L. E. STEPHENS.

CASING PERFORATOR.

APPLICATION FILED JUNE 18, 1907.

904,657.

Patented Nov. 24, 1908.

Fig. 1.

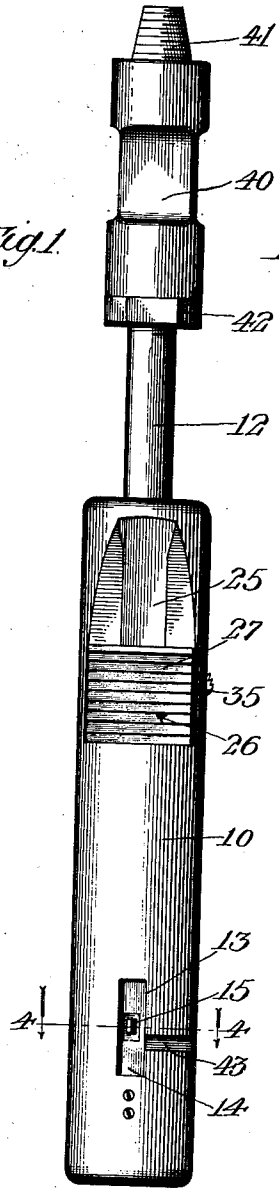


Fig. 2.

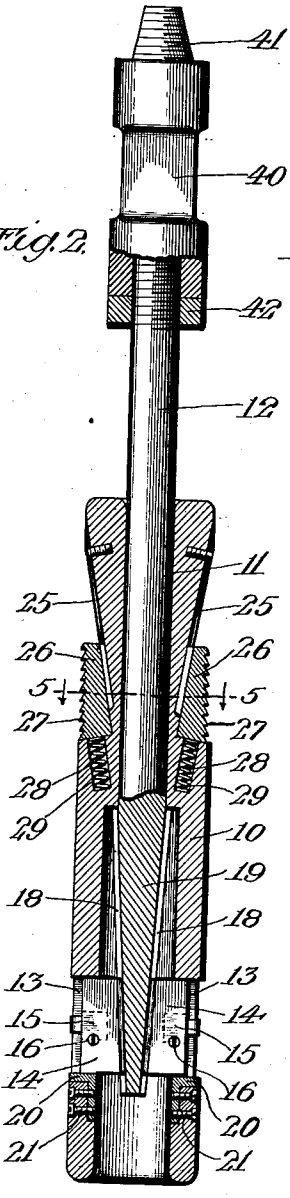


Fig. 3.

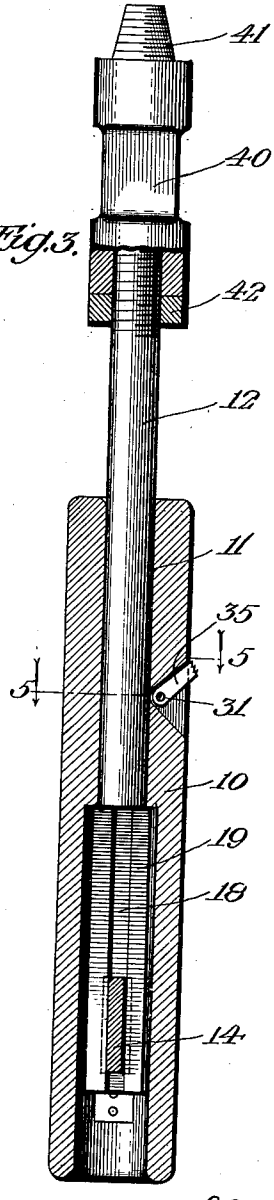


Fig. 4.

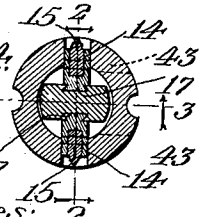


Fig. 5.

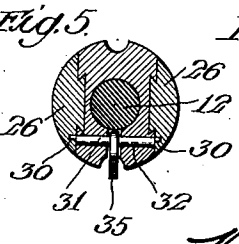
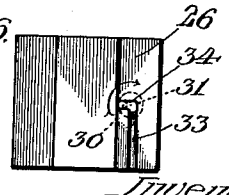


Fig. 6.



