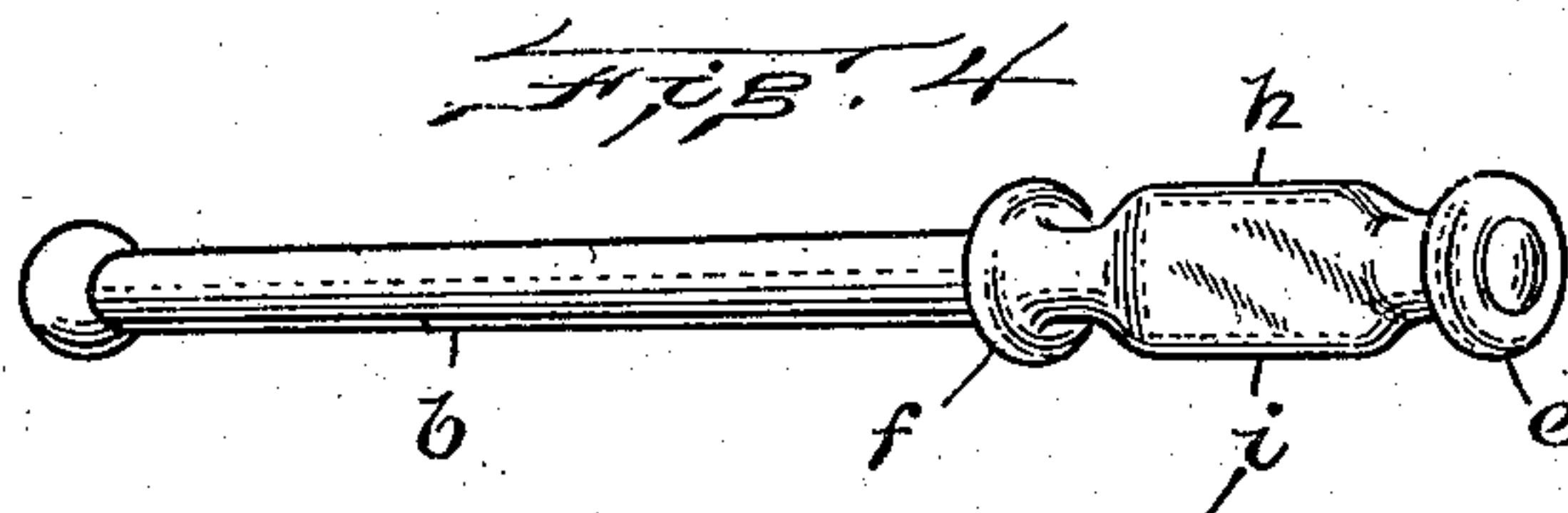
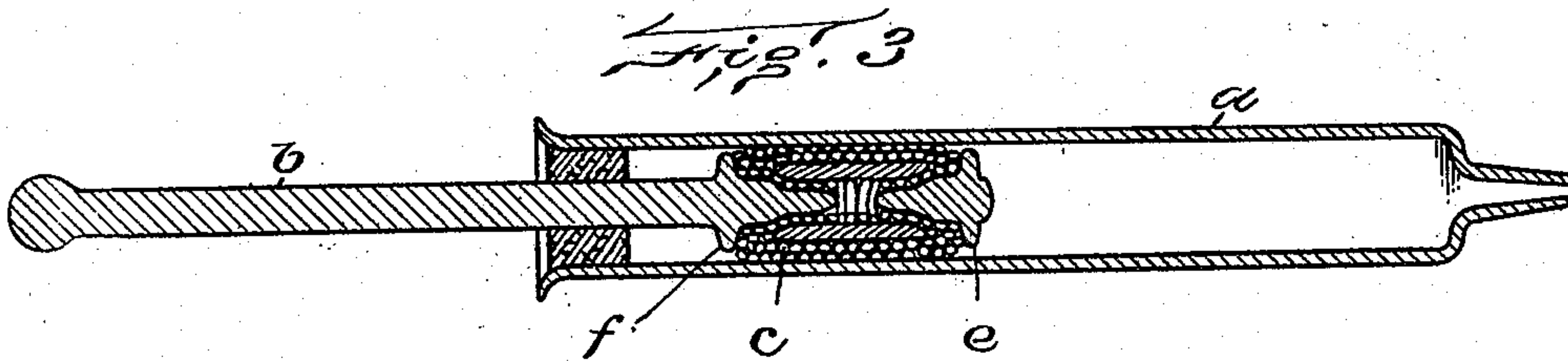
