P. F. YÜNGLING.

PERFORATOR FOR WELL CASINGS OR TUBES.

APPLICATION FILED SEPT. 9, 1912.

1,080,313.

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Fig. 1.

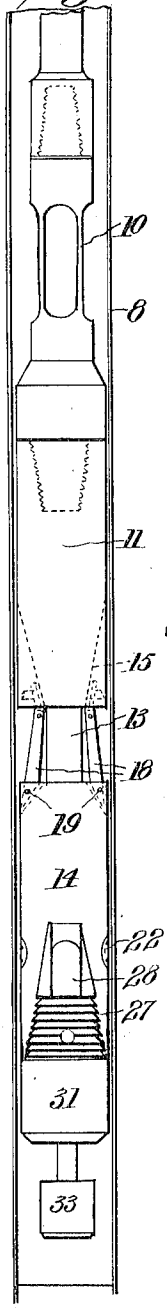


Fig. 2.

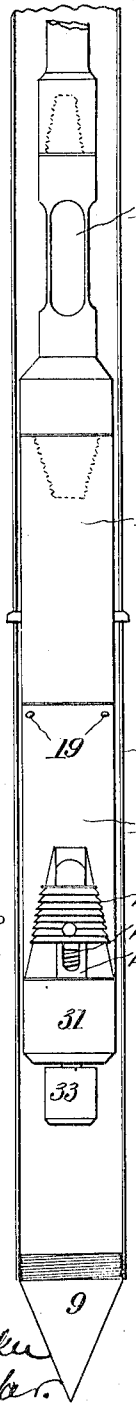


Fig. 3.

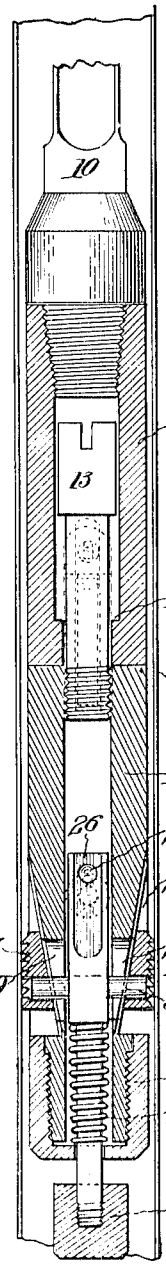


Fig. 4.

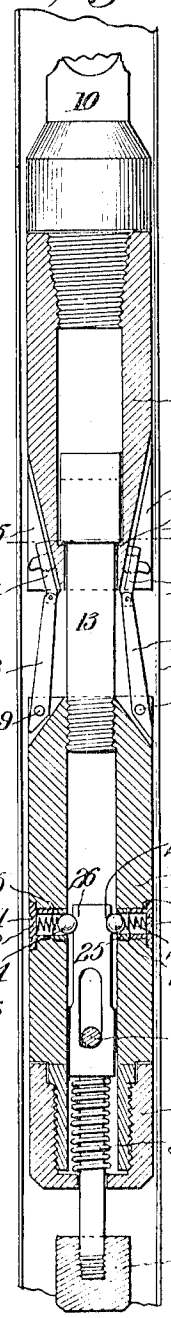


Fig. 5.

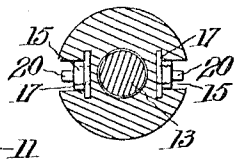


Fig. 6.

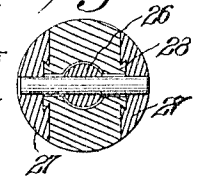


Fig. 7.

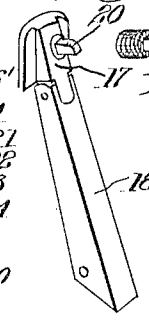


Fig 8.

Witnesses

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UNITED STATES PATENT OFFICE.

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PERFORATOR FOR WELL CASINGS OR TUBES.

1,080,313. Specification of Letters Patent. Patented Dec. 2, 1913.

Application filed September 9, 1912. Serial No. 719,438.

To all whom it may concern:

Be it known that I, PAUL F. YÜNGLING, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented certain new and useful Improvements in Perforators for Well Casings or Tubes, of which the following is a specification.

This invention relates to improvements in perforators for well casings or tubes and embodies in its construction a tool that is adapted to be attached to a regular drilling string, such tool comprising a top or upper member or substitute for engagement with the tool and drilling string, a lower member having grips to engage with the inside of the casing to hold the tool against downward movement and a middle section or member that is maintained in longitudinal movable relation with the lower member to project when lowered punches that are associated with the middle and the lower members.

