United States Patent

Cimber

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[54] ASPIRATOR NEEDLE INJECTOR

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[51] **Int. Cl.** **A61b 17/34**

[58] **Field of Search** ..... 128/215, 218 R, 218 F, 218 G, 128/347-348, 329-330, 253, 276-278

[56] **References Cited**

UNITED STATES PATENTS

1,845,930	2/1932	Morrow	128/276
2,399,011	4/1946	Erickson	128/275
2,892,457	6/1959	Sturtz	128/218 R
3,380,448	4/1968	Sadove et al.	128/215
3,400,715	9/1968	Pederson	128/215
3,504,673	4/1970	Parisi	128/218 R

FOREIGN PATENTS OR APPLICATIONS

163,203	6/1955	Australia	128/218 F
780,008	7/1957	Great Britain	128/218 F

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[57] **ABSTRACT**

A disposable sterilizable aspirator needle and operating mechanism therefor in which a hollow disposable needle is supported in a hollow barrel for controlled spring loaded injection into the body for a predetermined distance. The barrel is secured to a pistol grip and the hollow needle is secured to a plunger in the pistol grip which is spring biased toward the injecting position and retained against movement under the spring bias by a latch mechanism which may be manually released. The needle is fully recessed in the barrel so that the barrel end may be placed against the body at the appropriate location and is extruded under the spring bias from the barrel end on release of the latch. The hollow needle may, as required, receive a catheter and a catheter stiffening wire. More specifically, the needle barrel and the pistol grip operating mechanism including the latch mechanism are separable.

