

No. 688,445.

Patented Dec. 10, 1901.

J. C. SNYDER.
VALVED PISTON.

(Application filed Jan. 9, 1901.)

(No Model.)

Fig. 1.

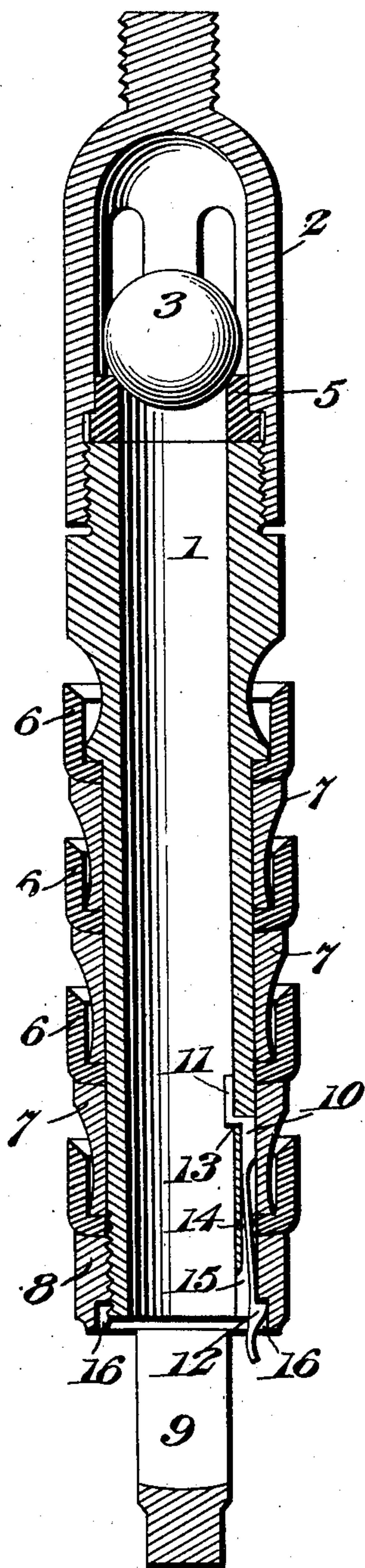


Fig. 2.

