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C. T. NOONAN ET AL

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COMBINED ASPIRATOR AND IRRIGATION INSTRUMENT

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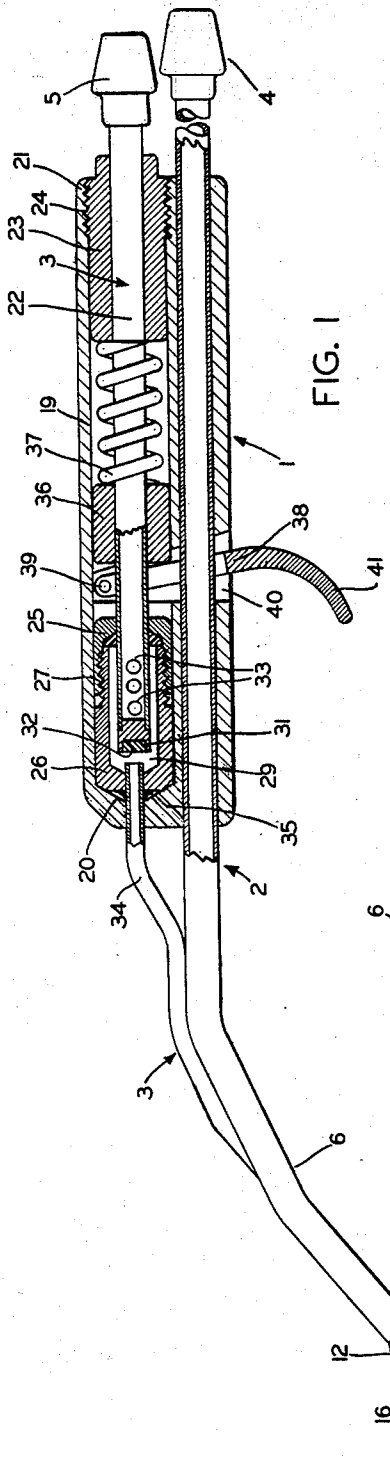


FIG. 1

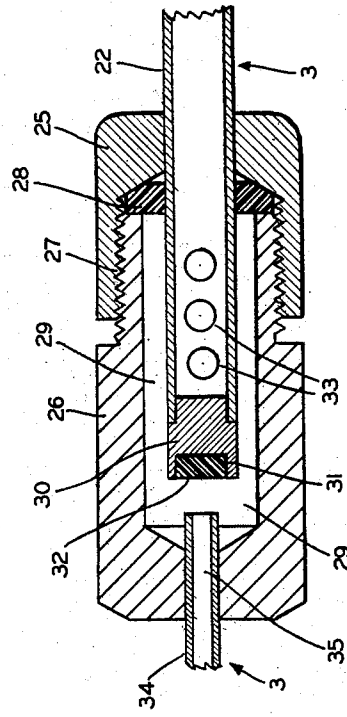


FIG. 3

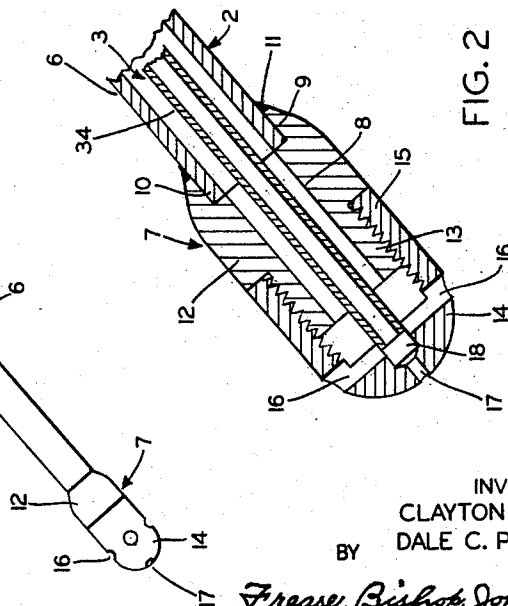


FIG. 2

INVENTORS.
CLAYTON T. NOONAN &
DALE C. P. SALISBURY

BY *Freese, Bishop, Johns & Schick*

ATTORNEYS

1

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Clayton T. Noonan, 525 N. 85th St., Seattle 3, Wash., and Dale C. P. Salisbury, 1639 Edgefield Road, Lyndhurst 24, Ohio

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3 Claims. (Cl. 128-240)

The invention relates to surgical instruments, and more particularly to an improved aspirator and irrigation device especially adapted for controlling bleeding in surgical operations.

