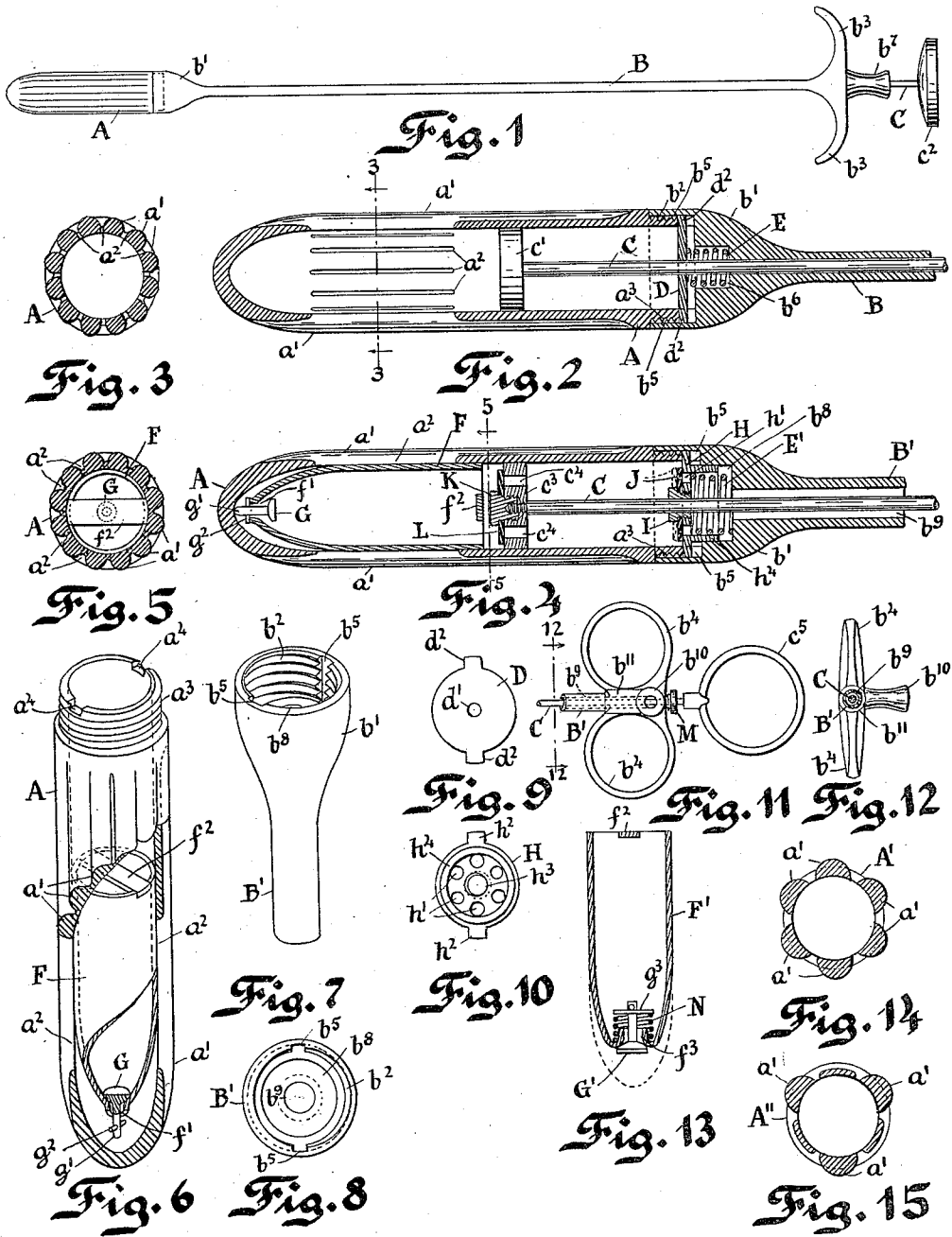


G. BJÖRKMAN.
 MASSAGING SYRINGE.
 APPLICATION FILED APR. 24, 1911.

1,043,899.

Patented Nov. 12, 1912.