5 Claims, 5 Drawing Figures

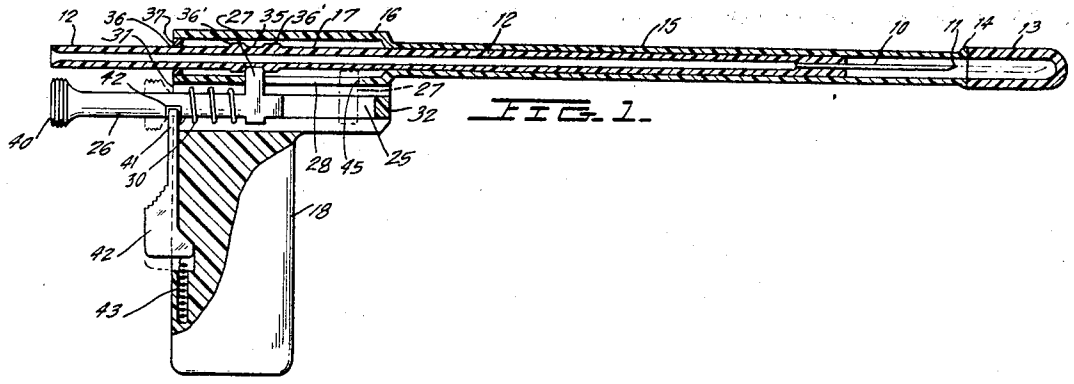


FIG. 1

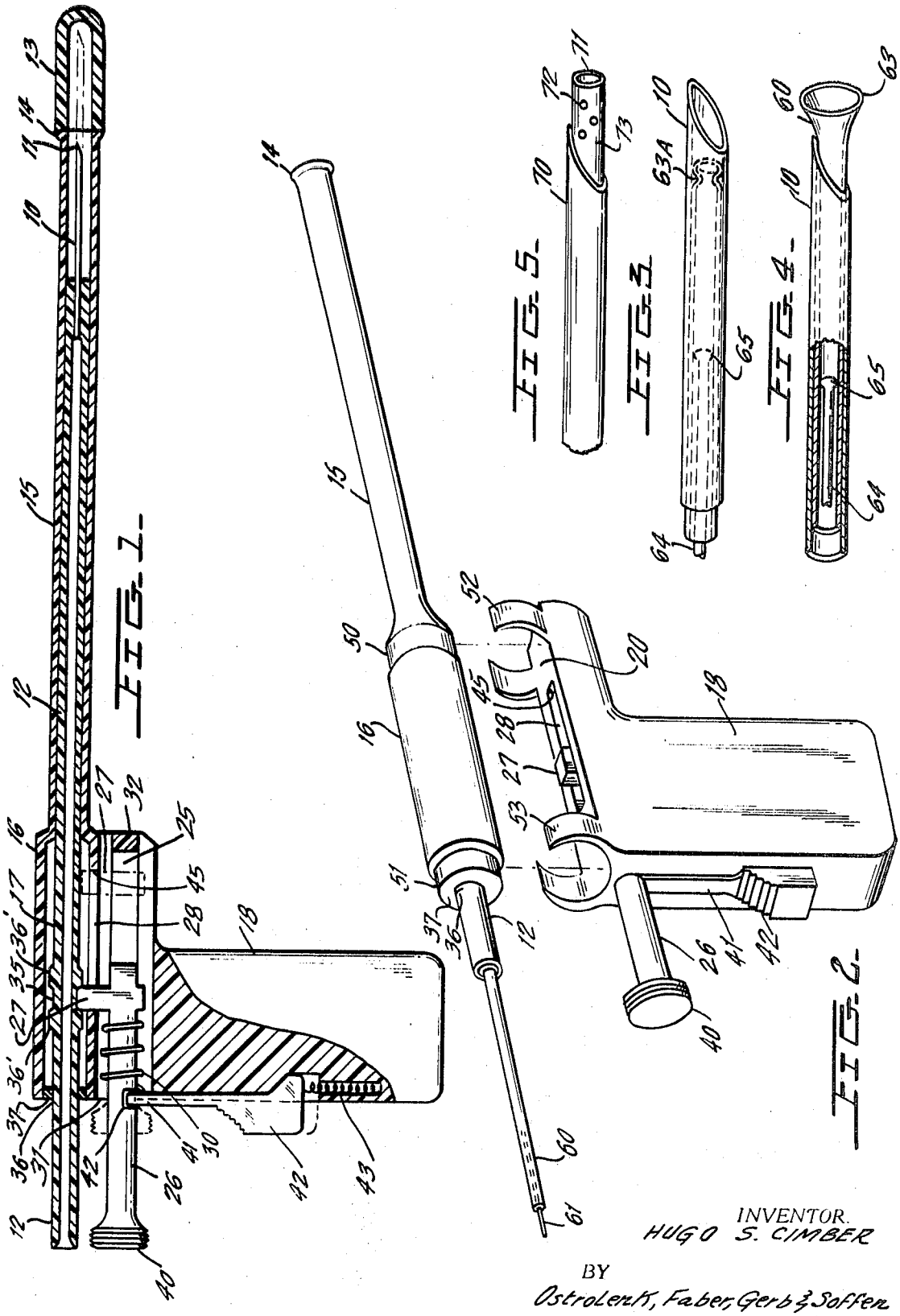


FIG. 1

FIG. 5

FIG. 3

FIG. 4

FIG. 2

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ASPIRATOR NEEDLE INJECTOR

This invention relates to aspirators for collecting body fluids from body cavities, more specifically, an operating mechanism for a hollow needle to control the movement of the hollow needle into the body and prevent excessive penetration.

My present invention relates specifically to an improvement in the mechanism associated with the pistol grip trigger mechanism. Previously, the needle was connected to a hollow plunger which essentially was part of the pistol grip mechanism and was spring biased in a direction to eject the end of a needle from the end of a barrel.

My present invention separates the elements into two assemblies; the first of which comprises a handle and latch mechanism including operating mechanism, and the second assembly comprises the barrel which is removably mounted on the pistol grip handle, the plunger for operating the needle and the needle carrier. Thus, the needle, the plunger, and the barrel containing the same, constitutes a single assembly which is integrated. This assembly may then be mounted on the pistol grip or operating mechanism in order to enable the needle to be moved from a recess position in the barrel to an inserted or injected position.

The pistol grip mechanism is provided with a latch to hold the needle and plunger in retracted position with the needle just inside the end of the barrel. The end of the barrel is so arranged that it may be located at the appropriate portion of the body and slightly pressed in toward the body. When the latch mechanism is released the spring loading on the plunger drives the plunger and the needle into the body. The travel of the plunger is controlled so that the needle will have a controlled movement into the body for a predetermined distance.

After the needle has been inserted by operation of the pistol grip mechanism, the pistol grip mechanism may be removed from the barrel containing the needle. A catheter may be inserted through the plunger and in the needle for various purposes including the aspiration of body fluid. The catheter may have a control wire which is pre-bent or pre-curved to control the direction of the catheter portion which leaves the hollow needle to permit the catheter to aspirate fluid from the proper portion of the particular body cavity into which the catheter is then extended. The stiffening wire may then be removed with the catheter and needle in place and fluid from the body cavity may then be aspirated.

