No. 772,728. PATENTED OCT. 18, 1904.

J. E. MERRITT.

OIL WELL PACKER.

APPLICATION FILED MAR. 24, 1904.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

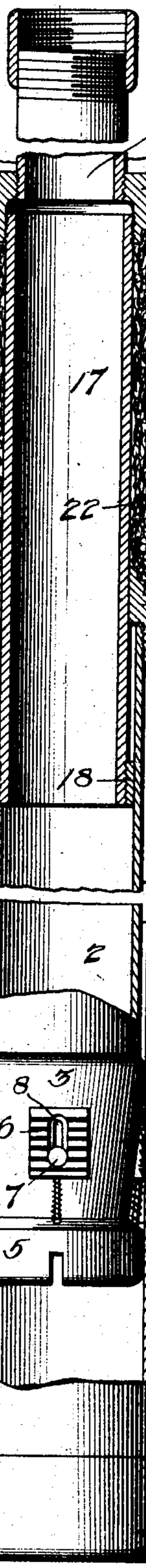


Fig. 3.

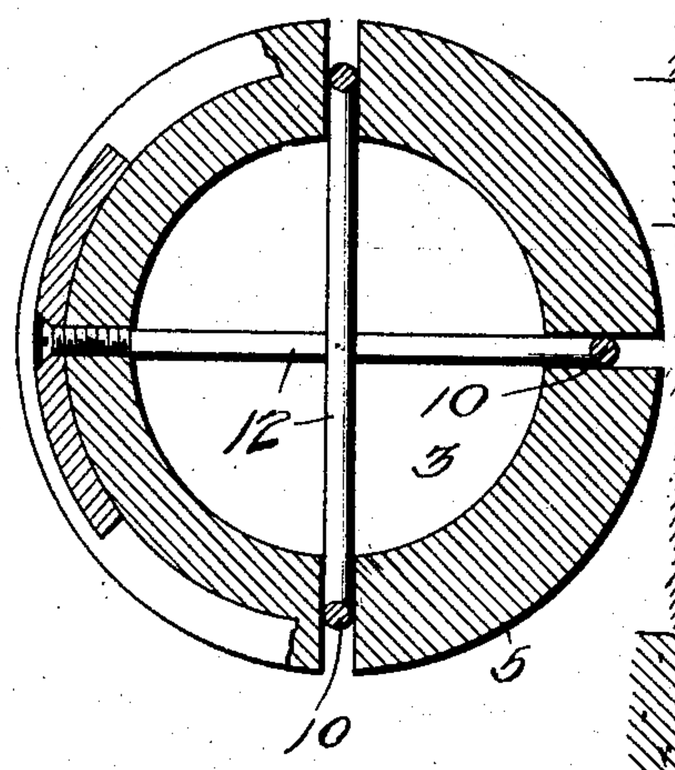


Fig. 4.