Witnesses
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GUSTAV BJÖRKMAN, OF RACINE, WISCONSIN.

MASSAGING-SYRINGE.

1,043,899.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, GUSTAV BJÖRKMAN, of Racine, Wisconsin, have invented a Massaging-Syringe, of which the following is a specification.

This invention relates to surgical instruments, and more particularly that class known as syringes for treating generally the internal passages of the human body.

My invention was originally designed and is more especially intended for treating the anterior urethra with the application of medicament in the form of paste, but is also excellently adapted, either with or without modification in dimensions, for treating the rectal and vaginal passages, and for use with liquor or a reservoir as in irrigating.

The object of my invention is more particularly to produce a massaging or kneading action upon the tissues, in conjunction with the application of a medicament, whereby the latter is worked into the same and produces a more rapid, immediate and lasting effect.

A secondary object of the invention is to provide means for using the same instrument independently either for paste or liquid, and in the case of the latter to provide means for varying the pressure or force of injection during the operation.

Another object of my invention is to provide means for dispensing with a reservoir under pressure and actuating the instrument as a pump.

The essential feature of my invention resides in providing an instrument with an external surface having ribs, or of a sub-polygonal nature, whereby unequal pressure is produced upon the different parts of the surface, and by rotating the instrument the varying pressure is brought successively upon the different parts of the epithelial surface, and thereby the aforesaid kneading or massaging effect is produced. Furthermore, I provide between said ribs or projecting elements slits or orifices, through which the medicament contained in the interior of the instrument can be made to exude by means of pressure produced and varied at will from the outside.

To enable the same instrument to be used for a liquid, I further provide a special valved capsule fitting within the main cavity of the instrument and adapted to retain the liquid and to discharge it therefrom at the will of the operator.

I further provide other appliances whereby the various effects and purposes hereinbefore named are carried out, all of which are hereinafter fully described and pointed out in my claims.

In the accompanying drawings, I have, for the purposes of illustration, shown several forms of my instrument and attachments therefor. In these drawings Figure 1 is a side-elevation of a simple form of instrument of 16 ribs; Fig. 2 is a longitudinal section of the head-end of a similar instrument provided with twelve ribs, on a larger scale; Fig. 3 is a transverse section of the same on the plane 3; Fig. 4 is a longitudinal section of the head-end of an instrument provided with pump-valves, and containing also a capsule for liquids; Fig. 5 is a transverse section thereof on the plane 5; Fig. 6 is a perspective view of the head of said instrument removed from the shank, and containing the liquid capsule in position for filling; Fig. 7 is a perspective view of the head-end of the shank separately; Fig. 8 is an end-view of the same; Fig. 9 is a side-view of the locking-disk used in the form of Fig. 2; Fig. 10 is a rear side-view of the combined locking and valve-disk used in the form of Fig. 4; Figs. 11 and 12 are respectively a side and end-view of the handle-end of the instrument shown in Fig. 4, the shank in Fig. 12 being sectioned upon the plane 12; Fig. 13 is a longitudinal section through an alternative form of liquid capsule, which may be used instead of that shown in Figs. 5 and 6; and Figs. 14 and 15 are transverse sections through instruments of six and three massaging ribs, respectively.

The instrument in its simplest form comprises three elements, to wit: the head-piece A, the shank B and the piston-rod C having a head c' on one end and a pressure-button c'' on the other end. The head A is in the form of a capsule which is longitudinally grooved or ribbed as shown, the ribs a' having rounded outer surfaces and being separated for a part of their length by slits a'' , through which the medicament is forced out by the pressure of the piston c' . The number of ribs will depend upon the use to which the instrument is to be put, and the force of the massaging action desired. A head A' with only six ribs, as shown in Fig. 14, will necessarily be more vigorous in its action than one with twelve ribs, as in Fig. 3 and a head A'', with but three ribs, still

more so. The capsule A is closed at the free end, and provided with an external screw-thread a^3 at the other.

