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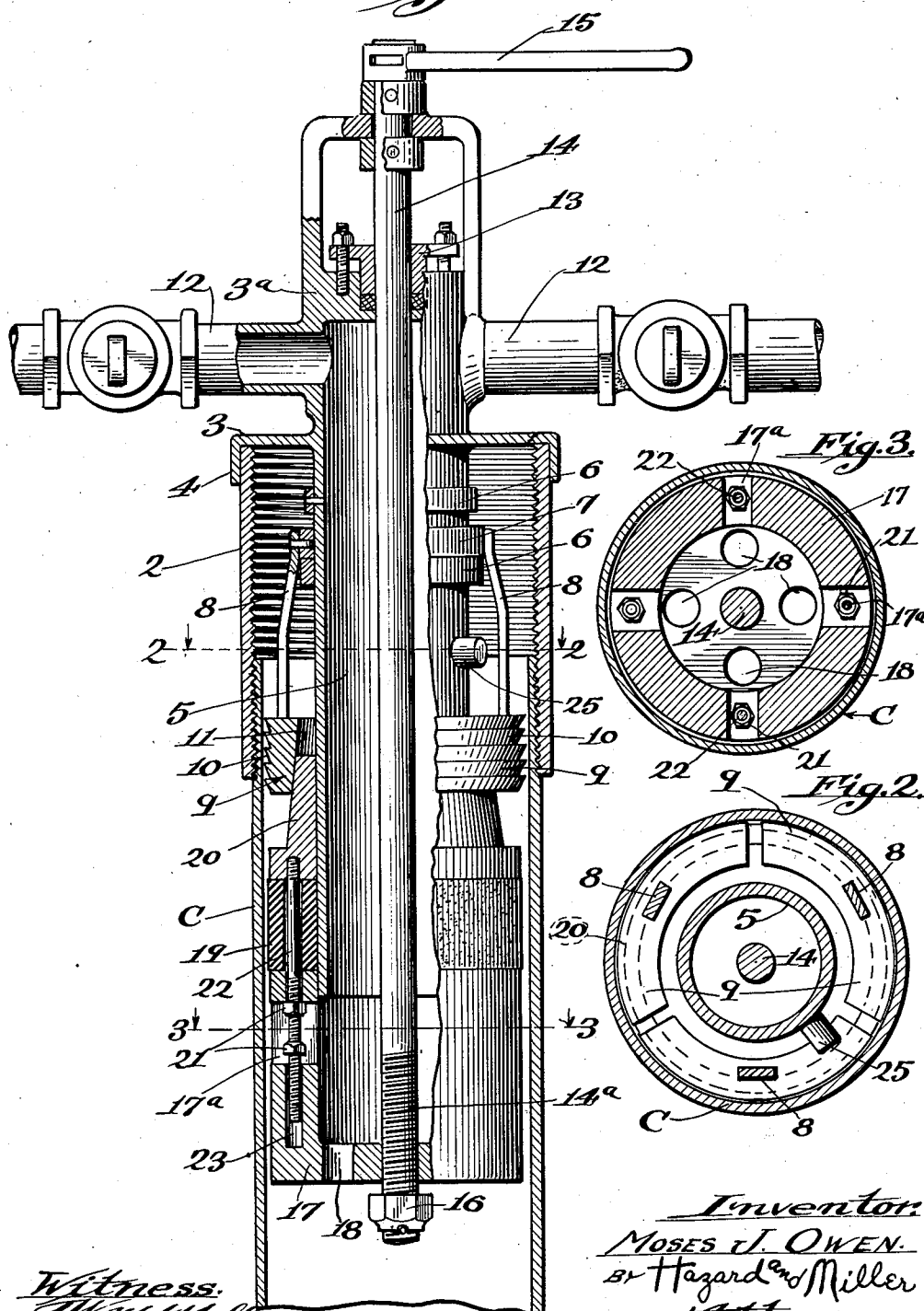
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CIRCULATING AND CEMENT HEAD

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Fig. 1.



