opening 95 with which the tube 91 is connected. By opening the injector control valve 76 a stream of liquid is passed through the tube 91, the small opening 95 and into the interior of the injector body 93. In view of the directing of this stream of liquid in an outward direction a suction is created in the outlet pipe 53 on the left side of the injector body of the injector 92. The inlet pipe 75 includes a control valve 96 in order that the pressure of the water passing to and through the injector 92 may be controlled, and in this manner the amount of vacuum produced in the inlet pipe 53 may be governed.

This form of my invention includes a flexible tube 100 having an applicator 101 on the end thereof. Both the inlet and the outlet of the invention are connected to this flexible tube 100. Connected to the flexible tube is a T-fitting 102 having a head portion which is in alignment with the adjacent end of the flexible tube 100 and also in alignment with the outlet pipe 53. The T-fitting 102 is connected by a short section 103 to the nipple 56 of the outlet pipe 53. This short section includes rubber tubes 104 and a central glass tube 105. The T-fitting has a relatively small pipe 107 extending from the head portion thereof, and connecting this pipe 107 to the nipple 38 of the inlet pipe 34 is a short flexible tube 108.

In using this form of my invention the percolator 37 is filled with the desired solution or liquid which is at the proper temperature. A clamp is then applied to the flexible tube 100 near the applicator and the apparatus is then adjusted so that the desired amount of vacuum may be produced at the desired time. The lever 62 is then moved from full line position in Fig. 5 into the position indicated by dotted lines 88. When in this position the injector control valve is open and a suction is imposed on the outlet pipe 53, the vacuum or negative pressure thus produced being indicated on the gauge 67. The valve 96 in the water pipe 75 is then regulated so that the pressure and velocity of the water passing through the injector 92 is sufficient to produce the desired vacuum. As previously pointed out I use a vacuum of approximately four inches for contracting the colon during the massaging operation. However, during the initial steps of cleansing the colon I use a less vacuum, which ordinarily is about two inches. The lever 62 is again returned to full line position, as shown in Fig. 5, in which position the injector control valve is closed and the outlet pipe 53 is open. The operator now expels the air from the apparatus

by removing the clamp from the flexible tube 100 and elevating the tube of the applicator 101 above the level of the apparatus. The foot pedal 50 is then depressed in order to open the inlet valve 39. This allows liquid to flow from the percolator 37 through the various connecting conduits of the apparatus and through the applicator. The lever 62 at this time is moved into position indicated by dotted lines 110 of Figs. 4 and 5. When in this position the gate 60 closes the outlet pipe 53. When the lever 62 is in full line position the gate 60 is in open position and the outlet pipe 53 is unobstructed. The full line position of the lever 62 will be referred to as the return flow position while the dotted line position 110 will be referred to as the retention stop position of the lever. This will expel all of the air from the inlet part of the apparatus and from the flexible tube 100 and applicator 101. The clamp is then reapplied to close the flexible tube near the applicator.

The applicator is then inserted into the rectal portion of the colon, as pointed out in connection with the form of my invention shown in Fig. 1. The clamp is then removed from the flexible tube 100 and the foot pedal 50 is depressed to permit the injection of fluid. During this operation the operator watches the gauge 67 and when a pressure starts to register the foot pedal 50 is released and the lever 62 is moved from retention stop position to a position indicated by dotted lines 88 in order to produce a vacuum in the outlet of the apparatus. The lever 62 is then returned to retention stop position, as shown by dotted lines 110, and the foot pedal 50 is again depressed to admit fluid into the patient. As the fluid is introduced the pressure gradually builds up, which pressure is indicated by the gauge 67. The patient is then requested to give an indication when the feeling of fullness is felt, and when the patient gives such signal the foot pedal 50 is released. The operator observes the gauge and notices the pressure at which the patient gives the signal and during the course of the treatment this pressure is never exceeded. By reason of this method of control the patient is never subjected to any ill effects nor to any dangers of over-expansion of the colon. In most cases a pressure of about eight ounces per square inch is satisfactory.

It is ordinarily necessary to remove obstructions from the sigmoid, which is that portion of the colon adjacent the rectal portion thereof. This is accomplished by alternately injecting and removing fluid. As previously pointed out the injecting of the fluid builds up a pressure not to exceed eight ounces per square inch, which expands the portion of the colon being treated, and the exhausting of the fluid therefrom produces a vacuum which contracts the colon. This alternate expansion and contraction of the colon produces the desired massaging operation and removes the feces from the sigmoid. This operation is continued until the entire colon is cleansed, at which time the very important massaging operation of my invention may be performed.

