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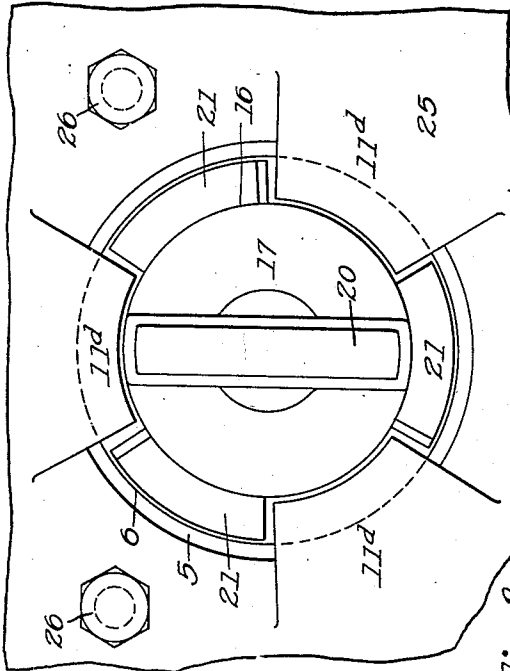
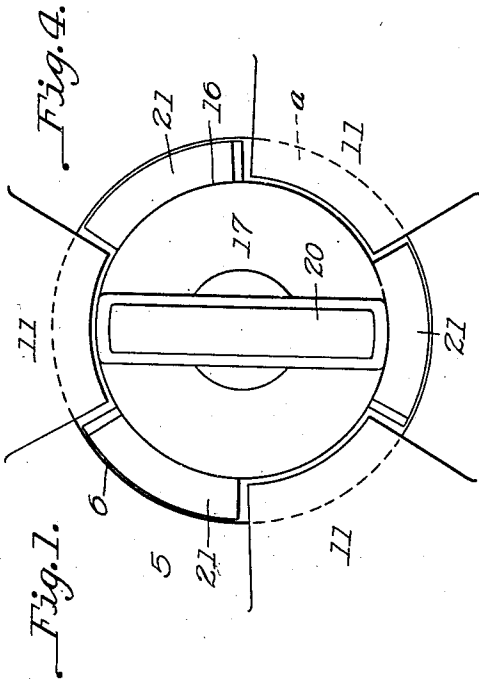
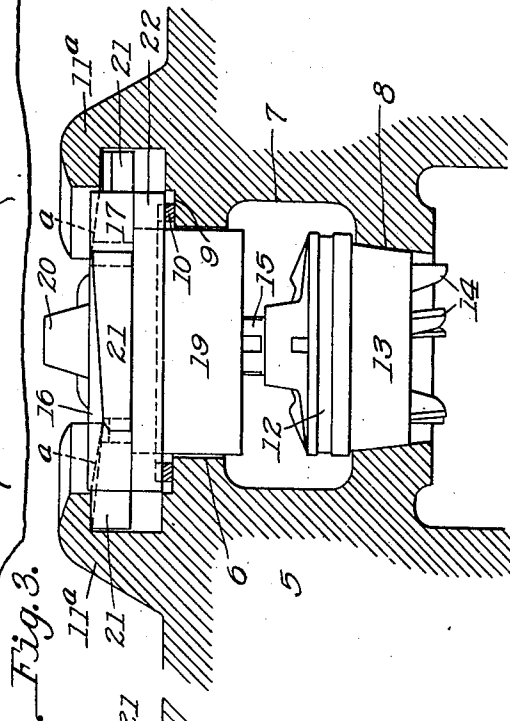
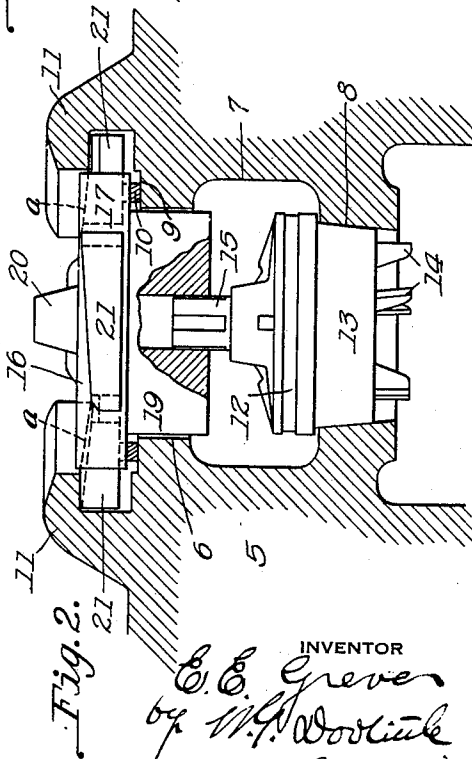
E. E. GREVE

