Aug. 15, 1939. M. PAYNE 2,169,371

SYRINGE

Filed Sept. 1, 1936

Fig. 1.

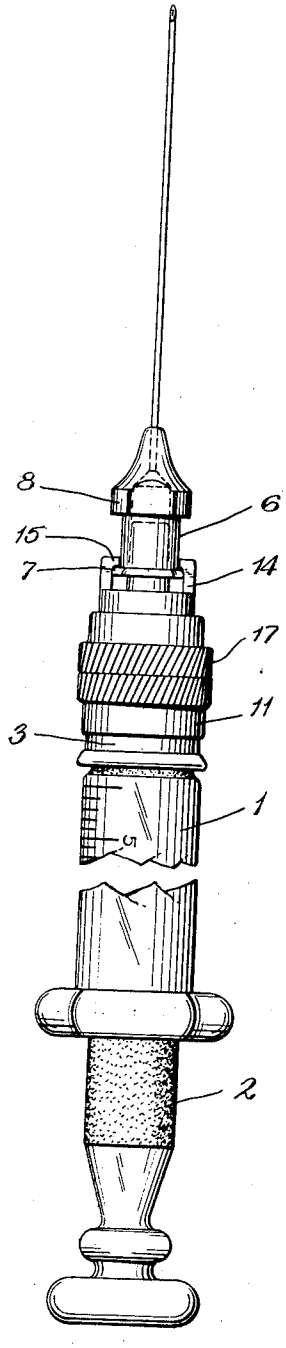


Fig. 3.

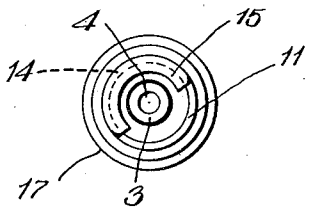
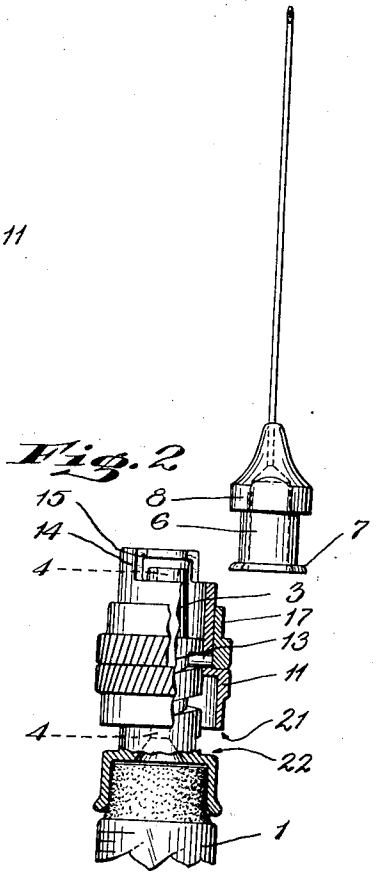


Fig. 2.



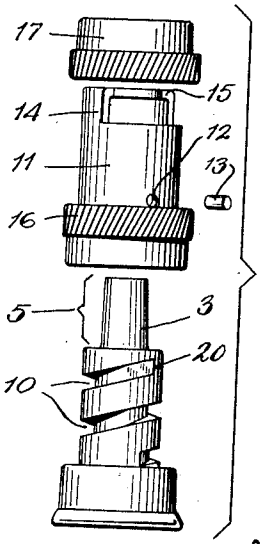


Fig. 4.

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SYRINGE

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5 Claims. (Cl. 128—221)

My invention relates to syringes.

It provides for the ready attachment and detachment of fluid-conveying devices, such as hypodermic needles for example.

The accompanying drawing illustrates a preferred form of my invention: Fig. 1 is an elevation of a syringe with a hypodermic needle attached thereto. Fig. 2 is an elevation, partly in section, of one end of the syringe of Fig. 1 with the needle detached and at one side in position to be moved onto the syringe nozzle. Fig. 3 is a plan view of the nozzle end of the syringe. Fig. 4 shows the various parts constituting the nozzle portion of the device illustrated, ready for assembly.