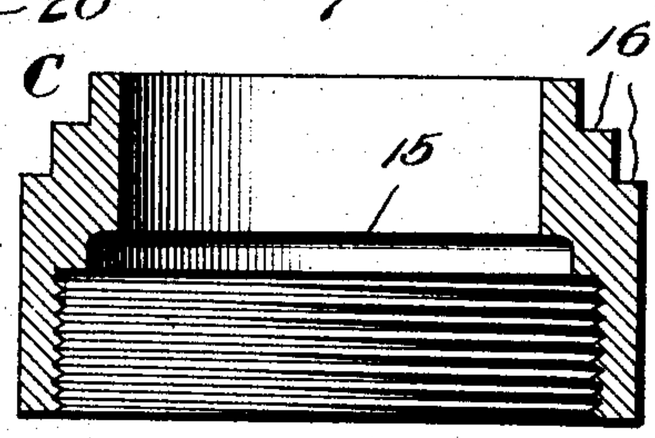
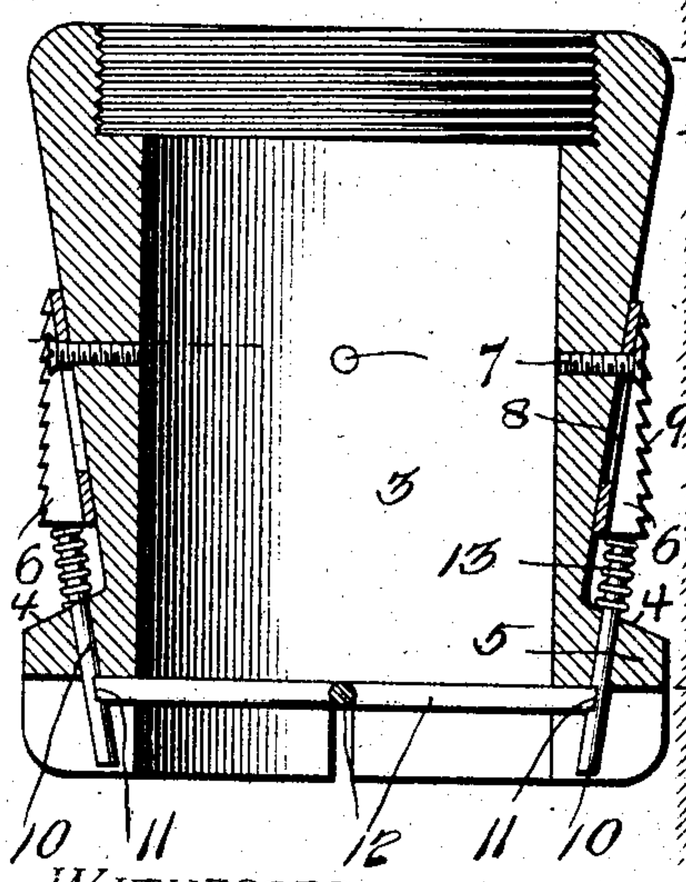


Fig. 2.



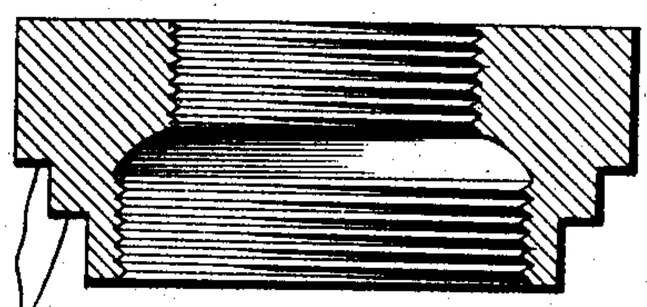


Fig. 5.

WITNESSES:

J. L. Mockabee

D. P. Holkinghton

INVENTOR

Joseph Edgar Merritt;

BY William O. Dame

Attorney

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OIL WELL PACKER.

APPLICATION FILED MAR. 24, 1904.

NO MODEL. 2 SHEETS—SHEET 2.

Fig. 6.