A further object of the present invention is the provision of an operating mechanism which includes a latch and trigger as well as a spring for moving a needle rapidly from a retracted to an injected position and a separable barrel and a plunger and needle assembly which may be connected to and disconnected from the operating mechanism.

These and other objects of this invention will become apparent from the following description and drawings in which:

FIG. 1 is a side elevation partly broken away showing my novel needle operating mechanism.

FIG. 2 is an expanded view of the elements of FIG. 1 demonstrating the operation of the device.

FIG. 3 is an enlarged view of my novel needle, showing a catheter and catheter inserting device in the needle.

FIG. 4 is a view corresponding to FIG. 3, showing the catheter extruding from the needle.

FIG. 5 is a fragmentary view corresponding to FIGS. 3 and 4, showing an alternate form of catheter.

Referring now to FIGS. 1 and 2, my novel device includes a hollow needle 10 having an appropriate penetrating conformation at its point 11 so that it may readily enter the body. The needle may be plastic and its point element 11 may be steel. The needle at the end opposite its point 11 is attached to the hollow bushing or carrier 12 which in turn is secured to or integrated with the hollow plunger 17. The plunger 17, the bushing 12 and needle 10 with its point 11 may be a single integrated element which may be handled as a unit and inserted as a unit into the barrel 16 of the pistol grip device.

The plunger 17 is longitudinally slidable and carried in the barrel 16 which in turn has a longitudinal extension 15 for the bushing 12. The forward end 14 of the barrel 15 is slightly

flared to provide a means for retaining the cap 13. In the normal position of the unit as it is sorted and shipped, the plunger 17, bushing 12 and needle 10, are moved to the right with respect to FIGS. 1 and 2, so that the needle point 11 extends from the end 14 of the barrel. The needle point 11 is protected by a removable cap 13.

In subsequent operation, when the needle 10 and its point 11 are withdrawn into the barrel 15 in the manner hereafter described, then prior to ejection, the cap 13 is removed, the needle now being entirely encased in the barrel, and the device is ready for operation, that is, for insertion of the needle.

The larger diameter of the barrel 16 which houses the plunger 17, is provided exteriorally with recess or other securement means 50, 51, which may cooperate with gripping devices respectively 52, 53, carried by the top wall 20 of the pistol grip handle 18.

The recess element 50, 51 provides in a similar manner, for registry of the barrel section 16 with the gripping elements 52, 53 on the pistol grip handle 18. While various securement means may be provided, the gripping elements 52, 53 may be spring elements which will be deflected as the plunger containing section 16 of the barrel is pressed down towards the wall 20 and will snap into gripping position when the section 16 is pressed home against the top wall 20 of the pistol grip 18.

The pistol grip handle 18 and its associate element are preferably made of a heat resistant plastic which will resist the heat of sterilization. Since however, the barrel 16-15 may be completely removed from the pistol grip handle 18, and may be separately sterilized, this may obviate the need for making the housing 18 of sterilizable material.

The pistol grip 18 is provided just below its upper wall with a longitudinal tubular opening 25 which carries the latch plunger 26 longitudinally slidable therein. The latch plunger 26 is provided with an upwardly directed latch element 27 which emerges through the top wall 20 through the slot 28.

A compression spring 30, captured between the latch element 27 and the back wall 31 of the tubular opening 25, biases the latch plunger 26 to the right against the plug 32, thereby positioning the latch element 27 at the dotted line position shown in FIG. 1 at the forward or right hand end of the slot 28.

The needle plunger 17 is provided with a recess 35 which may be located between two enlarged diameter elements 36', 36' to provide a latch detent. Said recess or latch detent element 35 is arranged to be engaged by the latch element 31 when the needle unit including the barrel 16–15 is secured to the pistol grip handle housing 18 at the top wall 20 thereof as previously described. For this purpose, the needle 10 and its plunger 12 are normally arranged so that the needle is extended to the right in the barrel 16–15 into the cap 13.

An appropriate index member may be placed at section 36 of the needle plunger 12, so that when this index mark is adjacent the rear wall 37, of barrel 16, the use will know that the detent 35 is in position to be engaged by the latch element 27 when the barrel 16–15 is mounted on the pistol grip handle 18.

