

P. D. BOWLER & W. D. DUTTON.
WELL MECHANISM.

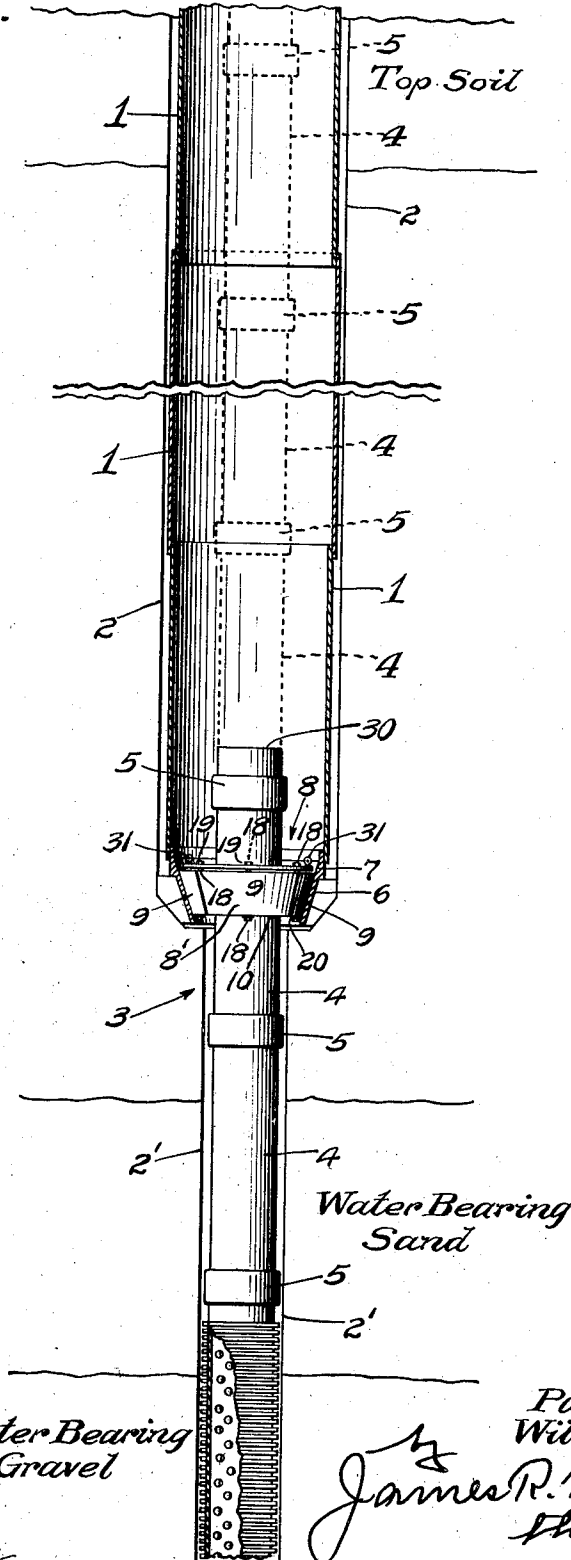
APPLICATION FILED FEB. 11, 1913.

1,079,690.

Patented Nov. 25, 1913.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses
Water Bearing
Gravel
H. N. Lusk
L. Bille Rice

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2 SHEETS—SHEET 2.

Fig. 2.

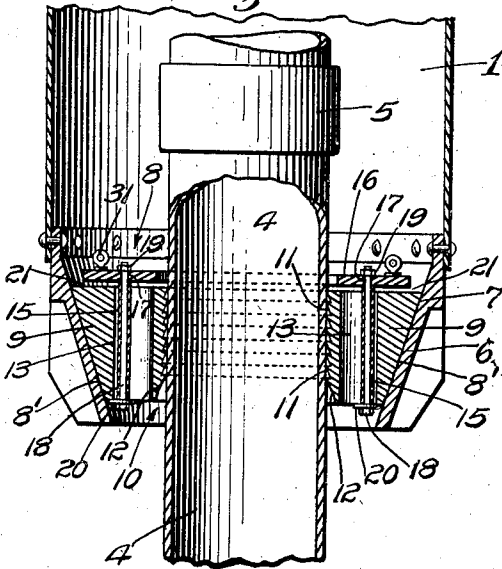


Fig. 3.

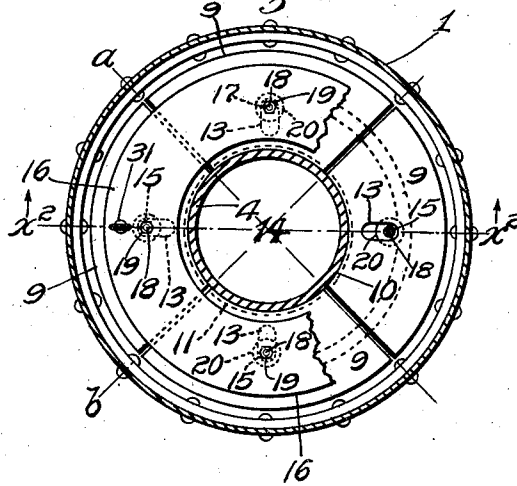


Fig. 4.