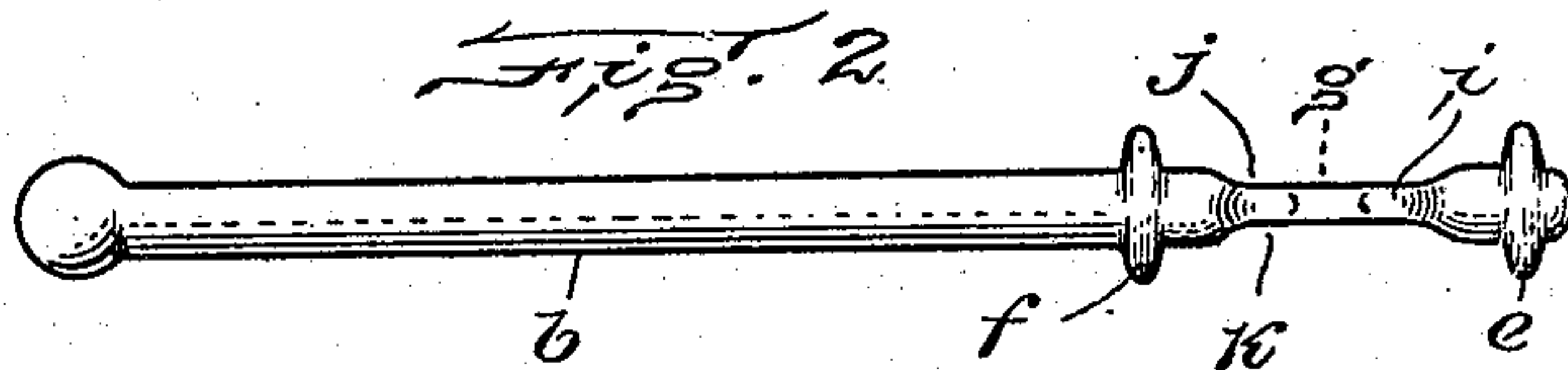
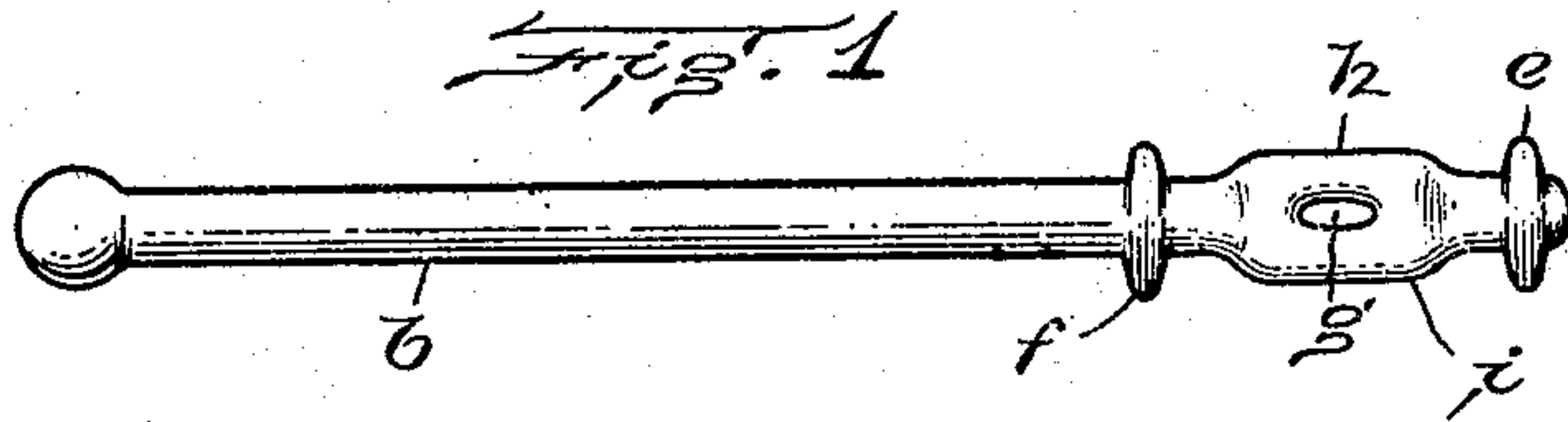