In the device shown the barrel 1 and plunger 2 of the syringe are of a well-known form as will be recognized. In the present instance the nozzle of the syringe is made separate from and later attached to the barrel, but this is not an essential feature of my invention; the end of the barrel 1 illustrated is somewhat contracted and is set into a recess in one end of the nozzle member 3 (Fig. 2), and may be permanently fixed in the recess in some conventional manner. The nozzle member 3 is provided with a passage 4 for the fluid, and the end of the nozzle opposite the recess mentioned is somewhat tapered externally in the region 5 (Fig. 4). The hypodermic needle illustrated is of a substantially conventional form. Its base member 6 is provided interiorly with a recess tapered similarly to the tapering at 5 on the nozzle member 3, so that the nozzle may fit well into the needle and form a sufficiently tight joint between the two, and adjacent its end the needle base 6 is provided with one or more radially-extending locking projections 7, or a single circular flange may be employed. A shoulder facing the syringe barrel, or a second flange or set of projections 8, extending radially outwardly, is or are provided also, preferably, for a purpose hereinafter indicated; this or these may consist of the circular flange flattened at two sides that is now found on some hypodermic needles.

A sleeve 11 is placed outside the nozzle member 3 to hold the needle to the nozzle. The sleeve and nozzle member are connected by screw threads as it were to provide for movement of the sleeve lengthwise of the nozzle to lock and release the needle. To this end preferably, according to my invention, one of these two members is provided with a spiral groove and the other with a projection extending into the groove but extending only a short distance lengthwise of the groove; generally speaking, this permits the nozzle member to be shorter than would be possible if both members were provided with screw threads completely encircling the respective members one or more times. Preferably this groove and projection are provided by cutting a spiral groove 10 in the outer surface of the nozzle member 3 and piercing the sleeve 11 with a radial hole 12 in which is inserted a pin 13 to ride in the thread groove 10. At the end of the sleeve 11 remote from the barrel 1 of the syringe, a longitudinal projection 14 carries at its outer end an inturned flange or radial lip 15 forming a shoulder facing the barrel of the syringe to engage the locking projection or projections 7 of the needle. This longitudinal projection 14 and lip 15 extend only part way around the longitudinal centerline of the nozzle member 3, leaving a space at one side through which the needle base 6 can be inserted as it were, with a projection 7 beneath the lip 15 (Fig. 2); that is to say, for example, the projection 14 and lip 15 may extend half way around this centerline or a little more, as is shown most clearly in Fig. 3. The sleeve 11 may be knurled as at 16 or otherwise formed so that it can be turned readily on the nozzle member 3. To confine the pin 13 in its hole 12 and the thread groove 10, preferably an outer sleeve 17 is forced down over the sleeve 11 with a driving fit. Such a construction is relatively inexpensive and readily made as well as well suited for the purposes.

The threading between the sleeve 11 and the nozzle member 3 is stopped at its end adjacent the taper 5. This prevents the locking sleeve being removed from the nozzle inadvertently in use. To this end the groove 10 is filled up, as it were, at 20, so that the turning of the locking sleeve 11 in a direction to move it off the nozzle member 3 is stopped by the pin 13 striking this filled-up end of the groove; this filling up of the end of the groove can be secured by discontinuing the cutting of the groove at the point 20. Longitudinal movement of the sleeve in the opposite direction can be limited and stopped in a like manner, or by arranging for the end 21 of the sleeve to come into engagement with, say, the shoulder 22 on the nozzle member while the pin is still within the thread groove 10. The locking sleeve therefore is at all times kept in threaded connection with the nozzle member so that its sole movements in use are rotation around the nozzle member and consequent straight line movement lengthwise of the nozzle member. To permit the needle to be placed on the nozzle under these conditions, the shoulder 15 is placed so far from, say, the pin 13 that without the screw-thread ele-

ments of the sleeve and nozzle member passing out of co-operating threaded relation, this shoulder can be brought to a position sufficiently far beyond the end of the nozzle to permit the needle to be seated on the nozzle and its locking projection 7 passed beneath the shoulder by a sidewise movement as is shown in Fig. 2. This Fig. 2 shows the position of the sleeve when the pin 13 is substantially engaged with the filling at 20. The length of the thread groove 10 as measured from 20 is at least such that the lip 15 can draw the needle base onto the nozzle end with the desired tightness. Such an arrangement permits the user to attach and detach a needle or other fluid-conveying device both readily and easily.

