A. S. JONES.

WELL CLEANING DEVICE.

APPLICATION FILED FEB. 27, 1919.

1,317,192. Patented Sept. 30, 1919.

Fig. I.

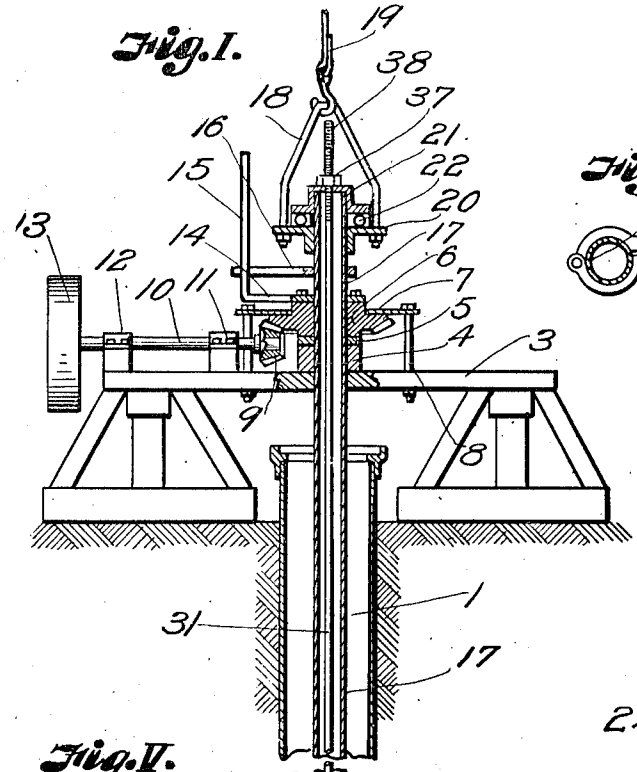


Fig. VI.

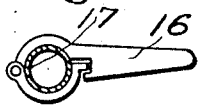


Fig. II.

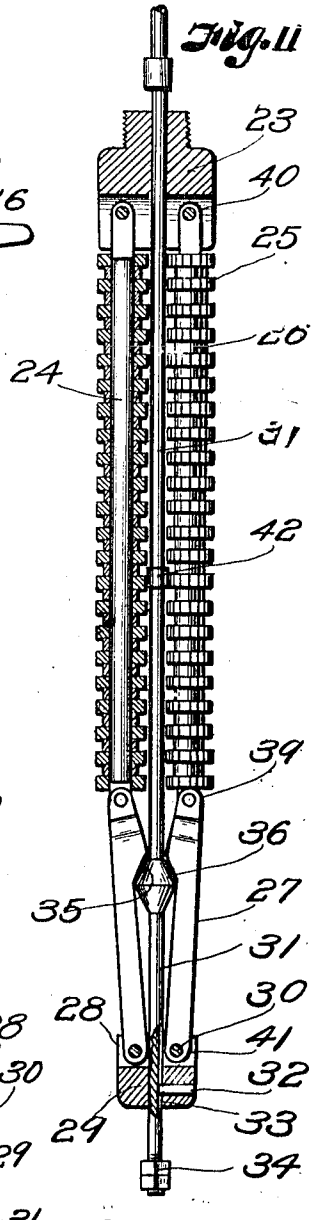


Fig. V.

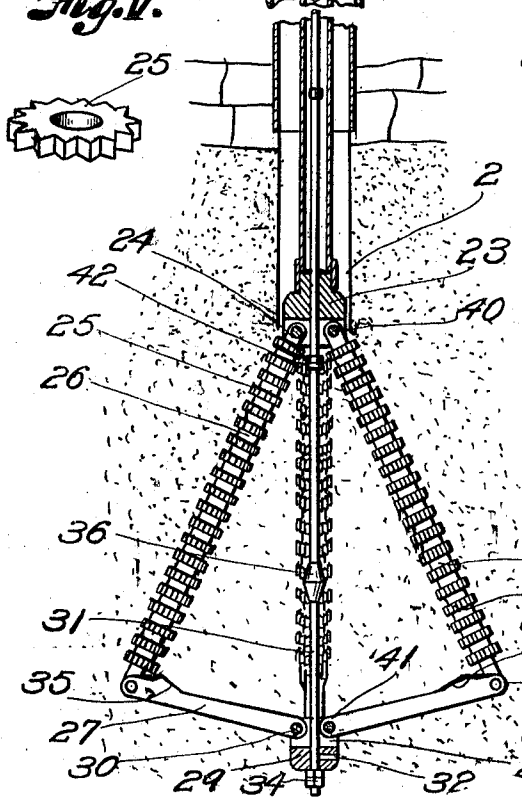


Fig. III.

