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ATTACHMENT FOR WELL PUMP PLUNGERS

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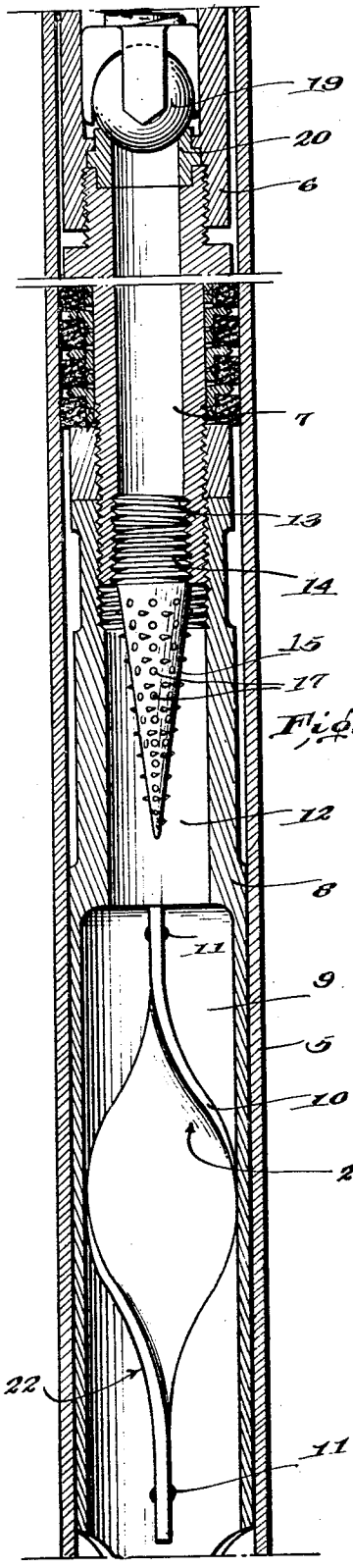


Fig. 1.

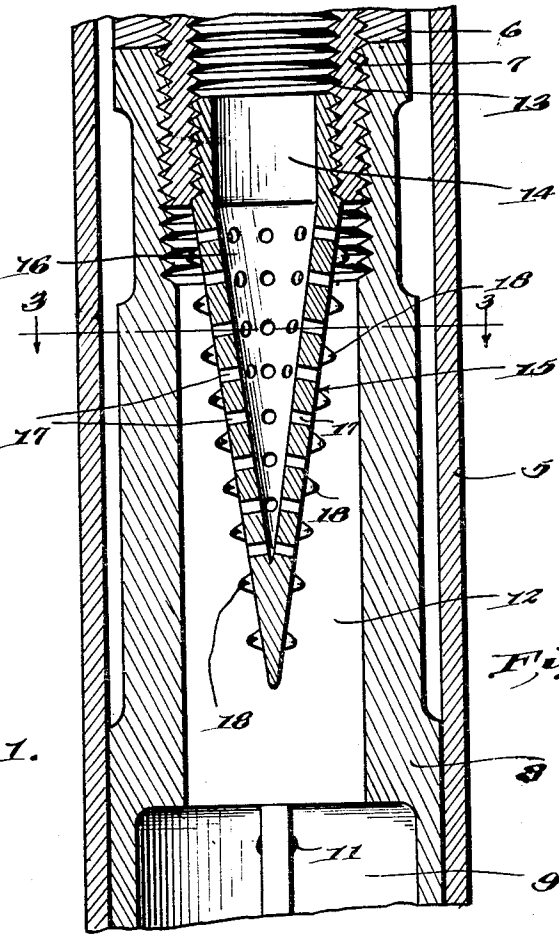


Fig. 2.