1,929,310

CLOSURE MEANS OR CAP FOR PUMPS

Filed May 10, 1928

2 Sheets-Sheet 1



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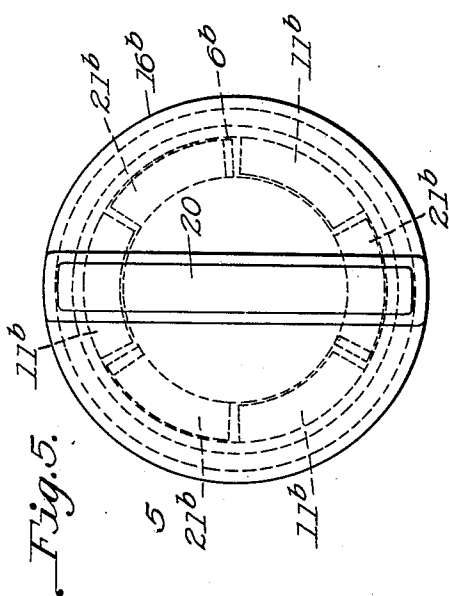
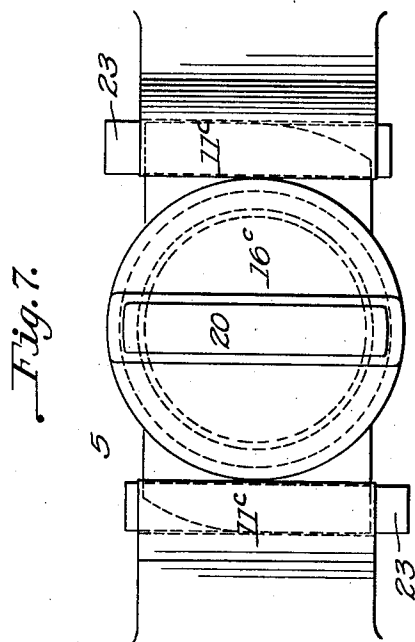
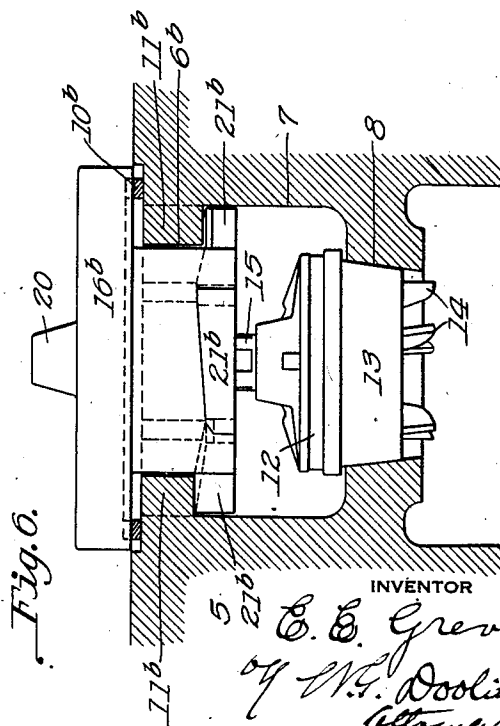
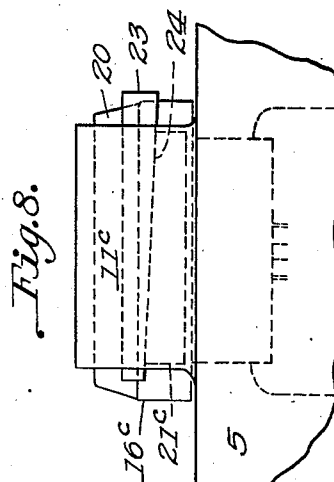
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CLOSURE MEANS OR CAP FOR PUMPS