When the entire colon is clear it is desirable to increase the vacuum produced by the apparatus and this is accomplished by the method pointed out heretofore, during which method the valve 96 is opened to a greater extent so that the pressure and velocity of the water passing through the injector 92 is suitably increased. During the massaging operation liquid is first delivered to the colon 15, as pointed out in connection with Fig. 1, so that the entire colon is filled. As the liquid is delivered to the colon the pressure gradually builds up and the foot pedal 50 is depressed until the desired pressure is indicated by the gauge 67, this pressure being that at which the patient gave a signal of the feeling of fullness. Upon releasing the foot pedal 50 the lever 62 is moved into dotted line position 88 in order to operate the injector. This produces suction on the apparatus and removes the liquid from the colon. The colon after the removal of the liquid is then contracted by reason of the vacuum or negative pressure produced thereon, this vacuum at this time being whatever is required by the patient and preferably being approximately four inches. The vacuum, however, used in my apparatus must be sufficient to contract the colon; otherwise, the beneficial results of massaging will not be obtained. My invention is intended first to expand and thereafter to contract the colon in order to produce an expansion and contraction therein which resembles the normal expansions and contractions produced involuntarily when the normal peristaltic action occurs. It will be seen, therefore, that in my invention it is absolutely necessary to contract the colon; otherwise, the contracting action normally produced in peristalsis cannot be produced by my apparatus. This operation is continued for a period of time, and the colon is thoroughly invigorated. The operator then fills the colon, as previously pointed out, and then moves the lever 62 into return flow position, which is the position shown in full lines in Figs. 4 and 5. In this position there is no vacuum placed on the outlet of the apparatus while at the same time the outlet is open. Any peristaltic action which occurs in the colon will cause a change in pressure of the liquid, and therefore by observing the gauge 67 fluctuations in pressure may be observed, and when these occur the operator will know that he has rehabilitated or stimulated peristalsis. When this occurs the treatment is completed.

In many cases it is impossible to treat the entire colon because of atonic constipation, spastic constipation, ptosis or bowel adhesions. Under these circumstances just a portion of the colon will be treated, with a view of gradually exercising the abnormal portion of the bowel in order to relieve the abnormal condition. In some cases it is necessary to give repeated treatments in order to completely remove constrictions from a bowel or to relieve abnormal conditions therein.

As previously pointed out the applicator 12 or the applicator 101 is inserted but a short distance in order that the entire colon may be available for treatment. The flexible tubes 11 and 100 are relatively large in diameter, and in fact may be considered as constituting a continuation of the colon. When preparing the colon for treatment it may be necessary to remove obstructions from the bowel. However, these operations are only preliminary to the important treatment of my invention, and it should be clearly understood that my invention is not an irrigating apparatus in any sense of the word, and usually the exercising of the colon is performed without removing considerable feces which may adhere to the walls of the colon. My invention, as previously pointed out, has for its object to rehabilitate or stimulate peristalsis, and this is accomplished by the expanding and contracting thereof, which in a measure reeducates the bowel to perform its normal functions. Ordinarily, the process is performed without removing considerable feces and

after the treatment has been completed the patient is sent to stool.

The particular arrangement of the parts of the form of my invention disclosed in Figs. 2 to 5 inclusive constitutes an important part of my invention. The apparatus is susceptible of easy and convenient control. The introduction of the liquid is controlled by a foot lever while the removal of the liquid is controlled by a hand lever. A very important part of my invention is that it is unnecessary to sterilize the interior parts of the apparatus. This is due to the novel arrangement which I have produced. It will be seen that the only portion of the apparatus where there is a reverse flow, that is where there is an inflow and an outflow, is the head portion of the T-fitting **102**, the flexible tube **100** and the applicator **101**. For this reason these are the only parts of the apparatus which require sterilization. Since there is never an inflow through the section **103** or outlet pipe **53**, and since there is an outflow through the pipe **107**, the flexible tube **108** and the inlet pipe **34**, it is unnecessary to sterilize these parts. It will, therefore, be seen that in my invention sterilization is very easily accomplished and the parts which are to be sterilized are located on the exterior of the housing **30** and are so connected to the other parts that they may be easily removed and replaced. In hospitals employing my invention it is common practice to provide a number of sets of T-fittings, flexible tubes, and applicators, which may be used on different patients and then removed and a sterilized assembly installed for use on the next patient.

I claim as my invention:

1. In an apparatus of the class described, the combination of: an applicator adapted to be inserted into at least the rectal portion of the colon and providing a relatively tight seal with the rectal sphincter; a liquid inlet means connected to said applicator for supplying liquid to said colon under sufficient pressure to expand said colon; an outlet means connected to said applicator through which liquid may be withdrawn from said colon; an inlet valve means for closing said liquid inlet means; an outlet valve means for closing said outlet means; means for registering both the positive and negative pressures in said colon; and means for withdrawing liquid from said colon through said outlet means under sufficient negative pressure to contract said colon.

2. In an apparatus of the class described, the combination of: an applicator adapted to be inserted into at least the rectal portion of the colon and providing a relatively tight seal with the rectal sphincter; a liquid inlet means connected to said applicator for supplying liquid to said colon under sufficient pressure to expand said colon; an outlet means connected to said applicator through which liquid may be withdrawn from said colon; an inlet valve means for closing said liquid inlet means; an outlet valve means for closing said outlet means; means for registering peristaltic action in said colon; and means connected to said outlet means on the exhaust side of said outlet valve means for withdrawing liquid from said colon through said outlet means under sufficient negative pressure to contract said colon.