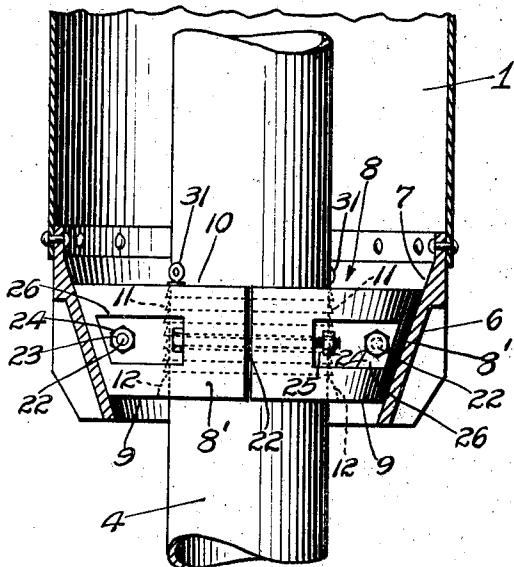
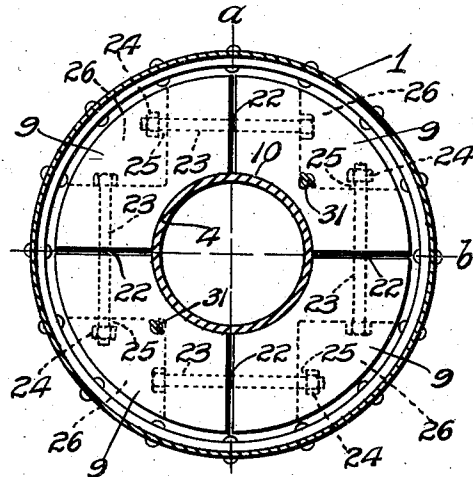


Fig. 5.



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UNITED STATES PATENT OFFICE.

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WELL MECHANISM.

1,079,690.

Specification of Letters Patent.

Patented Nov. 25, 1913.

Application filed February 11, 1913. Serial No. 747,814.

To all whom it may concern:

Be it known that we, PAUL D. BOWLER and WILLIAM D. DUTTON, both citizens of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented a new and useful Well Mechanism, of which the following is a specification.

This invention relates to well mechanism including a pit casing, a well casing, and novel means adapted to be dropped through the pit casing for coupling said casings together and sealing the opening between the same.

It has hitherto been the practice in installing well mechanism of this variety to form the well and pit bores prior to the installation of the casings. The well casing was then lowered into the well bore and the larger pit casing was then lowered over said well casing and down through the larger pit bore. A coupling bushing was usually mounted at that point along the well casing which was calculated to be finally positioned, several hundred feet beneath the surface of the earth often, at the junction of the well and pit bores; and a coupling head was usually attached to the lower extremity of the pit casing, the intention being to lower said pit casing down through the bore and then to manipulate the pit casing so as to interlock the coupling head with the coupling bushing to couple the pit and well casings together, and to seal the opening between the same.

In practising the foregoing mode of installation insurmountable difficulties were often encountered whereby it became impossible to unite the coupling head of the pit casing and the coupling bushing of the well casing and in these instances the well and pit casings were frequently left uncoupled, and such a defective installation though operable was exposed to damage which might cripple the well. The most frequent cause which produced the aforesaid difficulty and defect will now be described. While the pit casing was being lowered over the well casing and down through the pit bore, rocks, boulders and sand were often dislodged from the sides of the pit bore by the descending pit casing and such debris was

precipitated to the bottom of the pit bore, where it buried the coupling bushing located there. When the lower extremity of the pit casing, bearing the coupling head, finally approached the bottom of the pit bore the aforesaid debris intercepted the coupling bushing and the coupling head thereby making it impossible to couple these members together and thus producing the difficulty and defect aforesaid.

This application is a continuation of our former application, Serial No. 726,373, filed October 17, 1912, in so far as said former application relates to its Figs. 5 and 6. This present application illustrates one form of coupling mechanism whereby the aforesaid difficulty may be altogether avoided.

The invention is broadly characterized by the sequence in which the well parts may be assembled, it being possible to install the pit casing first, and the well casing through same, so that the burial of the coupling and the consequent defective installation is altogether avoided. Such matter broadly illustrated and described, but not herein claimed, is reserved for the aforesaid parent application, and the present application is limited somewhat more specifically to the mechanism herein shown.