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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CLOSURE MEANS OR CAP FOR PUMPS

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mesne assignments, to Oil Well Supply Com-
pany, Pittsburgh, Pa., a corporation of New
Jersey

Application May 10, 1928. Serial No. 276,598

4 Claims. (Cl. 103—228)

My invention relates to closure means or caps particularly designed for use in connection with valve mechanism employed for the water cylinders of high pressure pumps of the character employed in the oil fields.

The valve mechanism commonly employed includes a plurality of valves especially designed for handling heavy fluids. These valves are located adjacent the top of the cylinder and are utilized for controlling the passage of fluids through the water cylinder. The caps or closure means are attached to the cylinder directly over the valves, and are utilized for guiding the valves while moving into and out of engagement with the valve seats.

The pumps most commonly employed in the oil fields have eight valves and, of course, eight caps, although some pumps have as many as sixteen valves and caps.

Heretofore, it has been the common practice to attach the caps of the cylinder by means of threaded studs, usually four being employed for each cap, and the time and labor expended in attaching the caps by this method is very considerable. In some instances, these caps have been secured in position by "crow-feet" and bolts, and with this latter method some time has been saved, but this method of attaching is not satisfactory, especially when the pumps are operated on high pressures.

The prime object of the present invention is to provide a cap or closure construction of a character designed to cooperate with the valves, which eliminates the use of studs and other threaded parts and their accompanying disadvantages, and enables the caps to be effectively and quickly positioned on and removed from the cylinders.

A further object is to provide simple and efficient interlocking means, preferably including wedging means, said interlocking means being respectively borne by the cylinder and the cap, and adapted to cooperate to securely lock the cap on the cylinder.

Further objects and advantages of my invention will be apparent from the following description taken in connection with the accompanying drawings, or will be specially pointed out herein. In the accompanying drawings, which illustrate applications of my invention:

Fig. 1 is a top plan view of a portion of a water cylinder, showing the cap thereon in unlocked position;

Fig. 2 is a part vertical sectional and a part

elevational view, showing the cap in locked position on the cylinder;

Fig. 3 is a view similar to Fig. 2, showing a modified form;

Fig. 4 is a top plan view of a modified form, showing the cylinder locking means carried by a plate detachably secured thereto by bolts, and the cap in unlocked position;

Fig. 5 is a top plan of a still further modified form;

Fig. 6 is a part vertical sectional and a part elevational view of the form of Fig. 5, showing the cap in locked position in the cylinder;

Fig. 7 is a top plan of a further modified form, particularly showing a different form of locking means; and

Fig. 8 is a detail elevational view, particularly showing the locking means of the form of Fig. 7.

Referring to the drawings, 5 indicates generally a portion of a water cylinder structure of a pump of the character extensively used in the oil fields, and 6 a valve-receiving opening disposed adjacent the upper end of the water cylinder. The bore of said opening is enlarged, as shown at 7, to form an annular chamber, and is contracted to provide a tapered annular wall 8 for the reception of a valve seat. Surrounding the upper end of the opening 6, the cylinder is cut to form a ledge 9, said ledge 9 being designed to support a packing 10.

In the forms of Figs. 2 and 3, the cylinder structure adjacent the opening 6 is formed with integral lugs 11 and 11a respectively. These lugs constitute the cylinder locking members or means, and are designed to cooperate with locking means borne by the cap closure, as hereinafter described. As shown, the inner contact face of each lug is tapered, as indicated at a. The lugs 11a of the form of Fig. 3 are of slightly greater height than the lugs of the form of Fig. 2; otherwise the portions of the cylinder shown by the two figures are similar.

The opening 6 is designed to receive a removable valve of the type so generally used in pumps of this character. This valve 12 is adapted to be seated upon an annular valve seat 13, positioned on the tapered wall 8 of the cylinder structure. Valve 12, as illustrated includes downwardly extending guide members 14 adapted to engage the interior wall of the valve seat and with an upper guide portion 15 adapted to cooperate with means carried on a closure or cap 16 for guiding the valve.