In the accompanying drawings Figure 1 is a side elevation showing my improved casing perforator for wells with the parts positioned to be lowered to the bottom of the well casing. Fig. 2 is a side elevation showing the parts in position after perforating the well casing. Fig. 3 is a longitudinal section showing the parts positioned prior to raising the tool. Fig. 4 is a longitudinal section showing the parts in position to be dropped in the well casing. Fig. 5 is a transverse section on the line 5—5 of Fig. 4. Fig. 6 is a transverse section on the line 6—6 of Fig. 3. Fig. 7 is a detail perspective view of the punch-block and arm, and Fig. 8 is a perspective view of one of the punches.

Referring to the drawings, the casing 8 of the well may have at its lower end a point 9, when the well is driven but when bored the point will not be present. The casing or tube and the well tools or rig are of the usual type used in driving or boring oil or Artesian wells, and the perforator is constructed to be attached to the regular drilling string.

The upper member 10 of the casing perforator is provided at each end with reduced portions which are threaded to form "taper joints," the upper joint being of standard size to engage the socket of a lower rod of a string of tools and this upper member is practically a "substitute" the same having an intermediate squared portion to be engaged by a wrench. The middle section or member 11 of the casing perforator is cylindrical and hollow, the upper portion of the bore is tapered and threaded to receive the lower end of the upper member, the main bore extending from the threaded socket to a point near the lowest end of the section where the bore is reduced to provide a shoulder 12 and a reduced bore for the passage of the body of a bolt 13 the cylindrical head of which contacts with the shoulder 12 when the lower member 14 which is connected to the middle member by the bolt 13 is at the limit of its downward movement. The head of the bolt 13 fits to slide in the larger bore and its body portion slides in the lower bore, said bolt having in the upper portion of its head a transverse recess so that the bolt may be turned to effect engagement of its lower threaded end with the internally threaded bore at the upper end of the lower member 14. The middle section or member 11 is provided on opposite sides from its lowest end upward with inclined ways 15 that have as a part thereof laterally extending recesses to receive reduced sides of punch blocks or heads 17 that are pivoted to the upper ends of arms 18, the arms being pivoted at their lower ends within recesses formed in the lower member 14, being held in swinging engagement with the lower member and in the recesses by pins 19. The arms 18 which carry at their upper ends the punch blocks or heads 17 are tapered longitudinally and their lower ends on their inner sides may be beveled to register with the inclined inner walls of the recesses when their outer sides are in alinement with the outer surfaces of the middle and the lower sections.

The punch blocks 17 have internally threaded apertures to receive the inner threaded ends of the punches 20, said punches having inclined upper surfaces and beveled end portions to provide chisel cutting edges, the punches making through the casing or tube tapered openings, the smaller diameter of the openings being on the outside which prevents clogging of the openings. The sides of the punches are flat which admits of the same being readily replaced by the use of a suitable tool. The inclination of the ways for the arms and the size of the punch blocks and punches is such that the punches

will be well within the ways when the middle and lower members are separated for lowering into the casing.

The lower member 14 of the perforator is provided with a longitudinal bore, that is screw-threaded at its upper end to receive the threaded end portion of the bolt 13, and this bore extends through the lower section and the lower portion of the section is reduced and externally threaded to receive a cap that is centrally apertured, the opening being smaller than the bore of the lower member. At a suitable point below the recesses for the lower ends of the arms 18 the lower member has apertures 21, 21, the outer portions thereof being enlarged to provide recesses for the heads of screw-threaded plugs 22, such plugs being hollowed out to receive springs 23 that bear upon the plugs and balls 24 seated in cylindrical bushings 25 to press the balls toward a slide bar 26 with recesses to receive a part of the balls to effect frictional engagement of the slide bar with the lower member to hold the slide bar projected against the action of a compressed spring. A pair of grips 27 is associated with the lower member and is adapted to slide upward and outward each grip being mounted on sloping ways 28, the grips when moved upward engage the inner side of the pipe or casing when the grip rod or slide bar 26 has been tripped, the means hereinbefore described holding the grip rod to position the slides at the lower portion of the ways. The lower member has through the center portion of the ways 28 and through said lower member slots 29 for the passage of a transverse pin 30, that is carried by the grip rod and passes through the slots 29 to engage the grips 27 to move the same with the grip rod. The pin 30 is fitted tightly in the grip rod and loosely in the grips, and below the pin the grip rod is reduced in diameter for passage through a cap 31 that engages the externally threaded end of the lower section and between the cap and the shoulder on the grip rod there is a spring 32 which tends to force the grip rod upward when the friction locks are released. The upper portion of the slide bar or grip rod 26 has slightly flattened sides and the recesses 26′ for the balls 24 are formed in said flattened sides, this construction providing a flat way for the balls or friction locks for holding the grips in their lower or retracted position. The rod 26 has attached at its lower end a block or ball 33 for contact with the bottom of the well and the dropping of the tool releases the friction locks and the spring 32 moves the rod 26 with its attached grips upward to engage the tube and hold the lower member of the casing perforator against downward movement after which the parts above descend to project the punches.