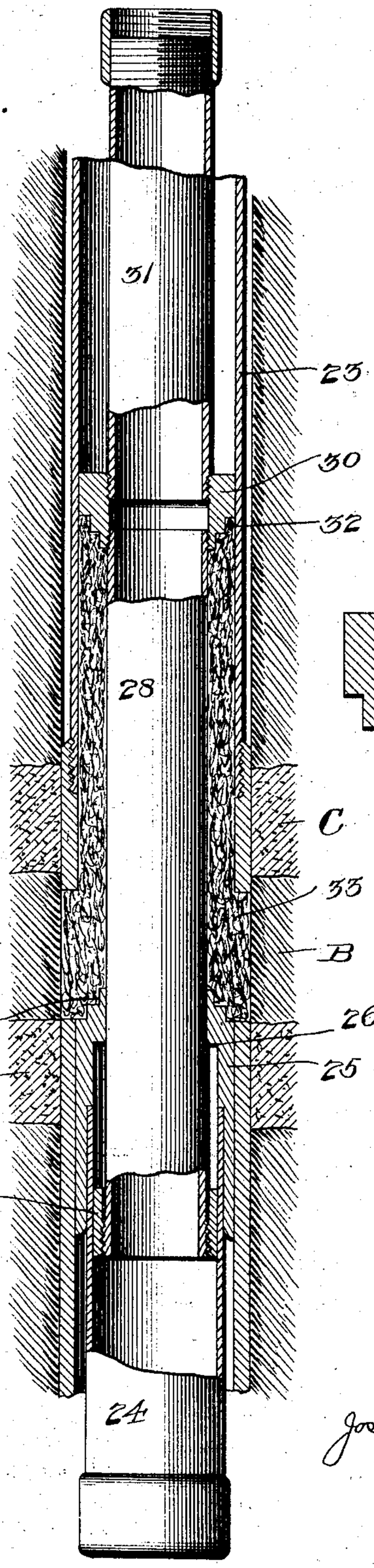


Fig. 7.

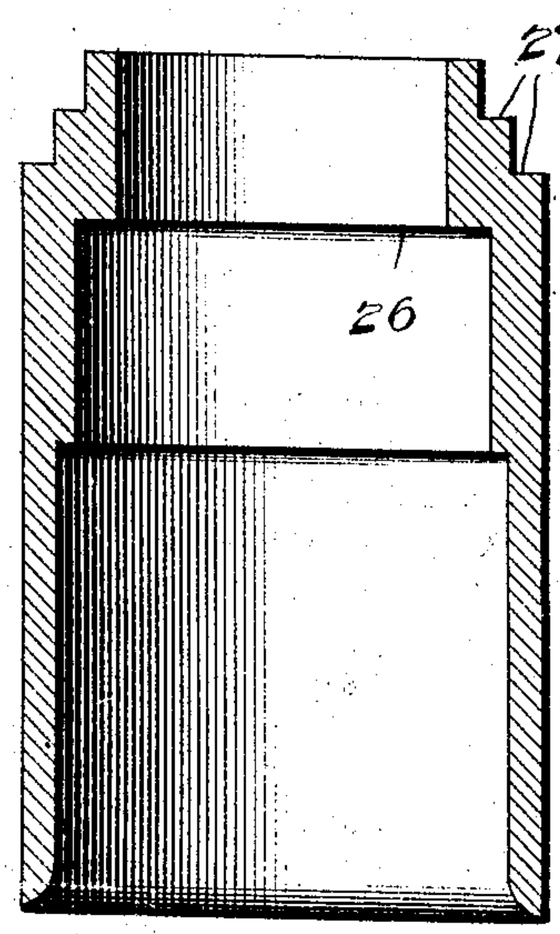
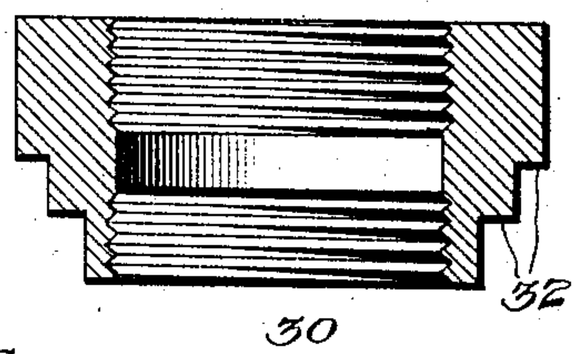


Fig. 8.



WITNESSES:

J. L. Kochersperger

S. P. Hollingsworth.

INVENTOR

Joseph Edgar Merritt,

BY William O. Deane

Attorney

No. 772,728. Patented October 18, 1904.

UNITED STATES PATENT OFFICE.

JOSEPH EDGAR MERRITT, OF BAKERSFIELD, CALIFORNIA.

OIL-WELL PACKER.

SPECIFICATION forming part of Letters Patent No. 772,728, dated October 18, 1904.

Application filed March 24, 1904. Serial No. 199,683. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH EDGAR MERRITT, a citizen of the United States, residing at Bakersfield, in the county of Kern and State of California, have invented certain new and useful Improvements in Oil-Well Packers, of which the following is a specification.