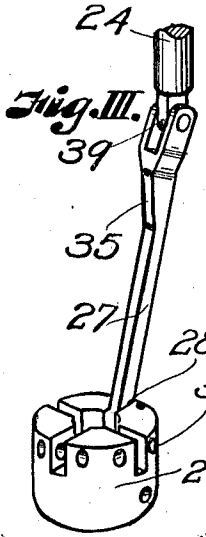
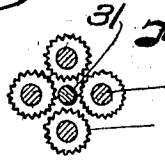


Fig. IV.



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WELL-CLEANING DEVICE.

1,317,192. Specification of Letters Patent. Patented Sept. 30, 1919.

Application filed February 27, 1919. Serial No. 279,489.

To all whom it may concern:

Be it known that I, ARTHUR S. JONES, a citizen of the United States, residing at Independence, in the county of Jackson and State of Missouri, have invented certain new and useful Improvements in Well-Cleaning Devices; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to a well cleaning device and particularly to a mechanism for cleaning out and enlarging the lower uncased part of a well so that a freer flow to the casing may be provided. One of the objects of the invention is to provide a cleaner or reamer for oil wells which is adapted to be lowered into the well into working position and revolved so as to enlarge the cavity thereof. Another object is to provide an expansible reamer with means for holding it in position and means for adjusting the expansible head members as well as to provide a construction in which water may be fed to the well while the cleaning is taking place. Another object of the invention is to provide a reamer and an operating shaft therefor which may be conveniently introduced into the well and readily removed therefrom, as the occasion may demand.

Other objects and advantages of this invention will be referred to hereinafter, it being understood that changes in form, proportion and minor details of construction may be resorted to without departing from the spirit of the invention or sacrificing any of its advantages.

In the drawings,

Figure I is a vertical longitudinal sectional view through a well casing into which my invention has been introduced, the reamer being shown in an expanded position.

Fig. II is a view, partly in elevation and partly in section, of a reamer collapsed.

Fig. III is a fragmentary detail perspective view of the lower reamer head, showing one of the toggle lever arms and a fragment of one of the cutter rods.

Fig. IV is a cross sectional view of the reamer showing the expanding rod and the cutters in grouped relation.

Fig. V is a detail perspective view of one of the cutters, and

Fig. VI is a sectional view through the reamer supporting tube, the tube rotating lever being shown in plan.

Referring now to the drawings by numerals of reference:

1 designates a well casing which may be of any preferred construction but which is here shown as comprising a plurality of tubes or pipes and below the lowermost tube is the well cavity 2 to be cleaned. Resting upon the ground and adjacent to the well casing is a staging or platform 3 on which is a gear step 4 provided with a bearing plate 5 supporting a beveled gear 6 clamped on the bearing plate collar 7, which is secured to the staging or platform 3 by bolts 8. The gear is adapted to be driven from a pinion 9 on the shaft 10 in bearings 11 and 12, said shaft 10 being rotated by the pulley 13 which may be driven from any suitable source. The gear 6 has an outwardly projecting arm 14 fast thereon, which is provided with an upstanding projection 15 adapted to contact with a tube rotating lever 16 removably clamped to a tube 17 which may be of any appropriate length and which may be suspended from a yoke 18 supported by an appropriate hanger 19. The tube is rotatable upon the yoke plate 20 by a flange cap 21 which rests upon the anti-friction bearings 22 supported by plate 20 and said tube 17 is vertically slidable through an opening in the gear 6, as will be clearly apparent by reference to Fig. I. It will, therefore, be seen that the tube rotating arm 16 may be clamped to any point with respect to the tube 17 so as to be in position to be contacted by the projection 15 as the gear 6 rotates. The tube 17 extends into the casing 1 and preferably terminates at a point adjacent to the bottom edge thereof, to which point it carries a head 23 which supports a plurality of pivoted cutter-carrying rods or arms 24, there being four shown in the illustration, spaced equi-distantly apart at angles of about 90° and these rods 24 carry alternate cutters and washers 25 and 26, the lower ends of the rods being connected to the outer ends of the toggle levers 27 which are pivoted in slots 28 in the lower head 29 by pins 30.