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 SYRINGE.
 APPLICATION FILED MAY 1, 1908.

919,918.

Patented Apr. 27, 1909.



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SYRINGE.

No. 919,918.

Specification of Letters Patent.

Patented April 27, 1909.

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To all whom it may concern:

Be it known that I, PATRICK J. McELROY, of Cambridge, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Syringes, of which the following is a specification.

This invention relates to syringes and has particular reference to the pistons or plungers used in connection therewith to eject the contents thereof.

It has for its object to enable the packing which is carried by the piston and causes the latter to fit tightly within the barrel of the syringe, to be united to the piston in such a way that it cannot turn or twist relatively to the piston rod, but must partake of any rotary movement which may be given to the latter.

It is the present practice to put up quantities of medicinal preparations such as antitoxins and serums, in glass syringes which are sealed up, and are ready for instant use by simply breaking the seal. These syringes contain pistons which consist of rods extending and moving longitudinally within the barrel of the syringe. Such rods are packed so that they will fit tightly within the syringe barrels and will expel all the contents thereof by compressible antiseptic packing which surrounds a part of the piston rod and usually takes the form of a cord wound repeatedly about the rod until the diameter is sufficient to cause it to fit tightly within the walls of the barrel. Such syringes when filled and packed away are sometimes allowed to remain unused for months, during which time the piston packing, having remained stationary, adheres more or less tightly to the syringe barrel. Much difficulty has been experienced in freeing the packing by a rotary movement of the piston so that the piston could subsequently be moved to expel the contents of the syringe, and prior to the present invention, no sure means of securing this result had been devised.

The syringes hitherto made have had packings which were held in such a way that they could not be displaced longitudinally of the rod, but heretofore the construction has been such that the packing can be practically moved within the syringe barrel only by a longitudinal movement of the piston. When the packing has become stuck by

long inaction, it is very difficult to start it by pressure in a longitudinal direction. Frequently the pressure necessary to overcome the adhesion is so great that when the piston is once started, it acquires a greater velocity than the rate of discharge of the contents, and so produces a pressure in the syringe sufficient to burst the barrel. Again, it is difficult to apply a starting pressure of so great an amount in a straight line, and so firm a grip is necessary to be taken on the syringe barrel to react against this starting pressure that there is great danger of crushing the barrel and snapping the stem of the piston rod.

The easiest way in which to free the packing from the barrel is to turn it rotarily by twisting the piston-rod, but with syringe pistons as hitherto constructed, it has not been practicable to do this, for the reason that the rod is usually smooth where it extends through the packing, and the latter is not secured to it in any way. Consequently, turning of the rod will simply cause it to rotate within the packing while the latter remains in as firm adhesion as before to the walls of the barrel. It has been proposed to provide the rod with small spurs engaging portions of the packing, but these are inadequate for the purpose stated.

By my invention, I have devised a construction of piston-rod which enables the packing to be fastened to it in such a way that relative rotation between the piston rod and packing is impossible. That is, whenever the piston-rod is turned, the packing must turn with it. It is impossible for the adhesion or friction between the packing and barrel to displace the former laterally when either the barrel or piston-rod is rotated.

My invention therefore consists in the construction of the piston-rod whereby the packing is so securely attached thereto that it cannot turn thereon, this construction being described and claimed in the following specification, and illustrated in the accompanying drawings, in which,—

Figure 1 represents an elevation of a syringe piston-rod embodying the features of this invention. Fig. 2 represents an elevation of the same as seen with the rod turned at right angles to the position of Fig. 1. Fig. 3 represents a sectional view illustrating the piston-rod having the packing applied

thereto and mounted within a syringe barrel. Fig. 4 represents a perspective view of a piston-rod having a slightly modified construction.

