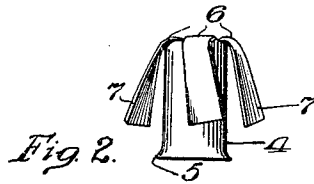
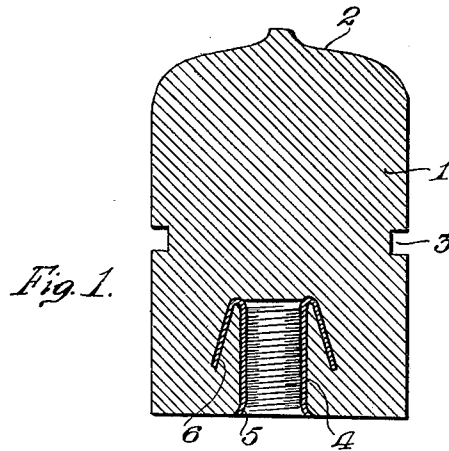


E. E. TOMPKINS.
BUSHING.
APPLICATION FILED MAR. 31, 1919.

1,373,778.

Patented Apr. 5, 1921.



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UNITED STATES PATENT OFFICE.

ERNEST E. TOMPKINS, OF PHILADELPHIA, PENNSYLVANIA.

BUSHING.

1,373,778.

Specification of Letters Patent.

Patented Apr. 5, 1921.

Application filed March 31, 1919. Serial No. 286,290.

To all whom it may concern:

Be it known that I, ERNEST E. TOMPKINS, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Bushings, of which the following is a specification.

The object of this invention is to provide an improved bushing, particularly for removably connecting together metal and yielding objects, such as those made of rubber.

In the manufacture and use of injectors of various sorts, such for instance as hypodermic-needles, rectal and pelvic syringes and the like, it has long been found necessary to employ a piston-like plunger of rubber closely fitting against the inside walls of the syringe, and operating said plunger to eject the fluid contents by connecting to each of them a rod of sufficient length to extend beyond the limits of the syringe-tube, when the plunger is in its innermost position.

However, it frequently occurs that the union or connection between the plunger and the operating-rod does not hold, upon manually shifting the latter, and that as a result they become separated, thus destroying the usefulness of the articles of which they form a part, as these two members can not be satisfactorily reconnected. Furthermore, through lack of use, a plunger often sticks to the sides of the containing-tube, and the operating-rod breaks from the plunger in trying to twist the latter free from engagement with said tube.

As a result of these difficulties which have long been encountered in the use of such articles, the present object is to provide an internally threaded metallic bushing, provided with means extending well into the body of a plunger of rubber or other yielding material, and after screwing the usual operating rod into said bushing said projectors operate to prevent the separation of said bushing from said plunger.

With these and other objects in view, the invention comprises certain novel details of construction and operation as hereinafter fully brought out in the following description, when read in conjunction with the accompanying drawings, in which Figure 1 is a longitudinal diametrical section of a sy-

ringe plunger provided with one form of the improved bushing; and Fig. 2 is a side elevation of the bushing of Fig. 1, *per se*.

Referring to the drawings, a common type of plunger is shown as comprising a solid member 1, with a rounded fluid-ejecting frontal surface 2, and provided peripherally intermediate of its ends with a groove 3, in which may be placed a suitable packing or the like, or otherwise left empty.

A bushing, comprising a cylindrical internally threaded section 4, is molded axially into the end portion of said plunger opposite to the frontal surface 2, and is provided at its free end portion with an outwardly directed peripheral flange 5, while its innermost end portion is split or cut to provide spaced ears or projecting lugs 6, adapted to be reversely bent into positions at acute angles with the adjacent sides of the cylindrical portion 4 of the bushing, in which position, with the material of the plunger surrounding them, any pull outwardly upon an operating rod screwed into said bushing only tends to increase the hold of the bushing upon the surrounding plunger material, as portions of the latter become wedged more tightly between the bushing cylinder and the diverging lugs or ears.

Finally, the bushing as illustrated by Fig. 2 is provided with outwardly bent lugs or ears, which it will be noted are preferably directed sharply rearwardly and having their lowermost end portions 7 flexed, so that one of the longitudinal edges of each of said ears is of greater and constantly increasing distance from the adjacent side of the cylinder 4 than the other of said edges.

Furthermore, this type of bushing, in addition to preventing its being removed longitudinally from the rubber plunger, is of such shape that, if the plunger sticks to the sides of the containing-tube, and a right-hand twist is given to the operating rod connected thereto, the ears 7 operate to wedge between themselves and the adjacent portions of the cylinder the interposed material of said plunger.

Thus it is obvious that in constructing these various modifications of the general improved bushing, the primary object has been to prevent the said bushing from being removed from a surrounding plunger as the result of any relative movement

whatsoever that might be given to the connected elements. And, while a plunger for articles used by physicians and surgeons has been described, it is to be understood that
5 this invention is equally adaptable to the bushings in connecting the usual metal rods to the rubber-ball plungers of lavatory-tanks, and in fact to any additional articles made of rubber or similar yielding material, to which it is desirable to connect other
10 elements.

Having thus described my invention, what I claim and desire to protect by Letters Patent of the United States is:—

15 1. A bushing comprising an internally threaded cylinder, and longitudinally extending fingers arranged outwardly of and near the cylinder in a surrounding group, said fingers being secured to the cylinder

and twisted upon their longitudinal axes 20 for forming spirals.

2. A bushing comprising an internally threaded cylinder, and fingers secured to the forward end thereof and bent outwardly and rearwardly to extend longitudinally of 25 the cylinder, said fingers being twisted upon their longitudinal axes.

3. A bushing comprising a cylinder, fingers formed integral with the forward end of the cylinder and bent outwardly and longitudinally and extending rearwardly exteriorly of the cylinder, said fingers being twisted upon their longitudinal axes, and an outwardly extending flange formed upon the rear end of the cylinder. 30

In testimony whereof I have affixed my signature. 35

ERNEST E. TOMPKINS.