The lower head 29 is splined to a reamer expanding rod 31 by means of the pin 32 which fits in the groove 33, as will be clearly

seen by reference to Fig. II, and on the lower end of the expanding rod 31 are nuts 34 which ream the downward movement of the head 30 with respect to said rod 31. The toggle levers 27 are provided with outsets or cam faces 35, against which the cone-shaped expanding collar 36 on rod 31 may contact to effect an initial opening movement of the toggle levers 27. The vertical movement of the expanding rod 31 may be effected by rotating the nut 37 on the threaded portion 38 of the rod 31, said nut bearing against the cap 21. The rotation of the nut may be effected by a suitable wrench, or any other suitable turning collar or nut may be substituted for the one illustrated.

When it is desired to clean or ream a well cavity, the device will be inserted through the casing 1 in a collapsed condition, as shown in Fig. II, suitable sections of tubing 17 and rod 31 being added to provide the desired length, the whole being lowered through the gear 6. The arm 16 will then be clamped on the tube 17 so as to be engaged by the projection 15 as it rotates horizontally about the axis of the gear 6. The power will then be applied to the pulley 13 and through the shaft 10 and pinion 9, the gear 6 will be rotated, it being understood that the reamer has been previously expanded through the medium of the rod 31. As the tube 17 is rotated, carrying with it the reamer cutters on rods 24, the cavity will be enlarged in an obvious manner, it being apparent that the expansion may be gradually increased by rotating the nut 37.

If desired, a suitable lubricating medium may be introduced into the casing 1 during the cleaning or reaming operation.

The expanding cone 36 will impart an initial opening movement to the toggle levers 27 by sliding against the cam faces 35 and as soon as the pivot points 39 are moved out of vertical alinement with the pivot points 40 and the pivot points 41, an upward pressure of the head 29 through the medium of rod 31 will complete the expansion of the reamer, as shown in Fig. I. Therefore, it will be apparent that a comparatively large cavity may be reamed or cleaned out below the well casing.

In order to prevent the head 29 from being raised too high, I have provided a stop collar 42 on rod 31 which may contact with the bottom of head 23; therefore, liability of accident due to inverted inclination of the toggle levers 27 will be avoided.

Having thus described my invention, what I claim as new therein, and desire to secure by Letters-Patent is:

1. A well cleaning device comprising a tubular shaft adapted to be inserted into a well casing, a head carried by the tubular shaft, cutter-carrying arms pivoted to the head and radially movable with respect thereto, toggle levers connected to the cutter-carrying arms and having cam projections on their inner edges, a head connecting the toggle levers, an expanding rod connected to the second mentioned head and passing through the first, and a cone carried by the head for contact with the cam faces of the toggle levers to initially move them outwardly away from the rod.

2. A well cleaning device comprising a tubular shaft adapted to be inserted into a well casing, a head carried by the tubular shaft, cutter-carrying arms pivoted to the head and radially movable with respect thereto, toggle levers connected to the cutter-carrying arms and having cam projections on their inner edges, a head connecting the toggle levers, an expanding rod connected to the second mentioned head and passing through the first, a cone carried by the head for contact with the cam faces of the toggle levers to initially move them outwardly away from the rod, and a stop on the rod for limiting the movement thereof in one direction.

3. A well cleaning device comprising a tubular shaft adapted to be inserted into a well casing, a head on the end of the shaft, pivoted arms carried by said head, cutter members and spacing washers in alternate relation carried by said arms, a second head, toggle levers connected to said head and to the end of the cutter carrying arms, said toggle levers having cam faces an expanding rod to which the head is splined, and a cam expanding member to engage the cam faces on the toggle levers, said expanding member carried by the rod.

4. A well cleaning device comprising a tubular shaft adapted to be inserted into a well casing, a vertically adjustable expansion rod carried by the tubular shaft, a head carried by the tubular shaft, a second head carried by the rod, a stop member on the rod for limiting its vertical movement in one direction, toggle levers connected to the head on the tubular shaft and to the head on the rod, and means carried by the rod for expanding the toggle levers.

In testimony whereof I affix my signature.

ARTHUR S. JONES.