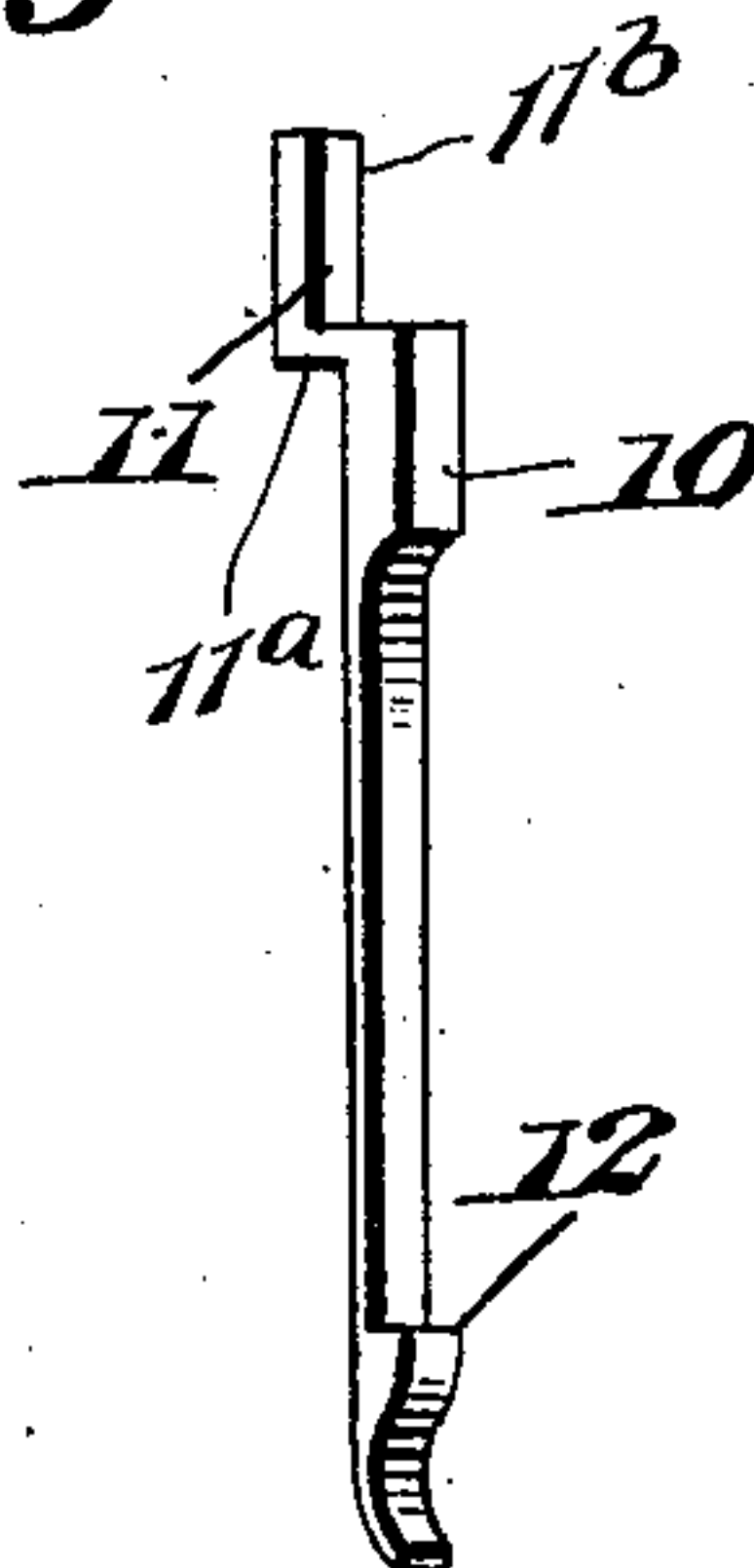
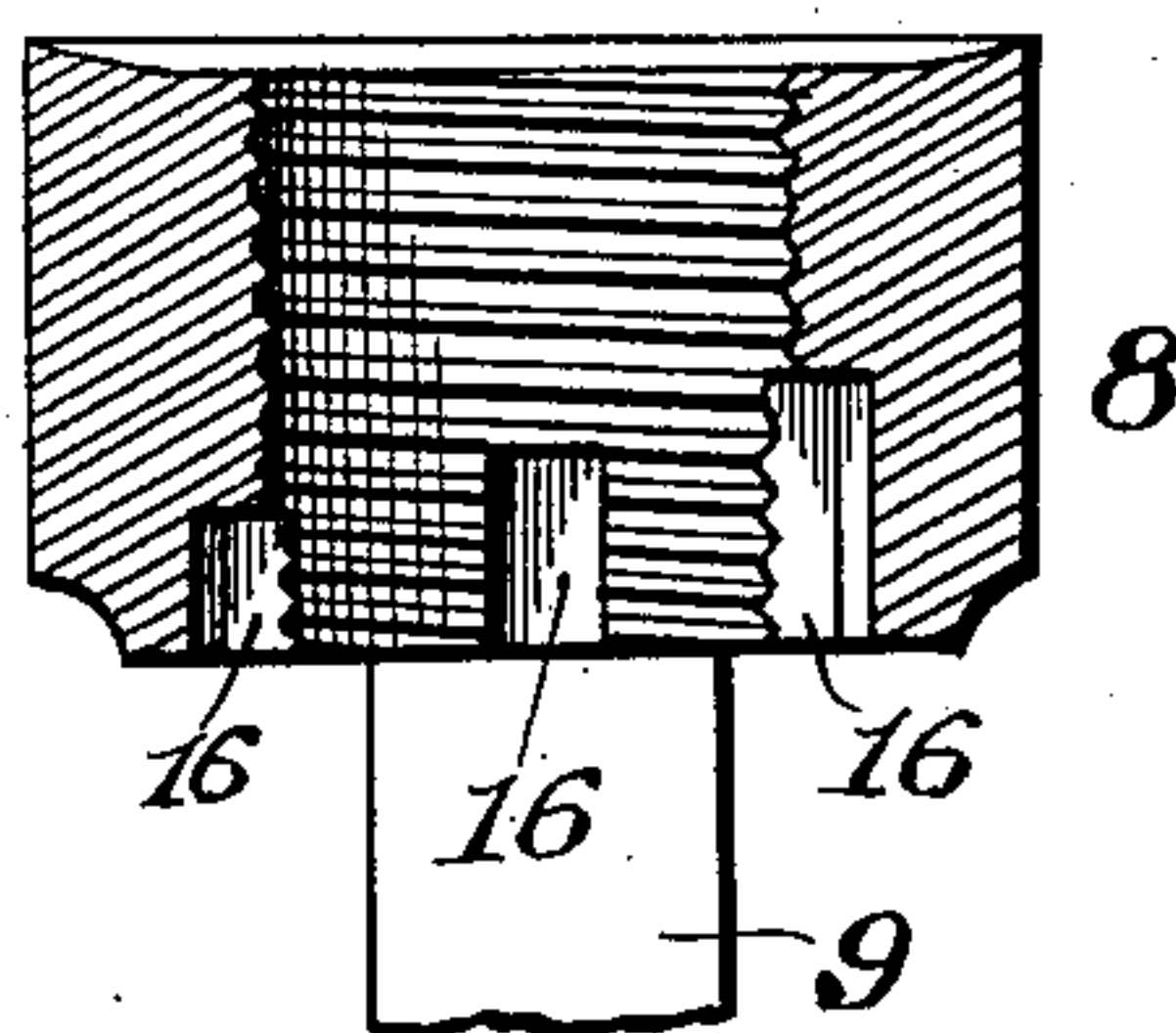