The shank B has an enlarged head-end b' provided with an internal screw-thread b^2 adapted to engage the thread a^3 so that the two parts are screwed together, giving an externally smooth joint. At the opposite or handle-end the shank is provided with recurved bars b^3 as shown in Fig. 1, or rings b^4 , as shown in Fig. 11, to provide a suitable finger hold; and the shank B is of course made tubular to receive in a reciprocating manner the piston-rod C.

The instrument as thus far described is in its simple form complete for use with a paste. Paste having been placed in the head A and the latter screwed into place, and pressure being exerted upon the press-button c^2 , the paste is forced out through the slits a^2 , and the instrument being at the same time rotated, the salve is pressed and massaged into the epithelium.

In order to prevent the possibility of the head becoming unscrewed and detached from the shank during the operation, as well as to prevent the rotation of the handle from merely loosening the joint without turning the head (though this would not be the case if the shank is turned continuously in the screwing-up direction) I provide a locking disk D, a side-view of which is shown in Fig. 9. This disk has a central aperture d' , through which the piston-rod C passes, and further a pair of diametrically opposite tongues d^2 . The internal face of the end b' , that is to say the screw-thread portion b^2 , is correspondingly provided with two opposite grooves b^5 , between which the tongues d^2 slide easily to the bottom of the thread. The recess b^5 , in which the screw-thread b^2 is cut is made sufficiently deeper than the length of the external thread a^3 of the head A to permit the disk D to recede thereinto beyond the end of the latter when it is screwed in place; so that when the disk D rests against the bottom of the recess b^5 , the tongues d^2 do not interfere with screwing the head home. The edges of the screw-threaded portion a^3 of the latter are also provided with two diametrically opposite shallow notches a^4 , into which the tongues d^2 are adapted to fall; and a light spring E is placed behind the disk D in a recess b^6 so as to keep the disk D pressed forward with a slight pressure. In screwing the head home, the piston c' is first drawn back, so as to hold the disk D against the back of the recess in which it lies either frictionally or by hand; and the piston being now moved slightly forward, the disk D is moved forward by the spring E, so as to engage the notches a^4 , and thereby the head is prevented from rotating in either direction until the piston is drawn back again,

which, as a matter of course, will not be done until the head is ready for refilling.

In some cases it will be desired to use liquid instead of a paste. To enable this to be done with the same instrument, I provide a liquid-capsule F, which fits neatly within the head A and covers the slits a^2 from the top. This capsule may have a small orifice f' at the lower end, and a mushroom-valve G covering and adapted to close said orifice. The valve G has a stem g' passing through said orifice, and a cross-bar g^2 placed across said stem limiting the movement of the valve and preventing it from falling out.

The mode of operation of this device is as follows: The valve is supposed to fit within the cavity of the head A with sufficient friction to prevent it from moving by the mere weight of the liquid which may be poured in. The capsule is then inserted part way, as shown in Fig. 6, the valve-stem g' being clear of the bottom so that the valve G is closed by gravity. The head and capsule being then in the positions of Fig. 6 may be filled to the top with the liquid medicament, and said liquid cannot flow out because the slits a^2 are covered from above. The head being then screwed in place, a slight forward movement of the piston forces the capsule forward into the position of Fig. 4 by hydrostatic pressure, so that the valve-stem g' striking on the end of the head-cavity opens the valve G, and on the further forward movement of the piston the liquid flows out around the sides of the capsule, and through the forward ends of the slits a^2 . The aperture f' is so small that the liquid will not run out when the instrument is laid on its side without advancing the piston. The capsule is provided with a cross-bar f^2 at its upper end, whereby it may be readily drawn out.

An alternative design of capsule is shown at F' in Fig. 13. In this form the walls of the aperture f^3 of the valve are turned inwardly, as shown, and the valve G' opens outwardly, and is provided on the inner side of the capsule with a washer g^3 and a spring N holding it closed with sufficient force to resist the weight of the liquid during the filling operation, but yielding and opening when the pressure of the piston is brought to bear upon it. The end of the capsule is flattened so that the valve will work clear of the head A.