In sinking oil-wells in certain districts it has been found that a stratum of clay from eight to ten feet thick is usually interposed between the lower oil-bearing sand and the upper stratum of water-bearing sand. Great difficulty has been experienced in preventing the water from the upper stratum passing through the clay to the oil-bearing sand by following down the exterior of the casing, thereby filling said oil-bearing sand in the vicinity of the well with water and crowding the oil away from the openings in the casing.

The present invention relates to means for packing the well about the outside of the casing to prevent the passage of the water; and the object of the invention is to provide means of a novel nature which is readily and successfully operable, is entirely efficient in action, and at the same time simple in structure, so that it will not readily become deranged or inoperative. Moreover, when in place it constitutes no impediment to the ordinary use of the well.

Two forms of construction are shown in the present application, these forms, however, being very similar in structure.

In the drawings, Figure 1 is a sectional view through a portion of a well, showing the packer in place therein. Fig. 2 is a sectional view, on an enlarged scale, through the support for the packer. Fig. 3 is a horizontal sectional view through the same. Fig. 4 is an enlarged sectional view through the collar at the upper end of the lower packing member. Fig. 5 is a similar view of the collar at the upper end of the upper packing member. Fig. 6 is a longitudinal sectional view through a slightly-modified form of structure. Fig. 7 is a vertical sectional view, on an enlarged scale, through the collar of the lower member of said modified form; and Fig. 8 is a similar view of the upper collar of the modified form of construction.

The same reference-characters are employed to designate similar parts throughout the various figures of the drawings.

The ordinary well-casing is designated by 1, the oil-bearing sand being shown at A with the cap of clay B thereabove, said clay having superimposed thereon the water-bearing stratum C. This arrangement is illustrated in both forms of the invention.

In the form illustrated in Figs. 1 to 5, inclusive, a lower packing member is provided comprising a tube-section 2, the lower end of which is threaded into a sleeve 3, that constitutes a support for the packing. This sleeve is provided with an annular exterior seat 4, having upwardly and outwardly inclined walls. The lower end of the seat is formed by an enlargement 5, constituting the lower end of the sleeve. Slips or jaws 6 are slidably mounted in the seat and are held in place by screws 7, threaded into the sleeve and passing through slots 8, formed in said jaws. The outer faces of the jaws are serrated to provide transversely-disposed teeth 9. Depending stems 10, carried by the jaws, are slidably mounted in the lower wall 5 and are provided on their inner sides with sockets 11. Holding-keys in the form of rods 12 are arranged to be placed across the lower end of the sleeve with their ends engaged in the sockets 11, thereby holding the jaws in their lowermost position, said keys 12 being detachable, as is hereinafter fully explained. Coiled springs 13, surrounding the upper ends of the stems and bearing, respectively, against the upper end of the wall 5 and the lower end of the jaws 6, serve to urge said jaws upwardly, and consequently outwardly, when released from the keys. The upper end of the packing-member tube 2 is provided with a collar 14. (Illustrated particularly in Fig. 4.) This collar 14 is threaded upon the upper end of the tube 2 and has an interior shoulder 15 and an exterior shoulder formed by its upper end, said exterior shoulder tapering toward its upper end and consisting of a series of annular steps 16. The interior shoulder may be properly termed a "stop," while the exterior shoulder will be designated as a "packing-shoulder." An upper packing member is employed in connec-

tion with the above-described lower member and consists of a tubular section 17, the lower portion of which is slidably telescoped in the lower tube 2. The lower end of the upper section carries an exterior collar 18, threaded thereon and located within said lower tube, said collar 18 coacting with the interior shoulder 15 to limit the upward movement of the upper member. The upper end of the tube 17 has threaded thereon another collar, 19, the lower end of which constitutes a packing-shoulder which coacts with the stepped shoulder 16 of the lower member, the lower end of said collar 19 being tapered, as shown, and being formed into a plurality of annular steps 20. The collar 19 also serves as a coupling between the upper packing member and a supplemental casing or string of tubes, one of which is illustrated at 21. Compressible packing, preferably in the form of hemp 22, is wound about the upper packing-tube 17 below the collar 19 and above the collar 14.