UNITED STATES PATENT OFFICE.

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CIRCULATING AND CEMENT HEAD.

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To all whom it may concern:

Be it known that I, MOSES J. OWEN, a citizen of the United States, residing at Long Beach, in the county of Los Angeles and State of California, have invented new and useful Improvements in Circulating and Cement Heads, of which the following is a specification.

This invention relates to deep well casing heads, and has for an object to provide a casing head including means whereby to provide a tight closure between the casing end and the head fittings, and to facilitate the circulation of circulating mud or the introduction of pressure fluid when cementing in.

An object is to provide a combined casing head and packing of simple, inexpensive and practicable form and to provide a casing head having a packing means that may be readily set after the head has been installed on the casing end.

Other objects and advantages will be made manifest in the following specification of an embodiment of the invention illustrated in the accompanying drawings, wherein—

Figure 1 is a central, longitudinal section through the grooved casing head as applied, with the parts in contracted position preliminary to expansion.

Fig. 2 is a cross section on line 2—2 of Figure 1.

Fig. 3 is a cross section on line 3—3 of Figure 1.

The invention is shown as combined with a standard or suitable section of casing C, upon the upper end of which is attached a casing head coupling 2. Upon the coupling 2 there is arranged a casing head including a flange 3, with a peripheral rim 4 adapted to encompass the coupling end. The casing head flange or disc 3 is provided with a downwardly extending, central, hollow mandrel 5, of such length as to project down into the upper end of the casing C, and this mandrel is provided with spaced collars 6, between which is a loose and slidable ring 7, to which is connected the downwardly extending shanks 8 of a set of segmental slips 9, having exterior, toothed surfaces 10 and having interior, upwardly and inwardly inclined surfaces 11.

Projecting up from the head disc 3 is a

head chamber 3^a, having suitable lateral connections 12 for inlet and outlet of fluids. The chamber 3^a is provided with a flat packing gland 13, through which extends a rod 14, rotatably mounted, and being provided with a lever arm 15 by which it may be turned. The lower end of the rod 14 is screw threaded at 14^a and is provided with a shoulder for ended nut 16.

Threaded on the rod threads 14^a is a piston-like member 17, which has apertures 18 for the passage of liquid to and from the casing. The piston is slidably mounted on the lower end of the mandrel 5 and engages the lower end of an annular packing 19, the upper end of which bears against an annular, conical expander 20, the inclined, exterior surface of which is contiguous to the complementary faces 11 of the slips 9. The piston 17 is provided with a plurality of apertures 17^a in its sides, and in these are exposed upper and lower nuts 21 carried on connecting bolts 22, passing through the packing ring 19 and being threaded in the expander 20. The lower ends of the bolts 22 slide freely in pockets 23 provided therefor in the piston 17.

In operation of the improved head, after the parts have been assembled as above described and clearly shown in the drawings, when it is desired to set the slips 9 to expand the packing 19, the lever arm 15 is rotated and results in a rotation of the screw part 14^a in the piston 17, and the latter will be forced to move upwardly. The initial upward movement of the piston causes the expander 20 to force the slips 9 outwardly, until they engage and bite into the contiguous surface of the casing C. As soon as the slips have gripped, further upward movement of the expander is substantially prevented, and therefore the continued upward movement of the piston 17 causes the packing 19 to be compressed between the expander and the piston and solidly jammed against the casing, and also against the engaged surface of the mandrel 5. After the expander has become stationary, the upward movement of the piston causes it to come into contact with the lower nuts 21, and therefore be solidly supported by connecting bolts 22.

In the event that the slips should tend

to turn with the screw part 14^a and its piston 17, a lug 25, fixed on the mandrel 5, will engage a contiguous swinging shank and arrest the rotation of the slips. This insures the positive advancing or upward movement of the piston 17 when the screw part 14^a is turned.

Further embodiments, modifications and variations may be resorted to within the principle of the invention.

