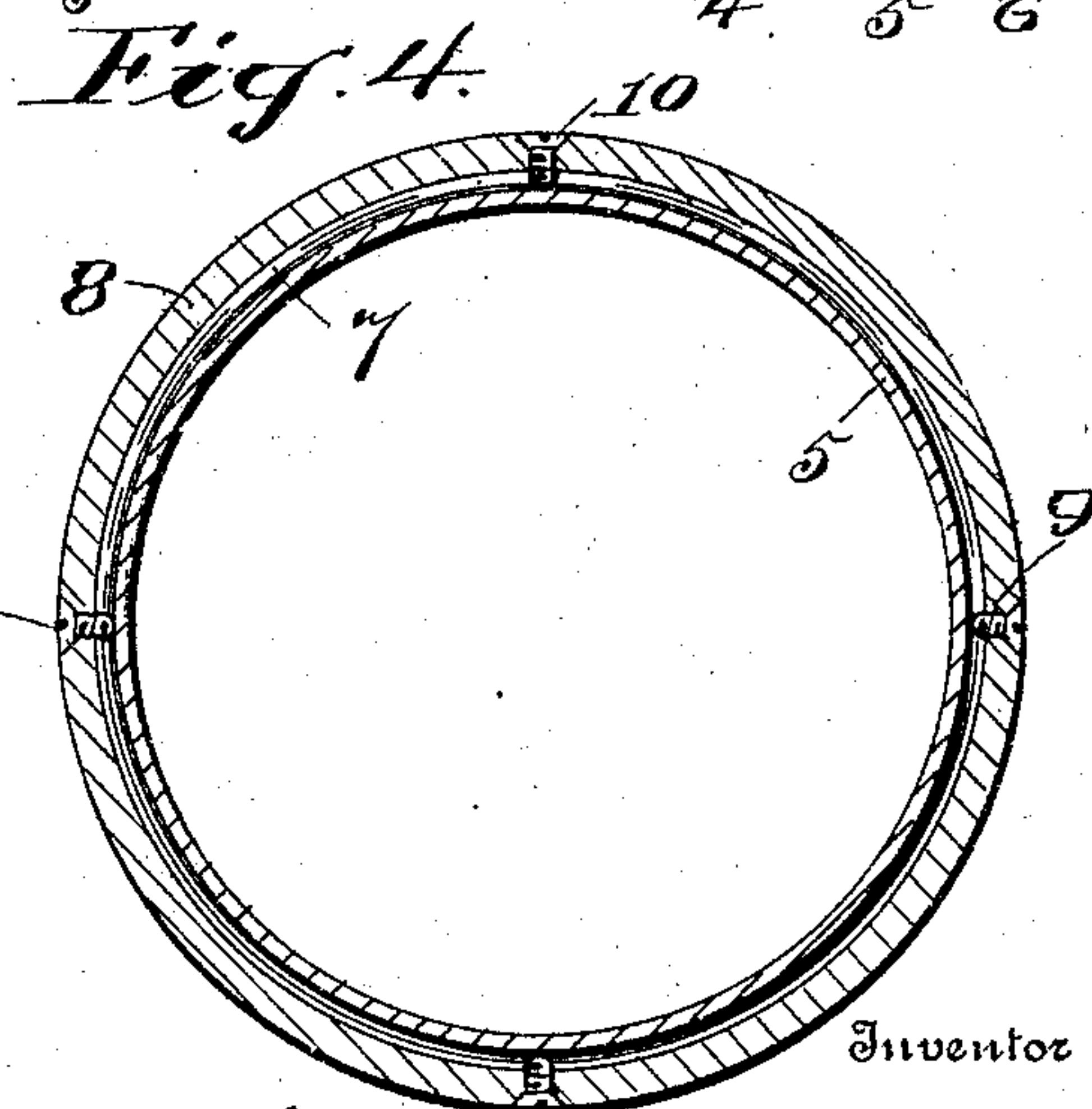