In use the locking sleeve 11 is rotated until, say, its rotation is stopped at the groove end or filling 20. The needle base 6 is then passed into the sleeve with a more or less sidewise movement, say from its position in Fig. 2, thus placing the locking projection 7 (or one of them) beneath the lip 15; the base may then be pressed onto the nozzle end but this is not altogether necessary. The locking sleeve 11 is then rotated to draw the lip 15 against the projection or projections 7 and therethrough draw the needle base into tight engagement with the nozzle end, and hold it there. Rotation of the locking sleeve 11 in the opposite direction releases the needle. If the needle does not free itself of the nozzle, continued rotation of the sleeve forces the locking lip 15 against the needle projection or projections 8 and therethrough lifts the needle base from the nozzle. When the sleeve again reaches its position in Fig. 2, the needle can be removed by sidewise movement of course.

It will be understood that my invention is not limited to the details of construction and operation herein described and illustrated except as appears hereafter in the claims.

I claim:

1. In a syringe, means to attach thereto a fluid-conveying device chambered to receive a nozzle and having a locking projection, said means comprising a nozzle to enter such chamber to support the fluid-conveying device and a sleeve outside said nozzle having a shoulder to engage the locking projection of the fluid-conveying device to hold the latter to the nozzle, said nozzle and sleeve being screw-threaded one to the other for adjustment of the sleeve lengthwise of the nozzle, and the length of the sleeve including the screw-thread element thereof being greater than the distance from the discharge end of the nozzle to the screw-thread element of the nozzle so that the sleeve can be adjusted, with the screw-thread elements in co-operating relation to each other, from a position whereat said shoulder is located alongside the nozzle to a position whereat said shoulder is beyond the end of the nozzle sufficiently to permit the fluid-conveying device to be seated on the nozzle and the locking projection thereon passed beneath said shoulder.

2. In a syringe, means to attach thereto a fluid-conveying device having a chamber to receive a nozzle and a locking projection, said means comprising a tapered nozzle to enter said recess and a sleeve outside said nozzle having a shoulder to engage the locking projection of the fluid-conveying device, said nozzle and sleeve being screw-threaded one to the other for adjustment of the sleeve lengthwise of the nozzle, and the length of the sleeve including the screw-thread element thereof being greater than the distance from the discharge end of the nozzle to the screw-thread element of the nozzle so that the sleeve can be adjusted, with the screw-thread elements in co-operating relation to each other, from a position whereat said shoulder is beyond the end of the nozzle sufficiently to permit the fluid-conveying device to be seated on the nozzle and the locking projection thereon to be passed beneath said shoulder, to a position whereat the nozzle is drawn into the recess in the fluid-conveying device and forms with the fluid-conveying device a fluid-tight joint.

3. The subject matter of claim 1 in combination with the fluid-conveying device, characterized by the fact that a second projection is provided on the fluid-conveying device, spaced from said locking projection and positioned to be engaged by said sleeve as the latter is moved toward the first mentioned position to force the fluid-conveying device loose from the nozzle.

4. In a syringe, means to attach thereto a fluid-conveying device having a locking projection, said means comprising a nozzle and a sleeve outside the nozzle having a shoulder to engage the locking projection of the fluid-conveying device to hold the latter to the nozzle, said nozzle and sleeve having cooperating screw-thread means to move the sleeve lengthwise of the nozzle as the sleeve is rotated, characterized by the fact that the length of the sleeve including the screw-thread means on the sleeve is greater than the distance from the discharge end of the nozzle to the screw-thread means on the nozzle and said screw-thread means on the nozzle extends far enough lengthwise of the nozzle to move said sleeve to a position whereat said shoulder is so far beyond the end of the nozzle that the fluid-conveying device can be seated on the nozzle and the locking projection passed beneath said shoulder, and a groove of said screw-thread means is stopped to prevent movement of the sleeve beyond said position.

5. In a syringe, means to attach thereto a fluid-conveying device having a locking projection, said means comprising a nozzle having a spiral slot in its outer surface, a sleeve outside the nozzle having a shoulder to engage the locking projection of the fluid-conveying device to hold the latter to the nozzle, and pierced with a hole, a pin in said hole in the sleeve extending into said slot to cooperate with the walls of the slot to move the sleeve lengthwise of the nozzle as the sleeve is rotated, and a second sleeve encircling the first mentioned sleeve in the region of the pin to retain the pin in place.

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