Sept. 25, 1934. J. J. FERLIN 1,974,986

CEMENT HEAD

Filed March 31, 1930

Fig. 1.

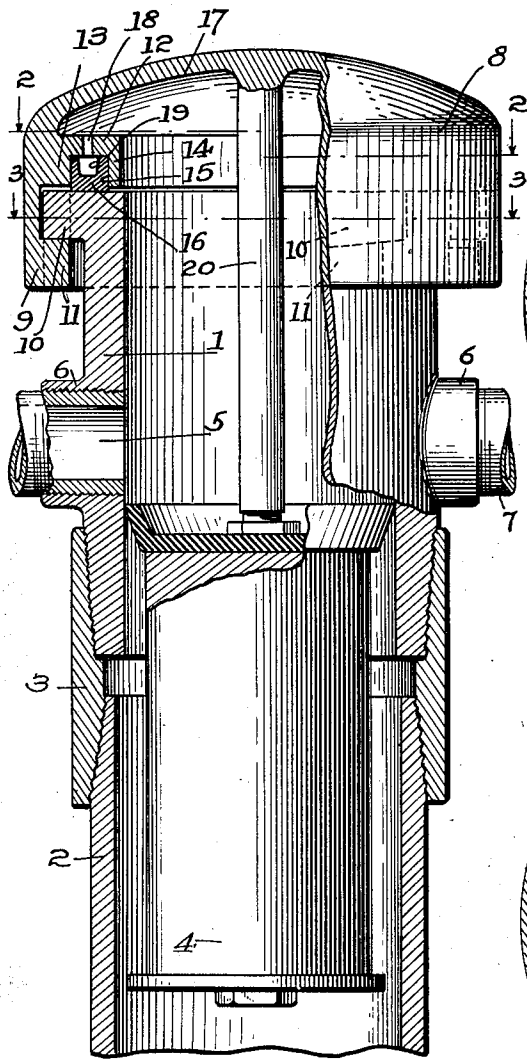


Fig. 2.

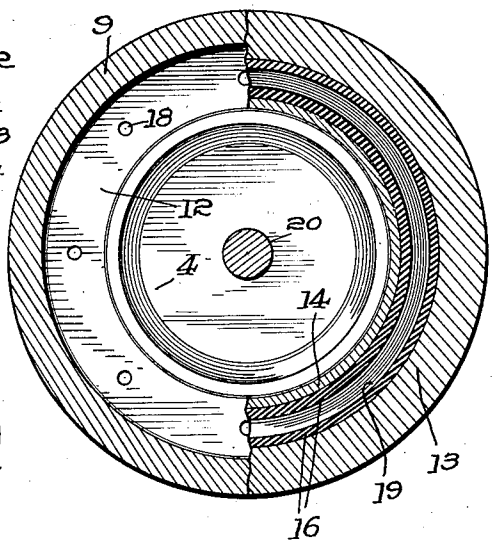
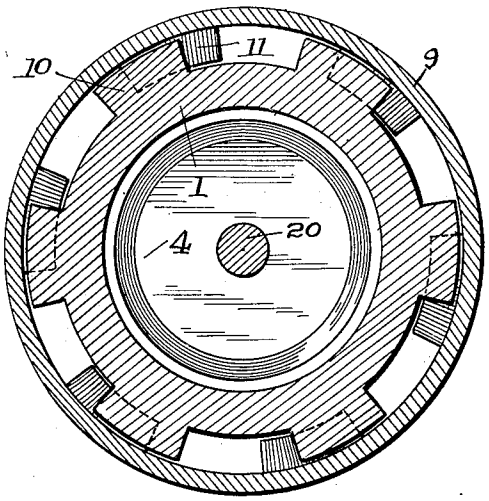


Fig. 3.



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CEMENT HEAD

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2 Claims. (Cl. 220—46)

This invention is a cement head for well casing; and has for its object to provide a construction whereby the closure means for the head is readily detachable and is adapted to be tightly packed-off when in operative position, with operative assembly of the closure means preferably assuring the cement plug which is placed in the head being lowered to a point where it will not obstruct the supply port of the head.

More particularly it is an object of the invention to provide simplified means for utilizing the pressure in the cement head for packing-off its closure means, with the closure means preferably having an external quick-detachable engagement with the head, and annular packing preferably provided between the closure means and the head and arranged whereby pressure in the head is preferably exerted against a channeled surface of the packing for radially and axially expanding it to operative position.

It is a further particular object of the invention to provide the closure means with a depending abutment adapted to engage the cement plug which is placed in the head prior to assembling the closure means, so that connecting the closure means to the head will force the cement plug downwardly to a point where it will clear the lateral supply port of the head, and will thus avoid the possibility of the cement plug overlying and closing the supply port as a result of careless assembly.

Further objects of the invention will be readily understood from the following description of the accompanying drawing, in which:

Fig. 1 is a side elevation of the cement head, partly in axial section.

Figs. 2 and 3 are transverse sections on the lines 2—2 and 3—3 respectively of Fig. 1.

The cement head comprises an annulus 1 adapted for mounting on well casing 2, and in the present instance is shown connected to the well casing by a usual threaded coupling 3. The annulus 1 has an open bore adapted to receive a usual cement plug 4 such as is lowered into the well casing in advance of cement, and the annulus 1 is laterally ported for supplying the cement, as for example at diametrically opposite ports 5 which are provided with usual couplings 6 for connecting supply pipes 7.

A closure cap 8 is mounted on annulus 1 after the plug 4 is in place, and is adapted for quick-detachable engagement, as for example by flanging the cap as shown at 9 for reception of the flange over the end of annulus 1, with circumferentially spaced exterior lugs 10 on the annulus 1 adapted for usual readily releasable bayonet-slot engagement by cooperating circumferentially spaced internal lugs 11 on the flange 9. The cooperating engaging surfaces of lugs 10—11 are inclined as clearly shown by dotted lines at the right of Fig. 1, and thus form cooperating cam surfaces so that when the cap 8 is turned to locked position on annulus 1 the cap is drawn down against the annulus.