Fig. 3.



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UNITED STATES PATENT OFFICE.

JOHN C. SNYDER, OF BOWLING GREEN, OHIO.

VALVED PISTON.

SPECIFICATION forming part of Letters Patent No. 688,445, dated December 10, 1901.

Application filed January 9, 1901. Serial No. 42,671. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. SNYDER, a citizen of the United States, residing at Bowling Green, in the county of Wood and State of Ohio, have invented a new and useful Valved Piston, of which the following is a specification.

My present invention relates to improvements in valved pistons or working valves for Artesian or other wells. Wells of this character are sunk or bored to great depths and are usually lined by a metallic well casing or tube containing a loose foot-valve at or adjacent to the bottom of the casing and a working valve or valved piston operated from a point above the well through the medium of a valve stem or rod of great length. The working valve comprises a hollow piston the opening through which is controlled by a suitably-retained gravity-valve, and close contact is maintained between the well-casing and the exterior of the working valve or piston by means of a series of annular rings of compressible material—as, for instance, leather—secured upon the exterior of the piston and ordinarily denominated “buckets” or “suckers.” Owing to the considerable fluid-pressure encountered at great depths, it is very difficult to insure the retention of these packing-rings or suckers against accidental displacement. Such disarrangement of the working valve is particularly disastrous, for the reason that any parts which may become loosened will gravitate to the bottom of the well and will greatly interfere with, if, indeed, they do not actually prevent, the effective operation of the foot-valve.

The object of my invention, therefore, is to provide means for effecting the secure attachment of the annular rings or suckers to the piston of the working valve in a manner to facilitate their detachment to replace worn or inefficient parts.

To the accomplishment of this object the invention is comprehended in the preferred embodiment thereof to be described, illustrated in the accompanying drawings, and defined in the appended claims.

In said drawings, Figure 1 is a central longitudinal section of the valved piston complete. Fig. 2 is a detail view of the cotter or locking member, and Fig. 3 is a detail sectional view of the sleeve detached.

Referring to the numerals employed to designate corresponding parts, 1 indicates the tubular piston, externally screw-threaded at its upper end for the attachment of the piston-shank 2, serving for the connection of the valve rod or stem (not illustrated) and chambered for the reception of a ball-valve 3, arranged to move within the chamber or cage 4 of the shank and to seat upon a removable annular valve-seat 5, retained upon the upper end of the piston 1 by the shank 2, having shouldered connection therewith, as shown. The lower portion of the piston 1 is slightly reduced in external diameter, and upon it are slipped a series of leather buckets, washers, or suckers 6 6, &c., between which are interposed spacing and retaining collars 7 7, &c. These alternating suckers and collars are retained securely in place by an internally-threaded sleeve 8, screwed upon the exteriorly-threaded lower end of the piston and provided with a depending loop 9, as shown. It will now appear that should the retaining-sleeve 8 become displaced the suckers or packing-rings and the intermediate spacing-collars will readily slip from the piston, and besides destroying its effectiveness will gravitate to the foot-valve and prevent the operation of the latter until these detached parts are rescued with an expenditure of considerable time and labor. The invention is therefore directed to the provision of means for effecting the secure retention of the sleeve 8 against accidental displacement, while permitting its ready removal when necessary. Such means comprehends, essentially, a cotter 10, formed of resilient metal and provided at one end with a lug 11 of right-angular form and at or adjacent to its opposite end with a detent 12. The purpose of this particular form of retaining-lug is to insure the retention of the cotter against accidental detachment when the sleeve and collars are removed from the piston. Ordinarily the cotter is retained in place by a lateral projection or lug which merely enters the perforation in the piston. Where such a construction is employed, the removal of the sleeve and lower collars permits the accidental detachment of the cotter, which is objectionable, because ordinarily the collars are merely removed for the purpose of removing worn suckers or buckets, and there