What is claimed is:

1. A casing head having, in combination, a mandrel adapted to extend down into the casing, a set of slips attached to the head and operative to engage the inner face of the casing, a packing mounted on the mandrel and adapted to be expanded to engage the casing, a piston on the mandrel against the packing, a rod extending through the casing head and through the mandrel and connected to the piston, and forming means for setting the slips and then causing the packing to be expanded to form a tight joint.

2. A casing head having, in combination, a mandrel adapted to extend down into the casing, a set of slips attached to the head and operative to engage the inner face of the casing, a packing mounted on the mandrel and adapted to be expanded to engage the casing, and means for setting the slips and then causing the packing to be expanded to form a tight joint, said means including a manually operative part extending above the casing head, an expander for engaging the slips and which supports the packing, and a packing compressing member connected to the manually operative part.

3. A casing head having, in combination, a mandrel adapted to extend down into the casing, a set of slips attached to the head and operative to engage the inner face of the casing, a packing mounted on the mandrel and adapted to be expanded to engage the casing, and means for setting the slips and then causing the packing to be expanded to form a tight joint, said means including a manually operative part extending above the casing head, an expander for engaging the slips and which supports the packing, and a packing compressing member, the said member being operatively connected to the said part and shifted thereby.

4. A casing head having, in combination, a mandrel adapted to extend down into the casing, a set of slips attached to the head and operative to engage the inner face of the casing, a packing mounted on the mandrel and adapted to be expanded to engage the casing, and means for setting the slips and then causing the packing to be expanded to form a tight joint, said means including a manually operative part extending above the casing head, an expander for engaging the slips and which supports the packing, and a packing compressing member connect-

ed to the manually operative part, the said expander being slidably mounted on the mandrel.

5. In combination with a casing head adapted to be applied to a casing, a mandrel fixed to the casing head, a screw rod extending through the mandrel and casing head and having an operating handle above the head, an expander movably mounted on the mandrel, a packing substance mounted on the mandrel and bearing against the expander, a set of slips attached to the casing head and engaging the expander, and means connected to the screw rod whereby, when the latter is rotated, the expander engages and sets the slips against the casing surface and compresses the packing substance to make a tight joint between the casing and the mandrel.

6. In combination with a casing head adapted to be applied to a casing, a mandrel fixed to the casing head, a screw rod extending through the mandrel and casing head and having an operating handle above the head, an expander movably mounted on the mandrel, a packing substance mounted on the mandrel and bearing against the expander, a set of slips attached to the casing head and engaging the expander, and means connected to the screw rod whereby, when the latter is rotated, the expander engages and sets the slips against the casing surface and compresses the packing substance to make a tight joint between the casing and the mandrel, said connecting means including a piston-like member slidably mounted on the mandrel and between which and the expander the packing substance is disposed about the mandrel.

7. In combination with a casing head adapted to be applied to a casing, a mandrel fixed to the casing head, a screw rod extending through the mandrel and casing head and having an operating handle above the head, an expander movably mounted on the mandrel, a packing substance mounted on the mandrel and bearing against the expander, a set of slips attached to the casing head and engaging the expander, and means connected to the screw rod whereby, when the latter is rotated, the expander engages and sets the slips against the casing surface and compresses the packing substance to make a tight joint between the casing and the mandrel, said connecting means including a piston-like member slidably mounted on the mandrel and between which and the expander the packing substance is disposed about the mandrel, and bolts connecting the expander and the said member.

8. A casing head having, in combination, a mandrel adapted to extend down into the casing, a set of slips attached to the head and operative to engage the inner face of the casing, a packing mounted on the man-

drel and adapted to be expanded to engage the casing, a piston slidingly mounted on the mandrel, means for setting the slips mounted above the packing, a rod extending from above the casing head through the mandrel and connected to the piston for operating the piston and then causing the packing to be expanded to form a tight joint, and means for limiting rotative tendency of the slips as to the head. 10

In testimony whereof I have signed my name to this specification.

MOSES J. OWEN.