The closure cap is packed-off relative to annulus 1, preferably between the bore of the annulus and the detachable connection 10—11, and the packing is preferably arranged for operative expansion by the pressure in the cement head. As an instance of this arrangement the cap 8 and the end of the annulus 1 form cooperating abutment surfaces, one of which is grooved for reception of packing. In the present embodiment of the invention the packing is mounted on head 8, and for this purpose the head has an internal annular flange 12 terminating in depending radially spaced axial flanges 13—14 so as to form an annular groove 15 overlying the end of annulus 1 when the closure cap is operatively assembled, and a packing annulus 16 is mounted in groove 15 so as to engage the end of annulus 1 and thus provide a sealing engagement when the cap is drawn down against the annulus by the action of the cooperating cam surfaces of lugs 10—11.

Above the flange 12 the cap 8 preferably forms a dome 17, with ports 18 opening axially through the flange 12 from the dome 17 to the annular groove 15 so that the pressure in the cement head is transmitted to the annular groove 15 and is thereby directed against the packing annulus 16 for operatively expanding it against the end of annulus 1. The back of the packing annulus is preferably channeled at 19 in alinement with ports 18, so that in cross-section the packing is U-shaped as shown in Fig. 1, and the pressure from the cement head is thus adapted to radially expand the U-shaped packing against flanges 13—14 and also axially expand the base of the packing against annulus 1 in order to insure a fluid tight closure for the removable cap of the cement head.

In operation when the cap 8 is first mounted on annulus 1 the face of the packing 16 is seated on the end of the annulus by the cooperating cam surfaces of lugs 10—11 drawing the cap down against the annulus and fluid pressure in the cement head is thus sealed-off from the face of the packing, so that no fluid pressure is exerted against the packing in a direction tending to de-

stroy the sealing engagement but is directed through the ports 18 and against the back of the packing so as to exert pressure in the opposite direction for tightening the sealing engagement of the packing against the end of the annulus. It will thus be seen that irrespective of irregularities in the proximate surfaces of flange 14 and annulus 1, the cam surfaces of lugs 10—11 seat the packing on the annulus so that there can be no seepage at the face of the packing such as would result in a balanced fluid pressure against the packing, but on the contrary the entire fluid pressure is directed through ports 18 and against the back of the packing in a direction to increase the sealing engagement of the packing against the annulus.

Heretofore, due to careless assembly, the plug which is adapted for reception in a cement head has often been placed at a point where it does not clear the lateral supply ports of the cement head but overlies and closes the ports so as to prevent cement being supplied to the head, and in order to avoid such inoperative assembly the present invention provides for positively lowering the cement plug 4 to a point where it will clear the ports 5, irrespective of any carelessness on the part of the operator. For this purpose an abutment shown as a rod 20 depends concentrically from closure cap 8, and is of a length whereby it will extend below ports 5 when cap 8 is operatively assembled, so that impingement of the rod against the plug 4 which has been placed in the cement head, will lower the plug to a point where it will clear the ports 5 and thus insure free flow of cement into the head.

I have thus provided a cement head having a quick-detachable closure means which may be tightly packed-off by the pressure in the head and which when operatively assembled is adapted to lower a cement plug in the head to a point where it will not obstruct the inlet ports for the cement.

It will also be noted that the invention provides an extremely simple construction adapted for quick-detachable, packed-off operative mounting of the closure cap 8 on the annulus 1, by simply engaging the bayonet slot connections 10—11 and without the necessity of mechanism other than the rod 20 depending from the closure cap; and that the packing is adapted for mounting in groove 15 formed in an integral structure which includes the radially spaced walls 13—14, with the packing when mounted in the grooved flange of the closure cap longitudinally spaced inwardly from the forward end of the depending flange 9, which is adapted for reception on annulus 1 overlying the bayonet slot connections 10—11. The packing is thus held against displacement and both the packing and the bayonet slot connections are protected against injury when the closure cap is subject to the usual rough handling incident to its removal and replacement, and during such removal and replacement there are no movable nor adjustable parts of the closure cap, but only the rod 20, projecting below the depending flange 9 where they might be clogged or broken.

I claim:

1. A cement head comprising an annulus having an open bore, a closure cap adapted for mounting on the annulus and having a depending flange at its outer periphery adapted for reception over the annulus, the outer surface of the annulus and the depending flange having a quick-detachable locking engagement, said locking engagement including means for drawing the closure cap toward the annulus, an internal flange in the closure cap above the lower end of the depending flange, the interior of the closure cap providing communication between the bore of the annulus and the upper face of said flange when the closure cap is in operative position, a groove in the lower face of the internal flange, packing in said groove adapted for abutment by the internal flange so as to be forced into sealing engagement with the end of the annulus by movement of the closure cap toward the annulus, and a port opening through the internal flange into the packing groove and adapted to direct pressure from the bore of the annulus against the back of the packing for increasing the sealing engagement.

2. A cement head comprising an annulus having an open bore, a closure cap adapted for mounting on the annulus, a locking engagement between the annulus and closure cap at the outer periphery of the annulus, said locking engagement including means for drawing the closure cap toward the annulus, an internal flange in the closure cap, a groove in the internal flange, packing in said groove adapted for abutment by the internal flange so as to be forced into sealing engagement with the end of the annulus by movement of the closure cap toward the annulus, and a port opening through the internal flange into the packing groove and adapted to direct pressure from the bore of the annulus against the back of the packing for increasing the sealing engagement.

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