3. In an apparatus of the class described, the combination of: an applicator adapted to be inserted into at least the rectal portion of the colon and providing a relatively tight seal with the rectal sphincter; a liquid inlet means connected to said applicator for supplying liquid to said colon under sufficient pressure to expand said colon; an outlet means connected to said applicator through which liquid may be withdrawn from said colon; an inlet valve means for closing said liquid inlet means; an outlet valve means for closing said outlet means; means connected to said outlet means on the intake side of said outlet valve means for registering peristaltic action in said colon; and means for withdrawing liquid from said colon through said outlet means under sufficient negative pressure to contract said colon.

4. In an apparatus of the class described, the combination of: an applicator adapted to be inserted into at least the rectal portion of the colon and providing a relatively tight seal with the rectal sphincter; a liquid inlet means connected to said applicator for supplying liquid to said colon under sufficient pressure to expand said colon; an outlet means connected to said applicator through which liquid may be withdrawn from said colon; an inlet valve means for closing said liquid inlet means; an outlet valve means for closing said outlet means; means connected to said outlet means on the intake side of said outlet valve means for registering peristaltic action in said colon; and means for withdrawing liquid from said colon through said outlet means under sufficient negative pressure to contract said colon.

5. In an apparatus of the class described, the combination of: an applicator adapted to be inserted into at least the rectal portion of the colon and providing a relatively tight seal with the rectal sphincter; a liquid inlet means connected to said applicator for supplying liquid to said colon under sufficient pressure to expand said colon; an outlet means connected to said applicator through which liquid may be withdrawn from said colon; an inlet valve means for closing said liquid inlet means; an outlet valve means for closing said outlet means; means connected to said outlet means on the intake side of said outlet valve means for registering both the positive and negative pressures in said colon; and means for withdrawing liquid from said colon through said outlet means under sufficient negative pressure to contract said colon.

6. In an apparatus of the class described, the combination of: an applicator adapted to be inserted into at least the rectal portion of the colon and providing a relatively tight seal with the rectal sphincter; a liquid inlet means connected to said applicator for supplying liquid to said colon under sufficient pressure to expand said colon; an outlet means connected to said applicator through which liquid may be withdrawn from said colon; an inlet valve means for closing said liquid inlet means; an outlet valve means for closing said outlet means; means connected to said outlet means on the intake side of said outlet valve means for registering peristaltic action in said colon; and means connected to said outlet means on the exhaust side of said outlet valve means for withdrawing liquid from said colon through said outlet means under sufficient negative pressure to contract said colon.

7. In an apparatus of the class described, the combination of: an applicator adapted to be inserted into at least the rectal portion of the colon and providing a relatively tight seal with the rectal sphincter; a liquid inlet means connected to said applicator for supplying liquid to said colon under sufficient pressure to expand said colon; an outlet means connected to said applicator through

which liquid may be withdrawn from said colon; valve means for closing said inlet means and said outlet means in order to lock the liquid in said colon; means for registering peristaltic action in said colon while said liquid is so locked in said colon; and means for withdrawing liquid from said colon through said outlet means under sufficient negative pressure to contract said colon.

8. In an apparatus of the class described, the combination of: an applicator adapted to be inserted into at least the rectal portion of the colon and providing a relatively tight seal with the rectal sphincter; a liquid inlet means connected to said applicator for supplying liquid to said colon under sufficient pressure to expand said colon; an outlet means connected to said applicator through which liquid may be withdrawn from said colon; valve means for closing said inlet means and said outlet means in order to lock the liquid in said colon; means for registering both the positive and negative pressures in said colon while said liquid is so locked in said colon; and means for withdrawing liquid from said colon through said outlet means under sufficient negative pressure to contract said colon.

9. In an apparatus of the class described, the combination of: an applicator adapted to be inserted into at least the rectal portion of the colon and providing a relatively tight seal with the rectal sphincter; a liquid inlet means connected to said applicator for supplying liquid to said colon under sufficient pressure to expand said colon; an outlet means connected to said applicator through which liquid may be withdrawn from said colon; an inlet valve means for closing said liquid inlet means; an outlet valve means for closing said outlet means, said liquid being locked in said colon when both said inlet valve means and said outlet valve means are closed; means for registering peristaltic action in said colon while said liquid is so locked in said colon; and means for withdrawing liquid from said colon through said outlet means under sufficient negative pressure to contract said colon.

10. In an apparatus of the class described, the combination of: an applicator adapted to be inserted into at least the rectal portion of the colon and providing a relatively tight seal with the rectal sphincter; a liquid inlet means connected to said applicator for supplying liquid to said colon under sufficient pressure to expand said colon; an outlet means connected to said applicator through which liquid may be withdrawn from said colon; an inlet valve means for closing said liquid inlet means; an outlet valve means for closing said outlet means, said liquid being locked in said colon when both said inlet valve means and said outlet valve means are closed; means for registering both the positive and negative pressures in said colon while said liquid is so locked in said colon; and means for withdrawing liquid from said colon through said outlet means under sufficient negative pressure to contract said colon.

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