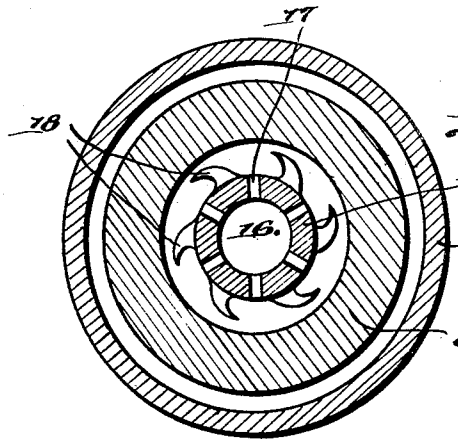


Fig. 3.

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ATTACHMENT FOR WELL PUMP PLUNGERS

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Application April 28, 1931. Serial No. 533,513

6 Claims. (Cl. 103—204)

My invention relates to an attachment for well pump plungers and embodies certain features of the invention disclosed in my co-pending application, Ser. No. 506,472, filed January 3, 1931.

After a well has been cemented it is the practice to bail out the well and attempt to remove all the foreign matter consisting of portions of the cementing plug and packing which are left at the bottom of the well. While this bailing operation results in the removal of a majority of the foreign matter, it has been the experience of operators in most cases that all new wells give a great amount of trouble due to the fact that solid matter works into the pump plunger and to the seat of the ball valve thereby preventing the valve from properly closing and necessitating pulling of the pump from the well to remove the obstruction. While various means such as screens and perforated baffles have been provided to prevent the foreign matter from reaching the ball valve, these various devices have proven very unsatisfactory as they soon become so clogged up as to prevent free flow of oil through the plunger.

With these conditions in mind, the present invention has as its principal object the provision of means for preventing the jamming of the ball valve of a pump plunger by solid matter in the well.

A further object of the invention is to provide a means for disintegrating or tearing any solid matter into small pieces so that the same may easily pass through the plunger without jamming the ball valve.

A still further object of the invention is to provide a means for inducing a swirling action of the liquid prior to its passage into the ball valve and to provide means within the path of the swirling liquid to cut up or disintegrate any solid matter carried in the stream of fluid.

A still further object of the invention is to provide such a means, which may be termed a digesting mechanism for an oil pump which may be formed as an integral part of new pumps or which may be added as an attachment to pumps now in use.

Other objects and advantages will become apparent during the course of the following detailed description when read in conjunction with the accompanying drawing which forms a part of this specification and in which:

Figure 1 is a vertical sectional view of a pump plunger embodying my invention;

Fig. 2 is an enlarged central vertical sectional view of the disintegrating attachment; and

Fig. 3 is a horizontal section taken on the line 3—3 of Fig. 2.

Referring now to the drawing in detail, wherein like reference numerals refer to like parts throughout the same, 5 indicates a well tubing in which a well plunger 6 is disposed for vertical reciprocation in the usual manner. The plunger 6 is made up of a plurality of threadedly connected sections, the uppermost one of which is threadedly connected with the lowermost of the usual string of pump operating rods (not shown). The plunger 6 includes a vertically extending tubular conduit 7 which has its lower end threadedly engaged within the upper end of a cylindrical member 8. The lower end 9 of the bore of the cylinder 8 is preferably slightly enlarged with respect to the upper end thereof.

A baffle 10 of substantially spiral form is fitted within the enlarged bore section 9 of the cylinder 8. This spiral baffle is preferably in the form of a twisted blade and is formed from a flat piece of steel or the like substantially equal in width to the internal diameter of the bore section 9. The baffle or blade 10 is secured within the cylinder by means of spot welds 11 or in any other suitable manner.

The blade or baffle 10 is twisted in a direction so that oil passing upwardly through the cylinder 8 will strike the under face 22 of the spiral and thereby exert sufficient force on the cylinder 8 and the remainder of the threadedly connected sections and rods as to maintain said sections and rods in tightly threadedly engagement.

It will be noted that as the upwardly flowing liquid passes through the spiral conduit formed by the baffle 10 and the bore 9, a circular current will be induced and a swirling action imparted thereto as it discharges from the spiral 10 into the upper section 12 of the bore of the cylinder 8. The spiral current will continue the whirling action induced by the baffle 10 as the liquid rises in the cylinder 8.