The cap or closure means 16 comprises a flat annular plate portion 17 having a depending

annular member 18 formed with means 19 co-operating with the guide means 15 of the valve, and with an up-standing member 20 that may be used for rotating the cap when applying and disconnecting it to the cylinder structure. In addition to the parts mentioned, the cap is formed with a plurality of spaced-apart locking means 21. These means are in the form of lugs projecting outwardly from the plate portion 17. The upper contacting faces of these lugs are tapered to cooperate with the tapering contacting faces of the locking lugs borne by the cylinder.

In the form of Fig. 3, I have provided a ring-like member 22 disposed between the lower face of portion 17 of the cap and the packing 10, the purpose of this member 22 being to protect the packing from wear during the rotative movement of the cap when applying it to or removing it from the cylinder.

The modified form of Fig. 6 shows the cylinder opening 6b of slightly different shape than the openings 6 of the form of Figs. 2 and 3, and the cylinder locking members 11b located within the opening or bore and extending below the upper surface of the cylinder, instead of projecting above the same. This form also shows the packing 10b differently located. The locking lugs, or members 11b in this form have tapered contacting faces adapted to engage the tapering faces of the locking lugs 21b of cap 16b.

In the form of Fig. 7, I provide separable wedge members 23 having tapering faces 24 designed to be driven between the lugs 11c of the cylinder and the tapered faces of the lugs 21c of the cap 16c.

The form of Fig. 4 shows a construction having the cylinder locking means 11d mounted on a separable plate 25, the latter being designed to be attached to the cylinder by bolts 26.

In all of the forms illustrated, the interlocking means of the cap and cylinder are of such construction that the cap may be readily locked to and unlocked from the cylinder.

In the use of the invention, the valve being introduced through the opening in the cylinder head and placed on its seat with its stem extending upward, the cap is first lowered to its seat with the guiding portion 19 engaging the valve stem loosely. This holds the stem against lateral movement with only sufficient play to permit adjustment to its seat, with its vertical movement limited by the shoulder at the lower end of the stem 15 and with freedom for relative movement rotatably. In lowering the cap, the projections thereon are in vertical alignment with the space between the projections on the cylinder head, so that the cap rests loosely on its seat.

Finally, by rotating the cap through a fraction of a complete turn, the projections thereon are brought under the projections on the cylinder head and the cap is pressed against the packing ring on the head and held in place firmly. By an equally quick movement, partially rotating and then lifting the cap, it is withdrawn to permit inspection, removal and, if necessary, replacement of a valve.

The construction is of the simplest, the cap and the valve are single units easily handled and easily set in proper relation in the cylinder head. Where a pump has a multiplicity of such valves, the inspection and restoration of the parts takes only a small fraction of the time involved with similar pumps of previous constructions.

I claim:

1. In a pump of the class described, cylinders having heads in which are valve seats adapted to co-operate with valves having upwardly projecting stems, enlarged chambers above said valve seats and openings beyond said chambers large enough to permit insertion and withdrawal of the valves, in combination with caps for closing said openings, said cylinder heads having projections spaced about said openings and each of said caps having a guiding element adapted to engage the stem of a valve with freedom of relative movement rotatively and, to a limited extent, vertically and having spaced projections adapted to pass vertically between the projections about the opening and to interlock therewith and to press the cap against the head by a rotating movement of less than a complete turn, so that the caps guide the valves and hold them in place and are quickly removable and replaceable to permit inspection, removal and replacement of the valves.

2. The pump of claim 1, the cylinder head carrying a packing ring located inwardly from its projections for engagement by the cap when the latter is inserted in position to engage the valve stem.

3. The pump of claim 1, the cylinder head carrying a packing ring located inwardly from its projections for engagement by the cap when the latter is inserted in position to engage the valve stem, the cap carrying a metal ring rotatably mounted thereon in position bearing against said packing ring.

4. The pump of claim 1, the cylinder head carrying a packing ring located outwardly from its projections and the cap having an outer portion adapted to engage said packing ring when the cap is inserted in position to engage the valve stem.

EDGAR E. GREVE.