The cap 13, may be so arranged that when the needle 10 and its plunger 12 are extended to the right so that the recess detent 35 is arranged to engage the latch element 27, the needle may be pushed against the inside of the cap 13 to push the cap off. If desired, however, the cap may be made sufficiently long, that it will permit the needle to travel fully to the right with respect to FIGS. 1 and 2, without being engaged by the needle, so that the cap must be otherwise manually removed.

When the barrel assembly 16–15 is integrated with the pistol grip handle as previously described, and the latch detent 35 engages tee latch element 27 while the latch element 27 is at the forward or right-hand end of slot 28, the needle is then connected to the operating mechanism in the pistol grip handle 18. When the latch operating plunger 26 is then pulled out by means of the knob 40, the spring 30 is compressed and loaded.

A vertically slidable plunger latch 41, carried by the handle 18, engages a corresponding detent 42 in element 26, to retain

the latch plunger 26 and the latch 27 in the retracted position. Latch 41 is an extension of trigger 42, which is biased in an upwardly direction by the compression spring 43 in pistol grip handle 18.

At this time, the needle 10 and its point 11 are fully retracted in the barrel 15. When the physician or technician now wishes to cause the needle to be injected through a body wall into an appropriate area behind the body wall or tissue, then he places the end 14 of barrel 15 at the appropriate location and, in effect, aims the pistol as a whole to ensure that the needle will move in the desired direction through the body wall or tissue. He then presses down on trigger 42, thereby releasing the latch plunger 26; the compression spring 30 now drives the latch plunger 26 through the latch element 35 and drives the needle plunger 12, the needle 10 and its point 11 into and through the body wall or tissue by a distance determined by the length of travel permitted by the end 45 of slot 28. By this means, a controlled insertion of the needle is obtained, the direction of insertion being determined by the aiming of the pistol and the depth of insertion being determined by the distance that the latch element 27 travels in the slot 28 to the end wall 45 of the slot 28. The needle thus having been inserted, the pistol grip handle 18 and its operating mechanism may be withdrawn from barrel section 16 and the needle and barrel section will remain in position.

The needle may have a catheter 60, partially inserted therein which may have a stiffening wire 61 which may be used to guide the catheter after it is pushed through the needle at the end 11, to arrange the catheter appropriately for aspiration purposes. The catheter as shown in FIG. 3 and 4, may have a flared end 63 which will provide a wider opening for aspiration purposes. The flared end is folded up inside the needle as shown at 63A in FIG. 3.

Instead of utilizing a stiffening wire as previously described, a director wire 64 may be used, having a slightly rounded end 65. After the needle is inserted into the body opening, the wire 64 and its enlarged end 65, may be pushed down through the needle, pushing the folded flared end 63A of the catheter out of the needle opening, until it reaches the position shown in FIG. 4. Thereafter, the wire 64 may be withdrawn to provide a free aspirating passage through the catheter 60.

As shown in FIG. 5, a substitute catheter 70 may be used having in addition to its principal tubular end opening 71, a plurality of additional openings 72 to ensure aspiration from all directions in the body cavity after the catheter is inserted.

In addition, and as previously mentioned, a simple catheter may be used which as desired, may be guided by a bent withdrawable wire, so that it may be aimed as desired inside the body cavity.

By this means I have provided a simplified needle injecting device which will provide for a controlled relatively high speed needle insertion through a body wall or tissue into a cavity and which will absolutely control the length of the needle insertion.

If, in the case of thin tissue walls or small individuals, a lessened degree of insertion is required, a shim of appropriate length, not shown, may be placed in the slot 28 against the wall 45, to shorten the effective length of the slot and thereby shorten the effect of stroke of the needle. Since the barrel and the pistol grip handle 18 are separable, the insertion of the shim may readily be made.

In operation, the user of the device will first move the plunger end 12 at the left side of FIGS. 1 and 2, to the right to push the cap 13 off, and will locate plunger 12 so that the latch detent 35 registers with latch element 27 by utilizing the mark 36 or any other marks which may be placed on the rear end of the plunger 12. He will then press the barrel section 16 and portions 50 and 51 thereof, onto the top wall 20 of the pistol grip 18, so that the spring elements 52, 53 will engage elements 51 and 50. The user will then pull the plunger knob 40 back until latch 41 engages detent 42 on latch plunger 26, being driven thereinto by the spring 43.