is usually no call for the removal of the cotter. For the purpose of providing a seat for the cotter the wall of the piston 1 is pierced by an orifice 13, from the outer end of which
 5 extends a longitudinal groove 14, terminating in a slot 15, opening through the end face of the piston-wall. The slot 15 is about one-third as long as the cotter and extends entirely through the wall of the piston. The lodgment
 10 of a foreign substance under the lower end of the cotter is thus prevented, and it is kept free for retraction when the removal of the sleeve is desired. The orifice 13 is designed for the reception of the laterally-disposed leg 11^a of
 15 the lug 11, the longitudinally-disposed leg or end 11^b of said lug being disposed flat against the inner face of the piston. The cotter is seated in the groove 14, with its outer face substantially flush with the periphery of the piston in order that it may be secured against
 20 accidental displacement by one or more of the alternating collars 7. It will be noted that the leg 11^b of the lug 11 and the body portion of the cotter are disposed in opposite
 25 directions from the aperture 13, but are disposed in offset relation by the leg 11^a of the lug 11, so that said parts are disposed, respectively, against the inner and outer surfaces of the piston-wall. The lower end of the cotter
 30 being disposed opposite the slot 15 is permitted to spring back for the purpose of withdrawing the detent 12 from engagement with either of a plurality of notches 16 in the interior face of the sleeve 8 and extending varying
 35 distances from the lower end thereof. The resiliency of the cotter tends to urge the detent outwardly against the interior face of the sleeve 8 as the latter is screwed to place to effect the engagement of the detent with a
 40 notch for the purpose of preventing unscrewing of the sleeve and the consequent release of the suckers and collars. As stated, the notches 16 are of different lengths and are designed to be successively engaged by the detent as it becomes necessary from time to
 45 time to screw up the sleeve 8 for the purpose of compensating for wear. The utility of the notches 16 of different lengths will be apparent when we consider the manipulation necessary to secure the sleeve in place. When the
 50 sleeve 8 is screwed upon the lower end of the piston, its rotation is not interfered with until the cotter springs into the upper end of the longest notch, and if continued rotation is necessary the cotter is depressed to permit
 55 another rotation of the sleeve, a single depression of the cotter being necessary for each complete rotation of the sleeve as it is screwed to place. If all of the notches were of the
 60 same length, the cotter would have to be depressed three times during each rotation of the sleeve, which would be unnecessary and objectionable. It is necessary, however, to supply more than one notch, because after the
 65 sleeve has been screwed to place and it is desired to turn it somewhat to compensate for

wear it is seldom necessary to rotate it more than a part of a rotation. Therefore the second notch is provided of less length than the first, so that while it does not receive the cotter when the sleeve is being first screwed up
 70 it is adapted for its reception during the subsequent rotation of the sleeve to compensate for wear. The same consideration governs the provision of other notches of less length,
 75 so that as the sleeve is screwed farther up during the course of repeated adjustments it is provided with means for holding it for only very slight movement from any given position.

If for any reason it should become necessary to remove either the leather rings or intermediate collars, it is simply necessary to press inwardly upon the depending end of the cotter to withdraw the detent from engagement with the notch in the sleeve, when,
 80 as will be obvious, the latter may be unscrewed and the series of rings and collars removed from the piston.

From the foregoing it will appear that I have produced a novel working valve or
 90 valved piston comprehending means for detachably securing a series of packing-rings, washers, suckers, or buckets against displacement; but while the present embodiment of my invention is believed at this time to be
 95 preferable I wish to reserve the right to effect such changes, modifications, and variations of the structure shown and described as may be fairly comprehended within the scope of the protection prayed.

What I claim is—

1. A valved piston provided with a series of suckers alternating with a series of metal sleeves on said piston, a sleeve screwed upon one end of the piston and provided with a
 105 plurality of notches of different lengths, and a spring-cotter having a detent at its lower end normally in engagement with said screw-threaded sleeve and secured at its upper end by one or more of said alternating metal
 110 sleeves.

2. In a valved piston for oil-wells, a valve-carrying tube provided with an opening in its wall, a spring-cotter having a detent at its lower end and provided at its upper end
 115 with a right-angular lug, one leg of the lug being located within the opening, and the other leg of the lug being disposed against the interior face of the piston, a series of buckets or suckers alternating with a series
 120 of metal sleeves on said tube, a screw-threaded portion at the bottom of said tube, and a screw-threaded sleeve thereon provided with a plurality of notches of different lengths, disposed for engagement with the detent.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JOHN C. SNYDER.

Witnesses:

J. P. PHILLIPS,
 IOLA BICKERSTAFF.