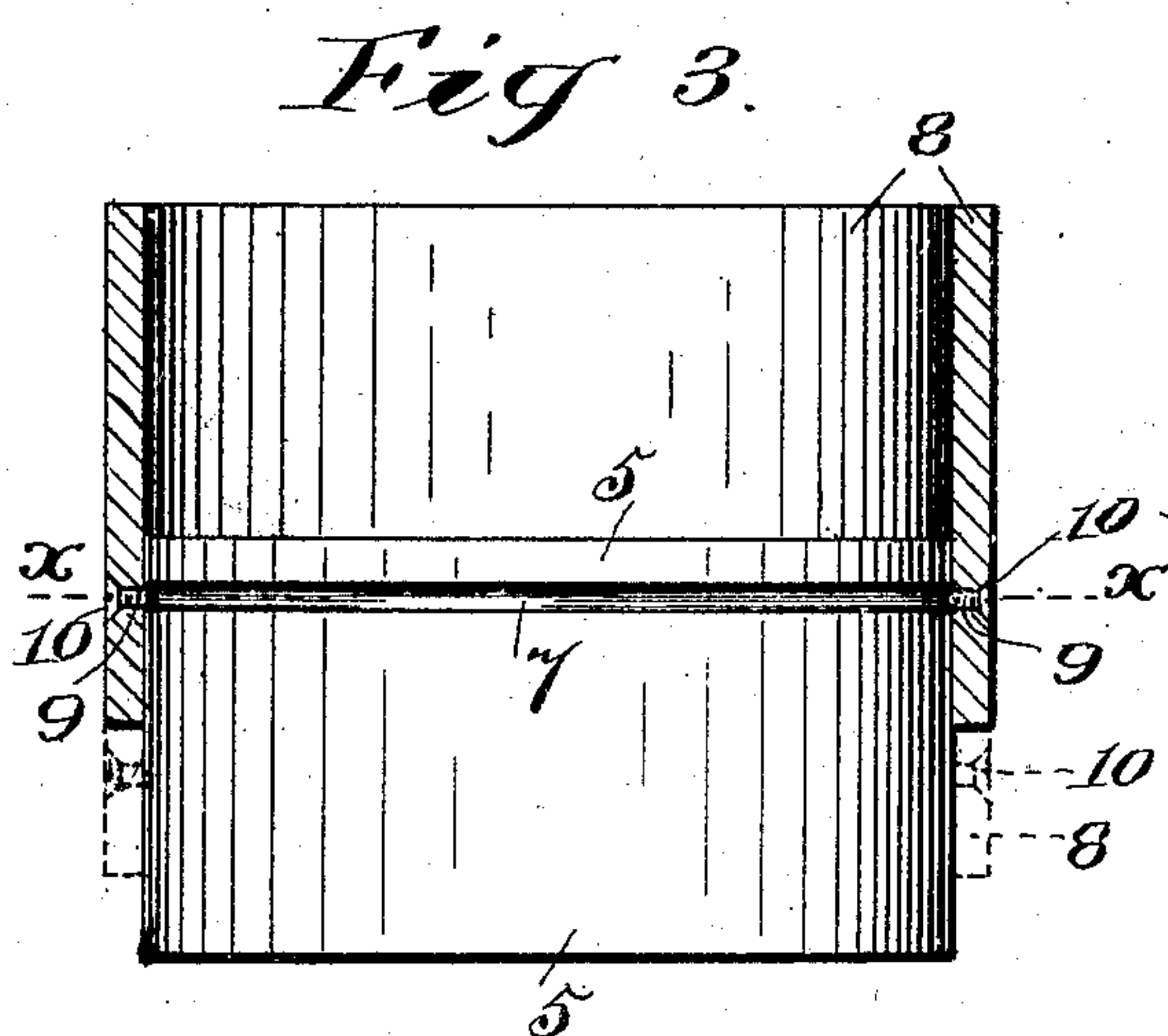
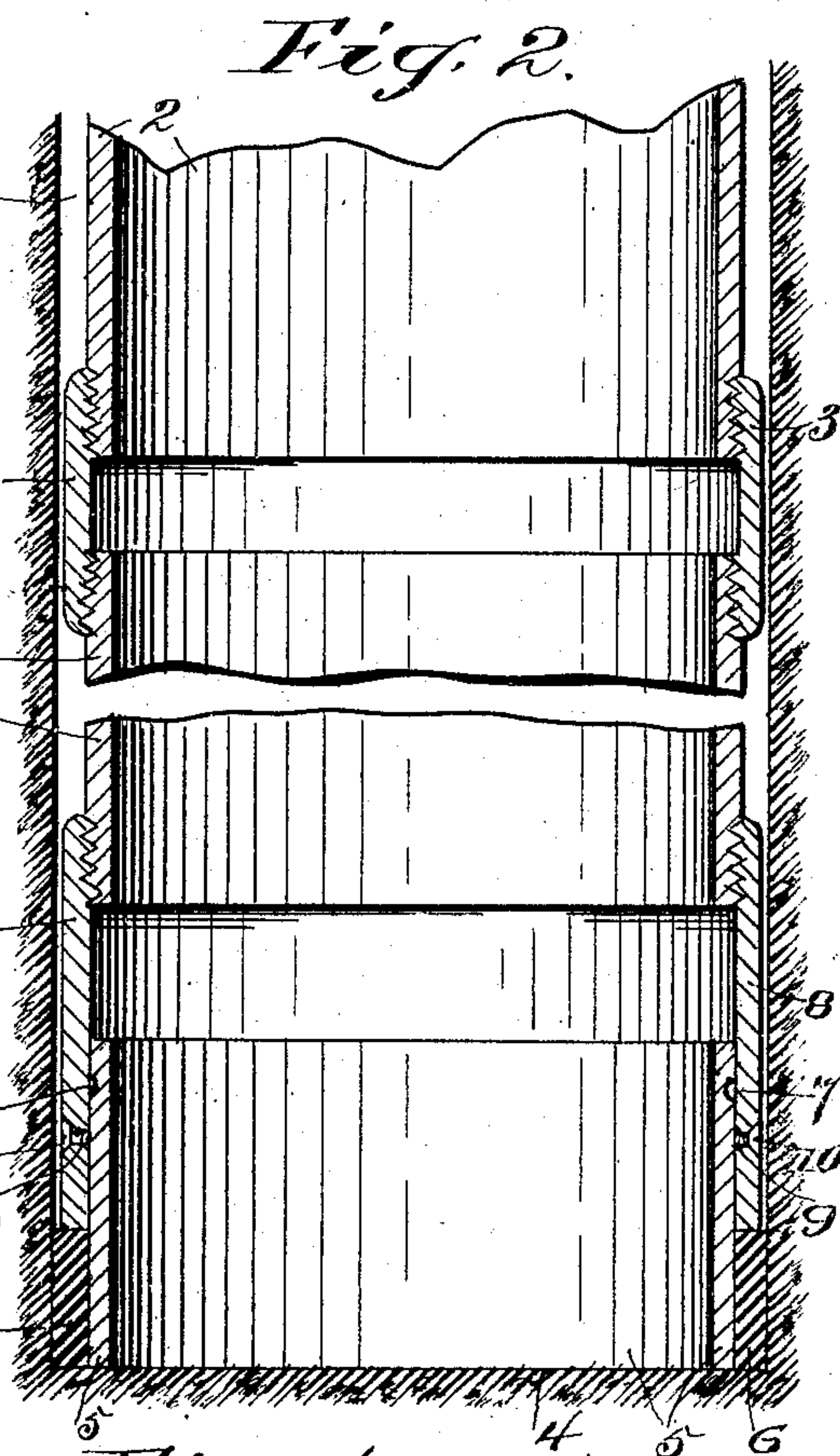