When installing wells with the mechanism herein shown the pit casing is preferably set into the earth first and the well casing is lowered through it, after which a closure, or coupling means, is permitted to drop, or to pass down, along the length of said pit casing for substantially closing the opening between the well casing and the pit casing. This affords a quick, convenient and practical mode for coupling the casings together, so that neither may be separated from the other, and also for closing the opening between said casings so as to exclude sand from the same.

The accompanying drawings illustrate the invention.

Figure 1 is a vertical section through a portion of the earth and shows a pit and well casing installed and coupled to each other by the novel coupling embraced in this invention. Fig. 2 is a fragmental axial section showing a well and pit casing united

by one form of coupling embraced in this invention. Fig. 3 is a plan view of the mechanism shown in Fig. 2. Fig. 4 is a fragmental section similar to Fig. 2, but shows a modified coupling. Fig. 5 is a plan view of the mechanism shown in Fig. 4.

The pit casing 1 is sunk several hundred feet often into the pit bore 2, Fig. 1, and through said pit casing and into the well bore 2' is then lowered the well casing 3, comprising separate sections 4 united by the externally projecting couplings 5. To the lower extremity of the pit casing 1 is securely attached a coupling head 6, Fig. 2, having an internal aperture 7 of frusto-conical or other suitably tapered form. The coupling 8 is seen to lie within this aperture and comprises a series of coupling members 9, Figs. 3 and 5, the same broadly constituting an annulus axially or longitudinally sectioned preferably along diameters *a* and *b*, the periphery 8' of said annulus being frusto-conical or otherwise suitably tapered and adapted to cooperate with the tapered wall in aperture 7 of the coupling head. Said coupling sections or members are loosely held together around a central aperture 10 through which passes the well casing 3, and the faces of said members bounding said aperture are provided with upstanding teeth 11, or with any other suitable gripping means, for suitably holding the well casing. The coupling means is also provided with a beveled lower edge 12 surrounding well casing 3, the object of said bevel being to spread the sections 9 when said edge contacts with well casing couplings 5 as coupling 8 falls along the well casing and down through the pit casing as will be hereinafter described.

The coupling means 8 may be constructed in various forms, but essentially comprises a series of members loosely held together around the well casing; and the chief difference between the couplings shown in Figs. 2 and 4 resides in the manner whereby said coupling members are held together loosely.

In the coupling shown in Fig. 2 the sections 9 are provided with apertures 13 extending longitudinally through same, and in Fig. 3 these apertures are seen to be elongated toward the coupling center 14. Through each of these apertures passes a hollow cylindrical distance piece 15, of sufficiently small diameter to permit easy motion along the elongated aperture 13, and of a length slightly exceeding the longitudinal length of coupling sections 9. Above sections 9 is positioned an annular collar 16, adapted to abut against the upper extremities of distance pieces 15, and having a series of suitably spaced cylindrical apertures 17, Fig. 2, so that one of said apertures lies over each of the elongated apertures 13 in coupling sections 9. Through the apertures

17 and corresponding distance pieces 15 pass bolts 18 having nuts 19 and washers 20 mounted on their lower ends, said washers being adapted to gap across the elongated apertures 13. When the coupling is assembled, nuts 19 are set up on their respective bolts until distance pieces 15 are nicely fixed between collar 16 and washers 20, there then being an adequate clearance indicated at 21, Fig. 2, between collar 16 and coupling members 9, whereby said coupling members may readily slip radially and may rock with a slight pendulum motion about the longitudinal axis of distance pieces 15.

In view of the comparative freedom acquired by coupling sections 9 by the foregoing compound motion of the sections, the coupling 8 may be slipped over the top of well casing 3, and is well adapted to fall along said well casing and down through the pit casing without binding or hanging itself on either of said casings. When a well coupling 5 is encountered the lower beveled edge 12 of coupling means 8 will contact with same, and in an obvious manner will spread the loosely mounted coupling sections 9, so that same will pass freely over said well casing coupling. When finally the coupling 8 reaches the lower extremity of the pit casing it falls into the tapered aperture 7 of coupling head 6. At this point the tapered external periphery 8' of the coupling contacts with the tapered wall of the coupling head, whereby the latter is well adapted to force the coupling members 9 toward and hard against well casing 3 and into coupling relation with the same, so as to automatically couple the well casing to the pit casing. In order to properly seal the opening between the well casing and the pit casing, the size and proportions of coupling sections 9 are preferably chosen, so that they substantially close together along the splitting diameters *a* and *b* after said sections have been forced into coupling relation by head 6.

In the coupling shown in Fig. 4, the members 9 are loosely held together by means of bolts 22 passing transversely through apertures 23, Fig. 5. These bolts are slightly smaller than the apertures 23, so that the coupling members may slide freely on same, and the nuts 24 are set up loosely on said bolts so as to leave sufficient spreading clearance 25. In order that the nuts and bolt heads may not interfere with the operation of said coupling the same are recessed into notches 26 formed into the tapered periphery 8' of the coupling members. Otherwise the construction and mode of operation of the latter coupling is similar to the coupling shown in Fig. 2.