Witnesses:

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UNITED STATES PATENT OFFICE.

LEWIS E. STEPHENS, OF FULLERTON, CALIFORNIA.

CASING-PERFORATOR.

No. 904,657. Specification of Letters Patent. Patented Nov. 24, 1908.

Application filed June 18, 1907. Serial No. 379,566.

To all whom it may concern:

Be it known that I, LEWIS E. STEPHENS, a citizen of the United States, residing at Fullerton, in the county of Orange and State of California, have invented new and useful Improvements in Casing-Perforators, of which the following is a specification.

The object of my invention is to provide a perforator which may be operated to perforate casing by the weight of the tools above the perforator and which, when such perforations are completed, may be hoisted out of the casing without being liable to catch therein.

A further object is to provide a perforator which is simple in construction and which may be easily taken apart for repairs.

I accomplish these objects by means of the device described herein and illustrated in the accompanying drawings, in which:—

Figure 1.—is an elevation of my complete casing perforator. Fig. 2.—is a longitudinal section of the same taken on line 2—2 of Fig. 4. Fig. 3.—is a longitudinal section taken on line 3—3 of Fig. 4. Fig. 4.—is a cross section taken on line 4—4 of Fig. 1. Fig. 5.—is a cross section taken on lines 5—5 of Figs. 2 and 3. Fig. 6.—is a rear elevation of one of the slips showing the groove therein for the reception of the retaining pin.

Referring to the drawings 10 designates a mandrel provided with a central longitudinal bore 11 in which stem 12 is adapted to reciprocate. Mounted in transverse guideways 13 formed in mandrel 10 and at the lower end thereof are two punch holders 14 which are adapted to receive casing punches 15 held in place therein by screws 16. These punches are preferably made of hardened steel and are provided with outwardly extending shanks which are adapted to pierce the casing upon their outward movement. Holders 14 are provided on their back side with dove tails 17 which are adapted to fit into inclined grooves 18 on either side of extension 19 of stem 12. Upon the downward movement of stem 12 in mandrel 10 holders 14 are forced outwardly and punches 15 are forced into engagement with and through the casing in which the mandrel is adapted to loosely fit. Hardened bearing plates 20 are provided for holders 14 in the lower end of guideway 13 being held therein by screws 21 so as to be removable in case of wear.

Mounted in inclined dovetailed guideways 25 at the upper end of mandrel 10 are two slips 26 provided on their outer cylindrical faces with teeth 27 adapted to engage with the inside of the casing and prevent the mandrel from moving downwardly therein. Coiled springs 28 mounted in recesses 29 directly under slips 26 are adapted to force the slips upwardly and outwardly along inclined guideways 25, the slips 26 being normally held against any upward movement by eccentric pins 30 on the outer ends of a transverse shaft 31 mounted in bore 32 in the mandrel. Pins 30 engage with slots 33 in the rear faces of slips 26, the pin being normally in the position shown in dotted lines in Fig. 6, being in engagement with the upper right angled portion 34 of slot 33, and thereby preventing the upward movement of slips 26. Upon the rotation of shaft 31 in the direction shown by the arrow in Fig. 6 pin 30 is moved out of engagement with the upper right angled end 34 of slot 33 and moved directly over slot 33 thereby permitting slips 26 to be forced upwardly by springs 28. The rotation of shaft 31 is accomplished by the engagement of dog 35, rigidly mounted on the shaft, with the casing on the upward movement of the perforator. Dog 35 is provided with teeth on its outer end adapted to engage the inside of the casing and stands normally in a position shown in the drawings so that any upward movement of the perforator will throw dog 35 downwardly.