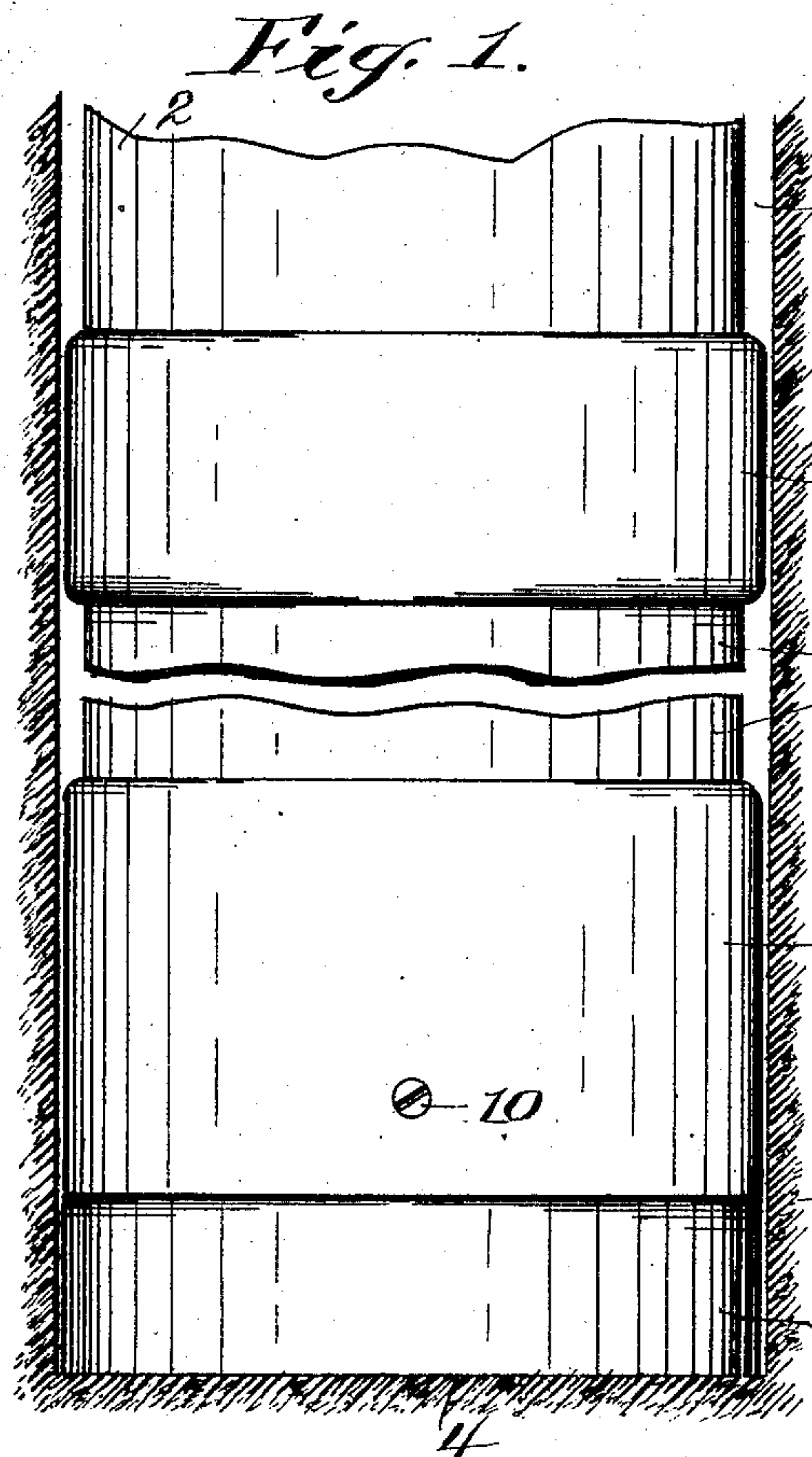