5 The same reference characters indicate the same parts in all the figures.

The essence of the invention resides in the formation or configuration of that end of the piston-rod which is contained within the
10 barrel of the syringe.

a represents the barrel of any suitable or ordinary form of syringe, and *b* represents a piston-rod which is capable of sliding within the barrel. The inner end portion of this
15 piston is surrounded by a packing *c* which preferably consists of a cord of flexible and compressible material such as asbestos or the like, which is made antiseptic and is wound about the rod to a thickness great
20 enough to make it fit tightly within the syringe barrel and prevent leakage of liquid or air. At the end of the piston-rod, and some distance back from the end, flanges *e* and *f* are formed upon the rod. The space
25 between these flanges contains the packing and the flanges serve to prevent the latter being displaced endwise.

In order to hold the packing so that it will not slip transversely or rotarily on the
30 piston-rod, I provide the latter between the flanges with an aperture *g* of which there may be one or more, as desired. Such aperture forms an eye through which the cord is passed as it is being wound upon the rod.
35 The strands of the cord which pass through the eye of course hold the packing and prevent it slipping upon the piston when the latter is turned and the outer surface of the packing is pressed against the inner surface
40 of the barrel.

In order to hold the packing still more securely, the rod between the flanges is given a non-circular shape or configuration, this portion of the rod being flattened or other-
45 wise formed. This flattening causes wings *h* and *i* to bulge out from opposite sides, while between these wings the rod is recessed, as at *j* and *k* in Fig. 2. When the packing is tightly wound upon this flattened
50 and widened portion of the rod, and is filled in between convolutions of the cord so that its outer periphery is cylindrical, it presses so tightly upon the flattened sides that the latter cannot turn within it, and any ro-
55 tary movement of the rod must necessarily be imparted to the packing.

In some cases the eye or aperture *g* may be dispensed with and the flattening of the rod relied upon alone to give the necessary grip
60 for the packing. Such a construction is shown in Fig. 4. Conversely, the flattening of the rod may be dispensed with, and the eye may be formed in a circular section and be employed alone to hold the packing.

I claim:--

1. In a syringe, a piston-rod having abutments, packing filling the space between the abutments and prevented thereby from being displaced endwise, and the piston-rod being provided with an aperture through
70 which part of the packing is passed, whereby the packing is restrained also from lateral displacement.

2. In a syringe, a piston consisting of a rod movable endwise within the barrel of
75 the syringe, and a packing surrounding the rod to fit the interior of the barrel, said rod having one or more apertures through which part of the packing extends and by which the packing is prevented from rotating on
80 the rod.

3. A syringe comprising a tubular barrel, a piston-rod movable endwise therein, and a packing consisting of a cord wound about said rod to a diameter equal to that of the
85 interior of the barrel, the rod having one or more apertures through which the cord is passed, whereby the packing is prevented from being displaced.

4. A syringe comprising a tubular barrel, 90 a piston-rod movable endwise therein, and a packing surrounding a part of said rod and fitting the interior of said barrel, the rod being of non-circular cross-section where surrounded by the packing, whereby the
95 latter is held and prevented from becoming displaced when the rod is rotated.

5. A syringe comprising a tubular barrel, a piston-rod movable endwise therein having separated lateral flanges near its inner end
100 and being flattened and widened between said flanges, and a packing surrounding the rod between the flanges, being held by the latter against endwise displacement and by said flattened portion of the rod from rela-
105 tive rotary displacement.

6. A syringe comprising a tubular barrel, a piston-rod movable endwise therein having separated lateral flanges near its inner end, said rod being flattened and widened for a
110 portion of the distance between said flanges and having an aperture through such flattened portion, and a packing surrounding the rod between the flanges and extending into such aperture, being restrained by the
115 flanges from endwise displacement and by the configuration of the rod and the aperture from rotation relatively to the rod, whereby rotation of the latter within the barrel will also turn the packing to free the same from
120 the walls of the barrel.

In testimony whereof I have affixed my signature, in presence of two witnesses.

PATRICK J. McELROY.

Witnesses:

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