It will be seen from the foregoing that the bushing 8 not only constitutes a coupling, but also constitutes one form of closure

means for closing the opening between the well casing and the pit casing whereby the sand and gravel are prevented from entering the pit casing. From this viewpoint the element 6 not only constitutes a coupling head, but also a closure supporting means upon which the closure 8 lies after passing down through the pit casing.

The chief advantages of this invention are that the pit casing may be sunk into the earth first and the well casing lowered through it, after which the opening between these set casings may be easily sealed by dropping the closure, or coupling 8, down through the pit casing until it rests upon the closure support or coupling head 6.

In order to secure the basic advantages of this invention, the closure 8 and closure supporting means 6, of course, may be of various forms. The closure need not be sectioned, nor need the closure supporting means be tapered as in the preferred construction herein shown. It will be noticed that the sloping walls, constituting the tapered aperture 7 of head 6, practically form a shoulder upon which the closure rests. This shoulder need not be tapered at all, as shown in this construction, and the closure 8 may be formed as a large annular washer adapted to drop through the pit casing after the well casing has been lowered through same. Such a washer would drop upon any suitable shoulder on head 6 and would be thereby supported. Such an expedient, though crude, would serve to substantially close the opening between the well casing and the pit casing and to exclude the sand from same, and would lie within the spirit of this invention.

Though the preferred construction hereinbefore described shows a closure, or coupling bushing 8, as positively biting the wall casing so as to firmly bind, or couple, the well casing to the pit casing, such biting is really not necessary in order to effect the coupling of the two casings. It is merely necessary that the central bushing aperture 10 be sufficiently small to prevent the casing coupling 5 from passing through it.

As is indicated in Fig. 1, the well casing is cut off at 30, the upper dotted portion of the well casing being then withdrawn. This leaves a casing coupling 5 on either side of bushing 8, and this will prevent the well casing sliding through and completely out of bushing aperture 10. In this sense the two casings are actually coupled together, so that the one may not become disconnected and totally separated from the other. In many instances the depth of head 6 beneath the surface of the earth is very great, so that if bushing 8 were slipped over the well casing and permitted to drop freely along same, it would impact so severe a shock on head 6 as to fracture or otherwise injure parts of

the mechanism. To avoid possible fracture from this source the dropping of bushing 8 is restrained by any suitable means, one of which will now be described. At suitable points a preferable number of eyes 31 are located and a pliable cable (not shown in the figures) is passed through each of said eyes before the bushing starts its descent along the well casing. Both ends of each of these cables are supported from above, and as the bushing passes down through the pit casing the cables are fed to it, so as to permit a restrained dropping of the bushing. Obviously, by this means, no destructive impact will be experienced when the bushing encounters its supporting shoulder on head 6. Though the bushing may be lowered into place by falling through the pit casing either freely, or under restraint, it is to be understood that both of these operations are included in the term "dropping" as used in this specification and appended claims, and that the only limitation on this term is that the bushing shall be propelled downward through the pit casing solely by its own weight.

From the foregoing detailed description it is believed that the construction and mode of using the novel coupling and closure means for coupling well casings of different diameters together, and for closing the opening between same, will be clear.

We claim:—

1. In combination, a pit casing, a well casing formed of sections connected by externally projecting couplings, means sectioned substantially along a longitudinal axis and adapted to pass down through the pit casing for coupling the well casing to the pit casing, said means having a beveled lower edge for spreading the sections of same when said edge contacts with a coupling on the well casing.

2. In combination, a pit casing, a well casing, a series of coupling members surrounding said well casing, means for loosely holding said members together, and a head on said pit casing adapted to force said members tight toward said well casing.

3. In combination, a well casing, a pit casing, and means for coupling the well casing to the pit casing, said means including a sectioned annulus and means for forcing said sectioned annulus tight around said well casing.

4. In combination, a pit casing sunk into the earth, closure supporting means on said casing, a well casing set down into and past said pit casing, and closure means loosely surrounding said well casing for passing down along said well casing and onto said closure supporting means after the well casing has been set into the pit casing.

5. In combination, a pit casing, a well casing, a series of members surrounding said

well casing, means for loosely holding said members together, and a head on said casing adapted to force said members toward each other so as to substantially close the
5 opening between the well casing and the pit casing.

In testimony whereof, we have hereunto

set our hands at Los Angeles, California, this 22d day of January, 1913.

PAUL D. BOWLER.

WILLIAM D. DUTTON.

In presence of—

JOHN A. WINTROATH,

ROBERT A. STEPS.