No. 788,353.

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W. H. DOWNING.
BOTTOM PACKING FOR OIL WELLS.

APPLICATION FILED DEC. 16, 1904.



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WILLIAM H. DOWNING, OF PARKERSBURG, WEST VIRGINIA.

BOTTOM PACKING FOR OIL-WELLS.

SPECIFICATION forming part of Letters Patent No. 788,353, dated April 25, 1905.

Application filed December 16, 1904. Serial No. 237,141.

To all whom it may concern:

Be it known that I, WILLIAM H. DOWNING, a citizen of the United States, residing at Parkersburg, in the county of Wood and State of West Virginia, have invented certain new and useful Improvements in Bottom Packing for Oil-Wells, of which the following is a specification.

This invention relates to oil-well packing, and pertains especially to means for packing off water and gas at the bottom of the well-bore by expanding a packing under pressure of the well-tubing.

The object of the invention is to provide a short section of casing or tubing carrying a packing-ring and having an annular groove or depression over which a coupling is slidably connected by a series of set-screws.

Packers of the character of my invention are practically the same size or diameter as the well-tubing. Hence in running the latter, with the packer, into the bore of a well there is invariably particles of the well-wall—such as earth, sand, and gravel—pushed ahead of the end of the tubing to the bottom of the bore, and the usual uneven condition of the bore-bottom is only made more so by the falling of said particles. It is therefore difficult to effect packing off of water and gas at the well-bottom in a permanent manner. Such packing-off has heretofore been attempted by packing-sleeves arranged to expand against the wall of the well without engaging the well-bottom, and particularly by a shouldered cone which surrounds and is secured to a shell by a frangible joint. This cone and part of the shell is incased by a sleeve of rubber or other annular packing having a tapering end, so that pressure on the upper end of the packing will compress it vertically and expand it laterally, thereby filling the space between the well-wall, the tube, and the cone; but the cone interferes with packing to such an extent that little or no expansion of the sleeve is made on the well-bottom and the lower end of the cone is mainly depended upon to do the packing. The shoulder of the cone limits the action of the tubing in its downward movement on the sleeve, so that compression and lateral

expansion of the sleeve are restricted by such limitation. The frangible joint referred to consists of rivets, which, if small, will be drawn by the weight of the tubing in running the cone into position, and if the rivets are large they may not be broken under the intended pressure of the tubing to brake them, in which event the packing is not expanded, and repeated operation of the tubing is necessary to break the joint.

It is therefore the purpose of this invention to cure the defects, overcome the objections, and remedy the disadvantages found in packers of this character and to provide a packer simple in construction, certain in operation, and of such arrangement that the packing is spread over the well-bottom to effectually pack off water and gas from the tubing.