In operation the upper member or substitute is connected to the well rods or drilling string, the pipe grips are set by pulling them or the ball downward until the friction locks engage the grip rod, and the tool is lowered to the bottom of the well where the ball or block releases the friction locks so that the spring will move the grips upward to engage the tube, the tool is then raised to the point where it is desired to have the lowest perforations, and the engine is reversed and run backward long enough to close the jars, upon which the grips engage the pipe and hold the lower member stationary and against downward movement; the weight of the tools and stroke of jars close the middle member down to the top of the lower member which action forces the punches out through the pipe to perforate the same, upon raising the tools the punches are drawn back and the grips released so that the tool may be raised for repetition of the operation.

I claim—

1. In a tool for perforating well casings, a lower member having grips associated therewith, frictional locks for the grips, a spring for moving a part associated with the frictional locks upward and the grips outward, means actuated by impact for releasing the frictional locks, an upper member maintained in movable relation with the lower member, inclined ways in said upper member, punch blocks seated in the ways and punches carried by the punch blocks to be projected when the members are moved one toward the other.

2. In a well casing perforator, a lower member having inclined ways for grips, grips seated in said inclined ways, means for holding the grips in a retracted position and means actuated by impact to release the means for holding the grips in a retracted position to move the grips upward and outward, an upper member having inclined ways for punch blocks, a bolt for holding the members in sliding engagement one with the other, and punches associated with the members to be projected by movement of the upper member toward the lower member.

3. In a perforator for well casings, two members maintained in longitudinally movable relation one to the other, punches associated with the members to be projected when one of the members is moved toward the other member, grips associated with the lower member to hold the same against downward movement when projected, a slidable bar associated with the grips, locks for frictionally holding the grips retracted and resilient means for moving the bar to project the grips upon release of the locks.

4. In a casing perforator, a lower member having inclined guideways which are intersected by a slot, grips associated with the guideways, a bolt having adjacent to its

upper end recesses the lower end of the bolt extending beyond the lower member, a spring for moving the bolt in a direction to project the grips which are associated with the bolt, spring actuated means for engagement with the recesses in the bolt to hold the bolt in such position that the grips will be retracted, an upper member maintained in slidable relation with the lower member, inclined ways in said upper member, punch blocks slidable in the ways and arms connected to the punch blocks and to the lower member.

5. In a perforator for well casings, an upper member having a longitudinal bore and an opening at its lower portion of less diameter than diameter of the bore above, inclined ways in the lower portion of the upper member, a lower member, a bolt for connecting the upper member in slidable relation with the lower member, punch blocks mounted to slide upon the inclined ways, arms pivoted to the lower member and to the punch blocks, a grip-rod having recesses formed therein, spring projected balls that engage the recessed portions of the grip-rod, a spring for retracting the grip-rod and grips associated with the grip-rod and the lower member.

6. In a casing perforator, an upper and a lower member maintained in longitudinally movable relation, a string of rods associated with the upper member, inclined ways formed in the upper member, punch-heads associated with the ways, arms pivoted to the punch-heads and to the lower member, and means associated with the lower member to hold the same in non-movable relation with the casing, the parts being organized so that in use the weight of the lower member will move the same away from the upper member to retract the punches and so that the weight of the upper member and rods associated therewith will project the punches when the lower section is held in non-movable relation with the casing.

7. In a casing perforator, an upper member provided with a bolt receiving bore, inclined punch-block receiving ways, a lower member, a bolt for connecting the members in longitudinally movable relation, arms connected to the lower member and to punch-blocks that engage the punch-block ways, a longitudinally movable grip-rod associated with the lower member and provided with a part that extends below the lower member, inclined ways, grips movable over the inclined ways, slots through the lower member, a pin that engages the grips and the grip-rod and a grip-rod lock which is adapted to be released by impact of the grip-rod with the bottom of the well.

In testimony whereof I affix my signature in presence of two witnesses.

PAUL F. YÜNGLING.

Witnesses:
W. H. RIETHMAIER,
OLIVER S. BARNUM.