When it is desired to use the instrument for ordinary irrigating, the piston-rod C is removed by unscrewing the piston c' , and the disk D and spring E may be also removed. At the handle-end of the instrument is provided a nipple b^7 to receive one end of a rubber tube leading from a reservoir, the liquid from which flows thence through the tubular passageway previously

occupied by the piston-rod. When, however, it is desired to use the instrument for a like purpose without a reservoir under pressure, it may be done by providing the pump-valve mechanism shown in Fig. 4. For this purpose, the plain-disk D is replaced by a member H, shown in rear-end view in Fig. 10, which, while provided with the opposite tongues h^2 , and acting as a substitute for the disk D, is also provided with apertures h' and a central threaded aperture h^3 larger than the piston-rod, and adapted to receive a threaded clamp-collar I, this latter being tubular and the piston-rod passing through the middle, as shown in Fig. 4, and having a shouldered head adapted to clamp the edges of a rubber-disk J, which overlies the holes h' . To prevent liquid from leaking around the disk, it is provided with a cylindrical flange h^4 , which slides in a recess b^8 made similar to the recess b^6 , but somewhat larger and inclosing behind it a light spring E' having the same function as the spring E. The piston-head c' is replaced by a perforated piston-head c^3 having holes c^4 , and on the forward side a threaded clamp-collar K securing the edges of the annular rubber valve L, the same as the collar I and disk J. The passageway b^9 in the shank B' is made sufficiently larger than the piston-rod C to pass the liquid around it. When the piston-rod is pressed forward the greater pressure on the forward side holds the valve L closed, and the diminution of pressure on the rear-side draws liquid by suction through the passageway b^9 and the apertures h' , causing the valve J to rise from the apertures in the manner shown in dotted lines. When the piston-rod is drawn back, the reverse operation takes place, the valve J now preventing recession of the liquid in the head, and forcing it past the piston-head c^3 through the holes c^4 therein. In this manner a continuous supply may be kept up, and the pressure varied at the will of the operator without ceasing the operation, and without unnecessary flooding.

It should be understood, of course, that the capsule F is not necessarily or even desirably used in this operation, it being merely shown in Fig. 4 to avoid the necessity of an additional figure of drawing.

Where the piston is used in connection with an external liquid-supply as just described, instead of the nipple b^7 at the end of the shank, a lateral nipple b^{10} is provided at the handle-end, as shown in Figs. 11 and 12. This together with the finger-holds b^4 may be formed on a special casting b^{11} , which is screwed or soldered on the end of the shank B', the piston-rod being suitably packed against leakage by a gland M. Instead of the press-button c^2 , a ring c^5 is used on the end of the piston-rod to enable it to be moved in both directions.

I wish it understood that my invention is not limited to the use of all the above described features and constructions, for some may be omitted and others may be varied or modified in various ways, as will readily occur to those skilled in the art.

Having thus described my invention what I claim as new and desire to secure by Letters Patent is:

1. An instrument of the class described comprising a capsule-shaped head adapted to contain a medicament and having apertures therethrough, a tubular-shank having means for attaching it to the open end of said head, a piston-rod passing through said shank, a piston on the end of said rod within said head, and a nipple adapted to receive a flexible hose formed on the opposite end of said shank.

2. In an instrument of the class described, the combination of a capsule-shaped head having a screw-thread at its open end, a tubular shank-member having a head-portion provided with a screw-thread adapted to engage said first-named thread, a piston-rod passing through said shank and carrying a piston on the end thereof, and an automatic locking-device adapted to prevent relative rotation of said head and shank-member.

3. In an instrument of the class described, the combination of a capsule-shaped head having a screw-thread at its open end, a tubular shank-member having a head-portion provided with a screw-thread adapted to engage said first-named thread, a piston-rod passing through said shank and carrying a piston on the end thereof, and an automatic locking-device within said shank-member and normally acting to prevent rotation of said head with relation to said shank-member; said locking-device being thrown out of action when said piston is completely retracted.

4. In an instrument of the class described, the combination of a capsule-shaped head having a screw-thread at its open end, a tubular shank-member having a head-portion provided with a screw-thread adapted to engage said first-named thread, a piston-rod passing through said shank and carrying a piston on the end thereof, said head having in its threaded end a notch, a locking-device within said shank-member and confined against rotation with respect thereto, and having an element adapted to enter said notch, and means for resiliently pressing said locking-device into said notch, said device being withdrawn from said notch when the piston is drawn back.