With these and various other objects in view the invention consists of a non-shouldered taperless bottom section of well tubing or casing carrying within its vertical limit a packing-sleeve and slidably connected without frangible joint to one end of a coupling, the other end of the latter having the usual well casing or tubing screwed thereinto and adapted to be operated to effect said sliding.

In the accompanying drawings, forming part of this application, Figure 1 is a vertical section of part of a well-bore, showing the invention in elevation and in position to receive pressure from the well-casing. Fig. 2 is a similar view showing all the parts in section and the packer expanded over the bottom of the well-bore. Fig. 3 is a detail elevation of the bottom tube-section, showing in section a coupling slidably connected thereto. Fig. 4 is a section on the line *x x*, Fig. 3.

The same numeral references denote the same parts throughout the several views of the drawings.

The well-bore 1 must be of greater diameter than the casing 2 and coupling 3, so that a space is left between the wall of the bore and said couplings, and a greater space is left between the tubing or casing and the wall, such space being also at the bottom 4 of the well-bore. It not being essential to produce a vertical packing or filling of the first-men-

tioned space, I am enabled to use a short section of tubing 5, carrying around the lower part of its length a packing-ring 6, the lower edge of which is flush with the lower edge of the tube 5. Near the upper end of the tube 5 is formed a shallow annular groove or depression 7. The tube 5 is without inner or outer shoulders and screw-threads and its bottom end rests on the bore-bottom 4.

The terminal coupling 8 has a top screw-thread by which it connects with the casing or tubing 2, and its bottom edge is beveled to receive the top edge of the packing-ring 6. The coupling 8 has a series of countersunk screw-threaded apertures 9 near its lower edge, so as to leave a portion to overlap the tube 5 below the groove 7. Set-screws 10 work in the apertures 9 and engage the groove 7 to hold the tube 5 to the coupling 8 during the placing of these parts at the bottom of the well-bore and afterward to permit telescopic movement of said parts without the screws being loosened.

It will be seen that the screws have sufficient bearing in the groove to prevent displacement during the introduction of the tubing or casing into the well; yet the groove is of such shallow depth that when the tube 5 strikes the well-bottom the screws are pushed out of the groove by the weight of the casing and couplings without breaking the screws or loosening them. After the tube 5 strikes the well-bottom the weight of the tubing-sections or casing slides the coupling 8 upon the tube 5 and carries the screws out of the groove so that they impinge the tube below the groove. Such sliding effects vertical compression and lateral expansion or crowding of the packing-ring over the bottom of the well between the wall of the latter and the tube 5.

It will be observed that the tube 5 is simply a small section or part of the well-tubing and without special preparation except the forming of the groove or slight depression therein; that the coupling 8 is one of ordinary use, with the exception of the omission of the screw-threads at one end and the substitution of the screw-apertures—hence the extreme simplicity and inexpensive features of the device, which are essential, inasmuch as one is required for every well.

Having thus described my invention, what

I claim as new, and desire to secure by Letters Patent, is—

1. A well casing or tubing, a packer, and set-screws connecting the tubing and packing to permit the packer to slide without operating the screws.

2. A well-casing coupling having a screwless end, the set-screws, and a packer slidably held to the coupling by the screws.

3. A well casing or tubing, a packer having telescopic connection with the casing or tubing, and set-screws making said connection and adapted to slide on the packer under pressure of the casing or tubing.

4. A well - casing coupling having set-screws, and a tube having an annular groove engaged by the screws to hold the coupling and the tube together and to permit telescopic movement thereof.

5. A well - casing coupling having set-screws, a tube having an annular groove engaged by the screws to make a telescopic connection, and a packing-ring carried by the tube and acted upon by the coupling to expand it on the bottom of the well.

6. The combination, with a well-casing having suitable couplings, and a terminal coupling having screw-threaded apertures, of a tube having an annular groove and slidable in the coupling, a packing-ring carried by the tube and expanded under pressure of the said coupling, and set-screws connecting the tube and the coupling and permitting a telescopic movement thereof.

7. The combination, with a well-casing having suitable couplings, and a coupling having screw-threaded apertures, of a tube having an annular depression overlapped by the said coupling to have the depression and the apertures register, a packing-ring extending from the end of the coupling to the bottom of the tube, and set-screws engaging the depression and adapted to slide therefrom in set position under pressure applied to the coupling.

In testimony whereof I affix my signature in presence of two witnesses.

WILLIAM H. DOWNING.

Witnesses:

G. W. HATCH,
J. W. SOLLEY.