Aspirators are commonly used for removing blood and other fluids from operating areas during surgical operations. Conventional aspirators such as are generally used for this purpose are not entirely satisfactory for the reason that they frequently become clogged by clotting or coagulation of the blood or other fluids being removed from the operating area. As a result, it frequently becomes necessary to clean or replace the aspirator during the course of a lengthy surgical operation.

Also, it is frequently necessary during a surgical operation to wash the operating area with water or other wash solution which is promptly removed from the area. This wash solution is usually introduced by means of a syringe or other separate instrument and is removed by the conventional aspirator.

It is therefore an object of the invention to provide an aspirator having means therein for preventing the clotting or coagulation of blood or other liquids being removed thereby, so as to prevent clogging of the aspirator while in use.

Another object of the invention is to provide a combined aspirator and irrigation instrument in which a portion of the wash solution is discharged into the operating area and the remainder of the wash solution is discharged into the suction tube of the aspirator to prevent clotting or coagulation of blood or other fluids therein.

A further object of the invention is to provide an instrument of the character referred to comprising a suction tube, a tip attached to the front end of the suction tube for insertion through an incision into an operating area and having radially disposed suction passages therein communicating with the suction tube, and a wash solution tube having its forward end located within the suction tube and terminating at a point spaced from an outlet opening in the tip and communicating with said radial passages.

Another object of the invention is to provide such an instrument with a trigger-operated valve for manually controlling the irrigation means.

The above and other objects, apparent from the drawing and following description, may be attained, the above described difficulties overcome and the advantages and results obtained, by the apparatus, construction, arrangement and combinations, subcombinations and parts which comprise the present invention, a preferred embodiment of which, illustrative of the best mode in which applicants have contemplated applying the principle, being set forth in detail in the following description and illustration in the accompanying drawing.

The invention may be described in general terms as comprising a combined aspirator and irrigation instrument comprising a handle portion through which are longitudinally located a suction tube and a wash solution tube in parallel relation.

The rear end of the suction tube is adapted to be connected to a flexible hose leading to any usual and conventional vacuum-producing device. The rear end of the wash solution tube is adapted to be connected to a flexible

2

hose leading to a suitable supply of wash solution under pressure.

The forward end portion of the suction tube is preferably disposed downwardly and forwardly from the handle, and the end thereof is connected to a tip of special design for insertion into the operating area. Radially disposed suction inlet passages are formed in the tip and communicate with the forward end of the suction tube.

Spring-biased valve means is located within the handle portion of the instrument for controlling the flow of liquid through the wash solution tube, and is arranged to be operated by a trigger or similar means associated with the handle portion of the instrument for convenient manual operation.

The forward end portion of the wash solution tube is of smaller diameter than the suction tube, and is disposed concentrically therein, terminating at a point spaced from a central outlet opening in the end of the tip and communicating with the radial suction passages therein.

With this construction, when the tip of the instrument is inserted into the operating area, blood and other fluids may be continuously withdrawn from the operating area, entering the tip through the radial suction passages and passing backward through the suction tube.

Water or other wash solution may be squirted into the operating area from the wash solution tube, through the outlet opening in the end of the tip, and will be immediately withdrawn with the blood and other fluids. A portion of the wash solution will be discharged into the radial suction passages of the tip and will pass directly back through the suction tube, continually washing and cleansing the same and preventing the blood or other fluids from clotting or coagulating in the suction tube and clogging the same.

The passage of wash solution through the wash solution tube is controlled by a trigger-operated valve, the trigger being conveniently located with reference to the handle so that the instrument may be manipulated with one hand.

Having thus briefly described the invention, reference is now made to the accompanying drawing illustrating a preferred embodiment thereof, in which:

FIG. 1 is a longitudinal sectional elevation of the combined aspirator and irrigation instrument;

FIG. 2 is an enlarged, longitudinal sectional view through the tip which is connected to the forward ends of the suction tube and wash solution tube; and,

FIG. 3 is an enlarged longitudinal sectional view of the valve for controlling the flow of liquid through the wash solution tube.

Referring now more particularly to the embodiment of the invention illustrated, in which similar numerals refer to similar parts throughout, the instrument includes a handle portion indicated generally at 1, through which are longitudinally disposed in parallel relation, a suction tube indicated generally at 2, and a wash solution tube indicated generally at 3.

Any conventional form of nipple 4 is mounted upon the rear end of the suction tube 2 for connection of a flexible hose leading to a suitable vacuum-producing device. A similar nipple 5 is mounted upon the rear of the wash solution tube 3 for connection of flexible hose leading to a suitable source of water or other wash solution under pressure.