Stem 12 is provided on its upper end with a sub 40 adapted to connect through taper joint 41 with a string of drilling tools, a lock nut 42 is on stem 12 preventing the disengagement of sub 40. To take the perforator apart it is only necessary to remove the sub from the upper end of the stem when the stem may be slipped downwardly out of the mandrel. To provide for the renewal of punches 15 without the necessity of removing the stem slots 43 are cut into the mandrel opposite screws 16 so that they may be removed and new punches inserted.

The operation of my perforator is as follows:—The perforator is first lowered into the casing to the lowermost point at which the perforations are wished to be made and then moved upwardly a slight distance to free slips 26 by the operation of dog 35. Slips 26 are then forced outwardly by their springs into contact with the casing and

thereby prevent the further downward movement of the perforator. Stem 12 is then allowed to fall under the weight of the usual tools above it and punches 15 are forced outwardly through the casing. The perforator is then hoisted through the distance desired between adjacent perforations and the operation is repeated. When the perforations have been completed the perforator may be hoisted out of the casing without any interference by the slips as they are constructed so as to only prevent the downward motion of the perforator.

Having described my invention what I claim as new and desire to secure by Letters Patent is:—

1. In a casing perforator a hollow mandrel, a plurality of casing punches mounted in said mandrel so as to slide transversely therein, a movable stem mounted in said mandrel, said stem being provided with inclined guideways adapted to engage and reciprocate said punches upon the movement of the stem, and means to hold the mandrel against downward movement in the casing.

2. In a casing perforator a hollow mandrel provided with transverse guideways therein, casing punches adapted to reciprocate in said guideways, a vertically movable stem mounted in said mandrel and adapted to be connected at its upper end with a string of drilling tools, said stem being provided with inclined guideways on its lower end adapted to engage with corresponding guideways on said casing punches and to move said punches outwardly on the downward movement of the stem, a plurality of slips mounted in inclined guideways in said mandrel and adapted to contact with the casing and prevent the downward movement of the perforator, and means to hold said slips out of engagement with the casing.

3. In a casing perforator, a hollow mandrel provided with transverse guideways, casing punches adapted to reciprocate in said guideways, a vertically movable stem mounted in said mandrel and adapted to be reciprocated by a string of drilling tools, said stem being provided with inclined guideways on its lower end adapted to engage with corresponding guideways on said punches and to move said punches outwardly on the downward movement of the stem in the mandrel, and means to hold the mandrel against downward movement in the casing.

4. In a casing perforator, a hollow mandrel, a plurality of casing punches mounted in transverse guideways in said mandrel, a movable stem mounted in said mandrel, said stem being provided with inclined guideways adapted to engage with and reciprocate said punches upon the movement of the stem, means to hold the mandrel against downward movement in the casing, and means to lock said holding means in its inoperative position.

5. A casing perforator comprising a mandrel, a movable stem mounted in said mandrel, casing punches mounted in said mandrel and adapted to be operated by the movements of said stem, means mounted on said mandrel to engage with the casing, means to lock said engaging means in its inoperative position, and means to release said locking means.

6. A casing perforator comprising a mandrel, a vertically movable stem mounted in said mandrel, casing punches mounted in said mandrel and adapted to be forced outwardly by the downward movement of the stem, gripping means mounted on said mandrel and adapted to engage with the casing to prevent the downward movement of said mandrel, means to lock said gripping means out of engagement with the casing, and means engaging with the casing to unlock said gripping means upon an upward movement of said mandrel in the casing.

7. A casing perforator comprising a mandrel, a vertically movable stem mounted in said mandrel, casing punches mounted in said mandrel and adapted to be forced outwardly by the downward movement of said stem, a plurality of slips mounted in upwardly expanding inclined guideways in said mandrel, resilient means to force said slips upwardly and outwardly along said guideways to contact with the casing and prevent the downward movement of the perforator, a cam to hold said slips in their lower inoperative position, and an operating arm attached to said cam, said arm projecting out of said mandrel and adapted to contact with the casing.

In witness that I claim the foregoing I have hereunto subscribed my name this 8th day of June, 1907.

LEWIS E. STEPHENS.

Witnesses:
TRIMBLE BARKELEW,
EDMUND A. STRAUSE.