5. In a device of the class described, the combination with a capsule-shaped head-member having an external screw-thread on its open end and a pair of notches in said open end, a shank-member having a head

provided with an internal screw-thread with which said external thread is adapted to engage, and having further a pair of opposite grooves, a locking-member within the end of said shank having projections running in said grooves and adapted to enter said notches, a spring behind said locking-member and acting to press it forwardly, a piston-rod passing through said locking-member, and a piston on the end of said rod; said locking-member being adapted when released in the screwed-up position of said head to engage the notches thereof, and thereby hold it against rotation with respect to said shank-member.

6. An instrument of the class described comprising a capsule-shaped head having an internal cavity closed at one end and open at the other and having upon its external periphery a series of longitudinal ribs and slots opening from said cavity between said ribs, said head having on its open end an external screw-thread and a pair of diametrically opposite notches, a tubular-shank-member having a head-portion provided with an internal thread adapted to engage said external thread and provided with two diametrically opposite longitudinal grooves in the threaded portion, a piston-rod mounted to reciprocate in said head, a piston mounted on the end of said rod, a disk-shaped locking-member having a central aperture through which said piston passes and a pair of diametrically opposite tongues working in said grooves and adapted to engage said notches, and a spring mounted behind said locking-member and adapted to press it forward into said notches.

7. In a device of the class described, in combination with a capsule-shaped head having a plurality of lateral openings through which a medicament is adapted to issue, a liquid-holding capsule fitting within said head and adapted to cut off communication between said openings and the cavity of said head; said capsule having a valve at the lower end through which the liquid is adapted to issue.

8. In a device of the class described, in combination with a capsule-shaped head having a plurality of lateral openings through which a medicament is adapted to issue, a liquid-holding capsule fitting within said head and adapted to cut off communication between said openings and the cavity of said head; said capsule having a valve at the lower end through which the liquid is adapted to issue; said valve being normally closed and adapted to be opened by the effect of fluid-pressure produced from within.

9. An instrument of the class described comprising a hollow head-portion having one or more openings through which a liquid

is adapted to issue, a tubular shank-portion jointed to said head-portion, a piston-rod mounted to reciprocate in said shank-portion, a valved piston-head on the end of said rod within said head-portion, and an inwardly opening stationary valve mounted on said shank-portion whereby the reciprocation of said rod produces a pumping effect and is adapted to draw a liquid from the exterior and force it through said openings.

10. An instrument of the class described comprising in combination a capsule-shaped head-portion having lateral openings through which a liquid is adapted to issue and having on its open end an external screw-thread and one or more notches, a tubular shank-member having a hollow head-portion provided with an internal screw-thread adapted to engage said external thread, said internal thread being grooved longitudinally, a piston-rod mounted to reciprocate within said shank-member, the tubular passageway whereof is greater than the diameter of said piston-rod whereby it admits the passage of liquid, means for reciprocating said piston-rod, a piston-head mounted on the end of said rod and reciprocating within said head-portion and having a forwardly-opening valve, and a combined valve and locking-member surrounding said piston and carrying a forwardly-opening valve and having one or more projections adapted to engage in the grooves of said shank-member and in said notch or notches on the end of said head whereby to prevent relative rotation between the latter and said shank-member, and a coiled-spring mounted in the cavity of said shank-member and pressing forward upon said combined valve and locking-member.

11. In an instrument of the class described, the combination of a capsule-shaped head having a screw-thread at its open end, a tubular shank-member having a head-portion provided with a screw-thread adapted to engage said first-named thread, a piston-rod passing through said shank and carrying a piston on the end thereof, and an automatic locking-device within said shank-member and having means for mutually engaging said head and said shank-member whereby their relative movement is prevented; said engaging-means being thrown out of said relative engagement when said piston is completely retracted.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

GUSTAV BJÖRKMAN.

Witnesses:

WM. C. MURPHY,
MARION DUFFY.