The forward end of the suction tube 2 is preferably disposed downwardly and forwardly at an angle, as indicated at 6, and is connected to a tip, indicated generally at 7, for insertion through an incision into an operating area.

A centrally disposed longitudinal passage 8 is formed through the tip 7, communicating with the forward end of the suction tube 2. The rear or upper end of the

3

passage 8 is enlarged as at 9 to receive the forward end 10 of the suction tube 2 which may be welded, soldered or otherwise secured thereto as indicated at 11.

The tip 7 is illustrated as comprising the rear or upper member 12 having the reduced screw-threaded neck 13 at its forward or lower end, and the forward or lower member 14 having the upwardly or rearwardly disposed internally screw-threaded flange 15 which is screwed upon the reduced neck 13 of the member 12.

Radially disposed suction passages 16 are formed in the forward or lower member 14 of the tip and communicate with the lower end of the longitudinal suction passage 8. A centrally located outlet opening 17 terminates upwardly in the enlarged portion 18 communicating with the radial suction passages 16. For the purpose of slidably mounting the wash solution tube 3 through the handle 1, the longitudinal bore 19 is formed through the handle, closed at its forward end as at 20, the rear end of said bore being open and internally screw-threaded, as indicated at 21.

The rear member 22 of the wash solution tube is longitudinally slidably located through a guide member 23 which is provided with a threaded portion 24 screwed into the internal screw threads 21 at the rear end of the bore 19, and through the rear member 25 of a valve casing including also the forward member 26.

The members 25 and 26 of the valve casing are connected together by screw threads, as indicated at 27, the washer or gasket 28 forming a fluid-tight seal therebetween. Both of the valve casing members 25 and 26 are of hollow cylindrical form providing a fluid chamber 29 therein.

The forward end of the slidable member 22 of the wash solution tube terminates within the chamber 29 and is closed by the block 30 having a socket 31 in its forward end within which is mounted a gasket 32, preferably formed of a suitable heat-resisting, non-corrosive plastic material such as polytetrafluoroethylene which may be obtained under the trademark Teflon.

Apertures 33 are formed in the walls of the tube member 22 providing communication between said tube and the chamber 29. The forward member 34 of the wash solution tube is preferably of smaller diameter than the member 22 thereof, and the rear end thereof is located through the forward end 20 of the handle 1 and through the closed forward end of the valve casing member 26 and terminates within the chamber 29. A gasket 35 forms a seal at this point around the forward member 34 of the wash solution tube.

A hollow boss 36 is fixed upon an intermediate portion of the slidable tube member 22, forming a shoulder thereon, and an expansion spring 37 is interposed between said shoulder and the guide member 23 to normally urge the tube 22 forward, or to the left as viewed in the drawing, to hold the gasket 32 thereof in contact with the rear end of the tube member 34, so as to close the same and prevent wash solution from passing from the chamber 29 into the tube 34.

For the purpose of sliding the tube 22 rearwardly against the pressure of the spring 37, a trigger 38 is pivoted as at 39 within the handle 1 and is disposed transversely through the slot 40 in the handle and provided with the finger grip portion 41 which may be conveniently operated by a finger of the same hand in which the handle 1 is held, in order to open the valve and permit wash solution to pass into the tube 34.

The forward end portion of the tube 34 is located concentric within the suction tube 2, as best shown in FIG. 2, and terminates at a point spaced from the outlet aperture 17, and in communication with the suction inlet passages 16.

In use, the tip 7 is inserted through the incision into the operating area, and the suction created in the suction tube 2 will continuously draw blood and other fluids from the operating area.

4

The spring 37 normally holds the tube 22 moved to the left, as viewed in the drawing, with the gasket 32 on the forward end thereof closing the end of the tube 34. Water or other wash solution under pressure can thus pass through the tube 22 and through the apertures 33 therein into the chamber 29, but cannot enter the tube 34.

When the operator pulls the trigger 38 to the right, as viewed in the drawing, the tube 22 will be slidably moved rearwardly or to the right, moving the gasket 32 thereon away from the end of the tube 34, as seen in FIGS. 1 and 3, permitting the wash solution under pressure to pass from the chamber 29 into the tube 34.

A portion of the washing solution will be squirted through the central outlet aperture 17 in the end of the tip, into the operating area, while the remainder thereof will pass into the radial suction passages 16 and be drawn rearwardly through the passage 18 in the tip and back through the suction tube 2, continuously washing the suction tube and preventing blood or other fluids being drawn back therethrough from clotting or coagulating within the suction tube, thus preventing clogging of the same.