The user will then locate portion 14 of the barrel at the appropriate position at the body wall or tissue and will move the now integrated "gun" so that the barrel 15 is aimed correctly, so that the needle when ejected will move in the right direction. The user will then push down on trigger element 42, thereby releasing the latch plunger 26 and the compression spring 27 will rapidly drive the needle 10 and its point 11 through the body wall or tissue into the cavity.

The user may then hold the barrel section 16 tightly and remove the pistol grip 18 and its mechanism therefrom. The catheter 60 may then be extruded through the end of the needle to provide an appropriate aspirator conduit.

By this means therefore, there has been provided a simplified mechanism for operating a hollow needle for controlled entry into a body. The operating mechanism which controls and drives the needle may be removed immediately after the injection, if desired, so that the needle and its support barrel may be made completely independent from the operating and impelling mechanism after it has been injected. In certain types of operations, the pistol grip handle may be left connected to the barrel during aspiration or other operation; but the separability of the pistol grip handle and the needle carrying barrel provides complete aseptic operation for the needle and the barrel which carries it without making it necessary to subject the operating mechanism to aseptic procedures.

Since it is obvious that many variations and modifications of my novel device should be clear to those skilled in the art, I prefer, accordingly, to be bound not by the specific disclosures herein contained but only by the appended claims.

I claim:

1. An aspirator needle and mounting therefor comprising a barrel, a tubular longitudinal opening in said barrel; said needle being longitudinally slidable in said barrel; said aspirator needle having a point;

said barrel having an enlarged section remote from the end of the barrel toward which the needle point is directed; said enlarged section having an increased internal diameter and an increased external diameter;

a bushing longitudinally slidable in the interior of said enlarged barrel section; said bushing being connected to the aspirator needle and having an internal longitudinal opening extending axially from said aspirator needle;

a plunger having a longitudinal opening connected to said bushing and extending from the end of the barrel opposite to the end toward which the needle point is directed; biasing means between the needle bushing and a surface of the interior of the enlarged barrel section driving said needle axially toward the end of the barrel toward which the point of the needle is directed;

the plunger being available for manual movement against said biasing means;

said bushing being provided with a latch detent section; the exterior of the enlarged section of the barrel being provided with at least one annular recess;

a pistol grip body for receiving and retaining said barrel; said pistol grip body having an upper wall;

securement means related to said upper wall of said pistol grip body for engaging said recess of said barrel to retain said enlarged section of said barrel against said upper wall of said pistol grip body;

a latch in said pistol grip body and a slot in said upper wall; said latch extending through said slot in said upper wall;

a corresponding slot in said enlarged section of said barrel registering with said slot in the upper wall of the pistol grip body;

said latch, when the barrel and pistol grip body are secured together, extending through the corresponding slot in the barrel to engage said latch detent section of said bushing.

2. The aspirator needle and mounting of claim 1 in which said latch may, when engaged with said detent, move said bushing against the force of said biasing means

3. The aspirator needle and mounting of claim 2 in which an auxiliary latch is mounted in the pistol grip body to retain said

pistol latch, the bushing and needle in retracted position against the force of said biasing means;

4. The aspirator needle and mounting of claim 3 in which a trigger on the pistol grip body is connected to said auxiliary latch; operation of the trigger to move the auxiliary latch to disengaged position permitting the biasing means to move the needle in the direction of its point

5. An aspirator needle and mounting therefor comprising a barrel, a tubular longitudinal opening in said barrel; said needle being longitudinally slidable in said barrel; said aspirator needle having a point;

said barrel having an enlarged section remote from the end of the barrel toward which the needle point is directed; said enlarged section having an increased internal diameter and an increased external diameter;

a bushing longitudinally slidable in the interior of said enlarged barrel section; said bushing being connected to the aspirator needle and having an internal longitudinal opening extending axially from said aspirator needle;

a plunger having a longitudinal opening connected to said bushing and extending from the end of the barrel opposite to the end toward which the needle point is directed; biasing means between the needle bushing and a surface of the interior of the enlarged barrel section driving said needle axially toward the end of the barrel toward which the point of the needle is directed;

the plunger being available for manual movement against said biasing means; a catheter mounted in the needle; the catheter having a flared end folded inside the needle; and a pusher wire adapted to push through the catheter and against the folded flared end to extrude the flared end from the end of the needle.

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