The lower end of the conduit 7 is interiorly threaded as at 13 for the reception of the cylindrically-threaded end 14 of the depending conical disintegrating baffle element 15, the apex of the conical member 15 is centrally disposed within the bore 12 and it terminates just above the upper end of the spiral baffle 10. The base of the conical member 15 terminates at the lower end of the conduit 7 merging into the cylindrical curved end 14. The conduit 7 and the interior 16 of the cone 15 are placed in communication with the bore 12 by means of a plurality of apertures 17 extending through the wall of said cone.

For the purpose of tearing up or disintegrating any solid matter which may enter the pump plunger and which is carried by the swirling fluid discharged into the bore section 12, the outer surface of the cone 15 is provided with a plurality of pointed studs or hooks which are curved in a direction counter to the direction of the swirling current entering the bore section 12 from the bore 9. The curved studs or hooks 18 have their forward edges and ends sharpened so as to present a series of pointed barbs which will act to disintegrate or tear to pieces any solid matter which is brought into contact therewith by the upwardly travelling spiral current.

The oil and small particles of solid matter pass through the apertures 17 into the conduit 7 and thus upwardly past the ball valve 19 which on the upstroke of the plunger 6 rests upon a seat 20. Any particles of solid matter which are small enough to pass through the apertures 17 will readily pass the ball valve seat without tending to clog the seat up or prevent seating of the valve.

In the operation of the pump plunger upon a down stroke thereof, liquid will be forced upwardly through the bore 9 in a spiral path due to the baffle 10 and into the lower section 12. Any solid matter which may be carried by the liquid will be thrown violently against the sharpened barbs or hooks 18 and will be torn to shreds by these barbs. This operation continues during the operation of the pump until the solid matter is torn into such small pieces as to pass through the apertures 17 and thus travel on through the pump and tubing to the top of the well. It will be noted that the cone 15 performs all the functions of previously known sieve or screen elements and in addition when combined with the spiral baffle 10 performs the added function of chewing up any solid matter presented thereto.

While a preferred embodiment of the invention has been shown and described, it will be understood that various changes in the details of construction may be made without departing from the spirit of the invention as defined by the appended claims.

I claim:

1. In a well plunger having a liquid conduit, a spiral baffle in said conduit, an inverted conical baffle within said conduit having its apex positioned adjacent the discharge end of said spiral baffle, and a cutter carried by said conical baffle.

2. In a well plunger having a liquid conduit, a spiral baffle in said conduit, an inverted conical baffle within said conduit having its apex positioned adjacent the discharge end of said spiral baffle, and a plurality of barbs carried by said conical baffle.

3. In a well plunger having a liquid conduit, a spiral baffle in said conduit, an inverted conical baffle within said conduit having its apex positioned adjacent the discharge end of said spiral baffle, and a plurality of barbs carried by said conical baffle, said barbs being curved in formation and directed counter to the direction of discharge from said spiral.

4. In a well plunger having a liquid conduit, a conical perforated baffle substantially closing said conduit, a cutter carried by said conical baffle, and means for inducing a swirling current in the liquid passing through said conduit adjacent said baffle.

5. In a well plunger having a liquid conduit, a conical perforated baffle substantially closing said conduit and having its apex directed counter to the direction of flow of liquid therethrough, a plurality of barbs carried by the outer face of said baffle, and means for inducing a swirling current in the liquid passing through said conduit adjacent said baffle.

6. In a well plunger having a liquid conduit, a conical perforated baffle substantially closing said conduit and having its apex directed counter to the direction of flow of liquid therethrough, a plurality of barbs carried by the outer face of said baffle, and means for inducing a swirling current in the liquid passing through said conduit adjacent said baffle, said barbs being curved in formation and directed counter to the direction of the swirling current.

JOHN W. PIPPIN.