It should be understood that the tip may be of greater length with a plurality of series of radial suction openings therein, for use in abdominal operations or other surgery in which a deep incision is required.

In the foregoing description, certain terms have been used for brevity, clearness and understanding, but no unnecessary limitations are to be implied therefrom beyond the requirements of the prior art, because such words are descriptive purposes herein and are intended to be broadly construed.

Moreover, the embodiments of the improved construction illustrated and described herein are by way of example, and the scope of the present invention is not limited to the exact details of construction.

Having now described the invention or discovery, the construction, the operation, and use of preferred embodiments thereof, and the advantageous new and useful results obtained thereby; the new and useful construction, and reasonable mechanical equivalents thereof obvious to those skilled in the art, are set forth in the appended claims.

We claim:

1. A combined surgical aspirator and irrigation instrument comprising an elongated handle portion having a forward end and a rear end, a suction tube and a wash solution tube located longitudinally through said handle portion, the forward ends of said tubes extending forwardly from the forward end of the handle valve means controlling the flow of solution through said wash solution tube, valve actuating means mounted on said handle portion for operating said valve means, a tip connected to the forward end of said suction tube for insertion into an operating area, there being radially disposed suction inlet passages in said tip, said radial suction inlet passages extending inwardly from the periphery of the tip to the center thereof and an outlet aperture in the end of the tip, the forward end portion of the wash solution tube being of smaller diameter than and located within the suction tube and terminating within the tip at a point spaced longitudinally from said outlet aperture, and the forward end of said wash solution tube being in communication with the inner ends of said radial suction passages, whereby a portion of the solution will be squirted from said wash solution tube through said outlet aperture into the operating area and the remainder of the solution will be drawn backward through the suction tube preventing fluid drawn from the operating area from clotting within the suction tube.

2. A combined surgical aspirator and irrigation instrument comprising an elongated handle portion having a forward end and a rear end, a suction tube and a wash solution tube located longitudinally through said handle portion, the forward ends of said tubes extending for-

5

wardly from the forward end of the handle valve means controlling the flow of solution through said wash solution tube, spring-biased means normally closing said valve means, manually operable means mounted on said handle portion for overcoming said spring-biased means for opening said valve means, a tip connected to the forward end of said suction tube for insertion into an operating area, there being radially disposed suction inlet passages in said tip, said radial suction inlet passages extending inwardly from the periphery of the tip to the center thereof and an outlet aperture in the end of the tip, the forward end portion of the wash solution tube being of smaller diameter than and located within the suction tube and terminating within the tip at a point spaced longitudinally from said outlet aperture, and the forward end of said wash solution tube being in communication with the inner ends of said radial suction passages whereby a portion of the solution will be squirted from said wash solution tube through said outlet aperture into the operating area and the remainder of the solution will be drawn backward through the suction tube preventing fluid drawn from the operating area from clotting within the suction tube.

3. A combined surgical aspirator and irrigation instrument comprising an elongated handle portion, a suction tube located longitudinally through said handle portion, there being a fluid chamber in one end of the handle portion, a wash solution tube slidably located through the other end of the handle portion and terminating in a closed end located within said liquid chamber, there being openings in the side walls of said wash solution tube adjacent the closed end thereof, said openings communicating with said liquid chamber, a second wash solution tube having one end located in said liquid chamber, spring

6

means normally urging the closed end of the first-named wash solution tube into contact with said one end of the second wash solution tube, means for slidably moving said first-named wash solution tube to move the closed end thereof away from said one end of the second wash solution tube for controlling the flow of solution from said liquid chamber to said second wash solution tube, a tip upon the end of the suction tube for insertion into an operating area, there being a radially disposed suction inlet passage in said tip, said suction inlet passage extending inwardly from the periphery of the tip to the center thereof, and an outlet aperture in the end of the tip, the other end of said second wash solution tube being located through said end of the suction tube and into said tip and terminating at a point spaced longitudinally from said outlet aperture and in communication with the inner ends of said radial inlet passages, whereby a portion of the solution will be squirted from said wash solution tube through said outlet aperture into the operating area and the remainder of the solution will be drawn backward through the suction tube preventing fluid drawn from the operating area from clotting within the suction tube.

References Cited in the file of this patent

UNITED STATES PATENTS

1,658,754	Wood	Feb. 7, 1928
1,725,671	Novack	Aug. 20, 1929
2,243,299	Travers	May 27, 1941
2,494,088	Dulity	Jan. 10, 1950
2,564,809	Levene	Aug. 21, 1951
2,604,685	Harms	July 29, 1952
2,642,873	Rice	June 23, 1953