The operation of the packer may be briefly described as follows: The first step is the removal of a portion of the original casing at a suitable point above the oil-sand. This may be readily accomplished by cutting a section of the casing, slitting said section, and removing the pieces by means of a mouse-trap or fishing-tools, thus leaving the desired portion of the hole that it is desired to pack without any casing or tubing in it, (the solidity of the formation keeping the hole open.) The packer is then lowered, by means of the supplemental tubing 21, until the supporting device is in proper position below the break in the original casing. When the desired position has been reached, the mud-bucket on the sand-line is then run through the supplemental casing and dropping upon the holding-keys 12 detaches them from the sleeve and from the stems 10. The jaws being thereby released will be forced upwardly by the springs 13, and consequently outwardly into engagement with the main casing 1. The support will thereby be positioned and located. The lower member of the packer being rigidly supported, the upper member is forced downwardly by means of the supplemental tubing 21. This will cause the lower portion of the upper member 17 to move into the lower member, and the shoulder 20 approaching the shoulder 16 will force the packing material outwardly into the unsupported portion of the hole about the exterior of the lower section of the main casing, thereby stopping all leakage and preventing the flow of water to the oil-sand. Access to the bottom of the well is obtained, however, through the supplemental string of tubing 21 and through the tubes 2 and 17 of the packer.

From the illustrations and the above description it will be seen that extremely simple packing means are provided which may be successfully operated at any desired point to thoroughly pack the well against the passage of water thereabout to the oil-bearing sand.

As an indication of how the structure may be modified attention is invited to the form illustrated in Figs. 6 to 8. The original casing is shown at 23, which casing is cut away in the usual manner. The lower packing member consists, as before, of a tube 24, which, however, is extended to the bottom of the well, and thus constitutes a support for said lower member, the supporting device illustrated in the above-described structure being obviated. This form is employed in wells where there is an inside string of casing that can be cut off and used as a support. The upper end of the tube 24 carries a collar 25, having an interior shoulder 26 and an exterior stepped shoulder 27. The upper packing member comprises a tube 28, that is slidably telescoped within the tube 24 and carries a collar 29, coacting with the interior stepped shoulder 26. The upper end of the tube 28 has a coupling sleeve or collar 30, constituting a connection for the upper supplemental string of tubing 31, this collar 30 being provided with a lower stepped shoulder 32, that coacts with the lower packing member. The usual packing 33 is employed, said packing being interposed between the shoulders 27 and 32. It will be apparent that the operation of this device is exactly the same as that already described, and it is believed no detailed account thereof is necessary.

It will of course be understood that the invention is not limited to the exact details of construction illustrated in the two forms of the invention, but that various changes may be made without departing from the spirit or scope of the invention.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an oil-well packer, a support comprising a sleeve having seats in its outer face, said seats being provided with inclined walls, vertically-sliding tube-engaging jaws arranged in the seats, springs located below the jaws for elevating them, and holding devices extending across the sleeve and detachably engaging the jaws to hold the same in lowered position against the action of the springs.

2. In an oil-well packer, a support comprising a sleeve having seats in its outer face, said seats being provided with lower walls, vertically-sliding outwardly-moving tube-engaging jaws having depending stems slidably mounted in the lower walls and provided with sockets, springs surrounding the stems for elevating the jaws, and holding-rods extending across the sleeve and detachably engaging in the sockets of the stem.

3. In an oil-well packer, the combination of an upper member; a lower member; said members being slidable within each other; a pack-

ing-collar secured to the upper member and formed with a plurality of integral steps on its exterior; a second packing-collar secured to the outside of the lower member and formed with a plurality of integral steps on its exterior corresponding to the steps on the other collar and a shoulder upon its interior; and a packing interposed between said collars.

4. In an oil-well packer, the combination of an upper member; a lower member; said members being relatively slidable; a sleeve secured to the lower member and formed with inclined exterior walls; spring-controlled jaws slidable in ways in said inclined faces; and detachable retaining devices for said jaws.

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

JOSEPH EDGAR MERRITT.

Witnesses:
S. C. SMITH,
M. L. BUTTZ.