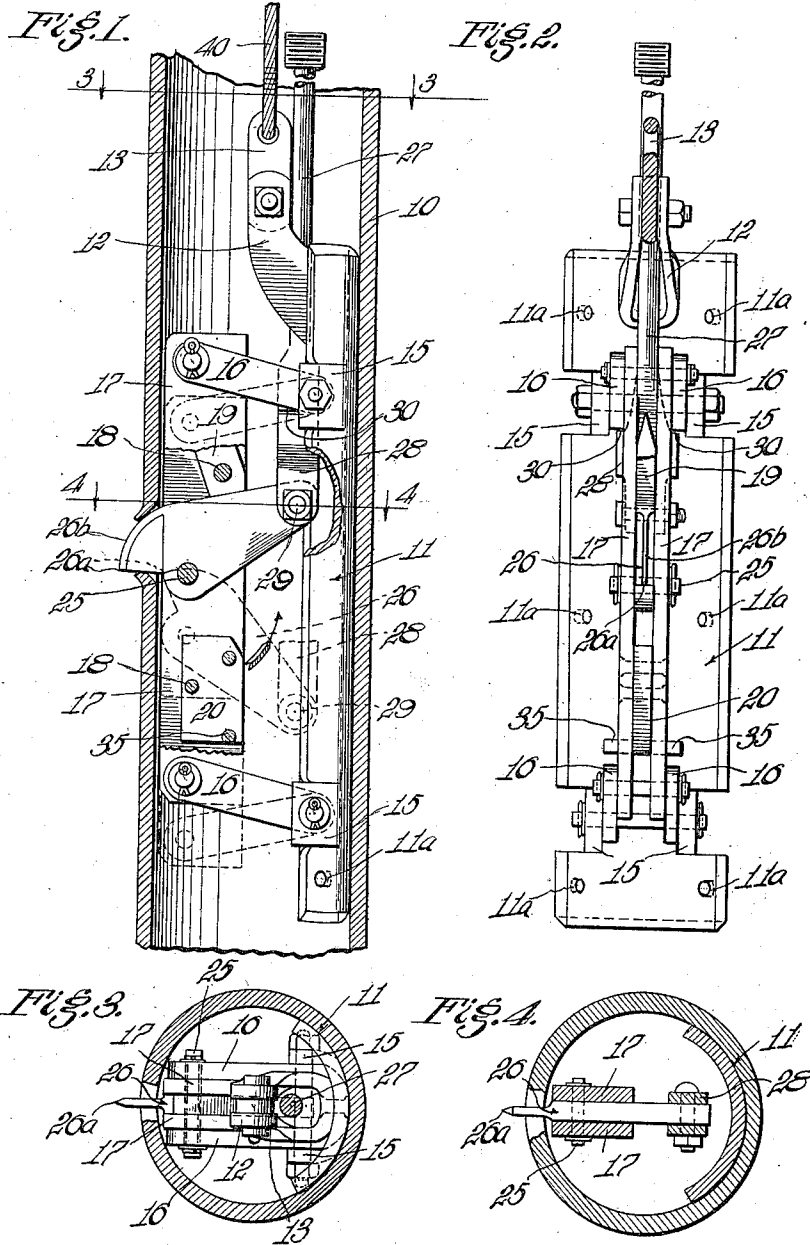


E. L. MILLS.
CASING PERFORATOR.
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1,063,277.

Patented June 3, 1913.



Witnesses.
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UNITED STATES PATENT OFFICE.

EDWARD L. MILLS, OF LOS ANGELES, CALIFORNIA.

CASING-PERFORATOR.

1,063,277.

Specification of Letters Patent.

Patented June 3, 1913.

Application filed April 20, 1912. Serial No. 692,109.

To all whom it may concern:

Be it known that I, EDWARD L. MILLS, a citizen of the United States, residing at Los Angeles, in the county of Los Angeles and State of California, have invented new and useful Improvements in Casing-Perforators, of which the following is a specification.

This invention relates to a device for perforating the casing of wells and the like; and the invention has for its prime object the provision of a simple and efficient mechanism whereby casing perforations may be easily and quickly made.

The fundamental novelty of my present invention consists in a peculiar mounting of the casing knife upon the body or bearing plate of the perforators. I employ a pivot for this casing perforator or knife, which pivot is movable longitudinally, that is vertically, with respect to the stationary bearing plate. The knife or perforator member is pivoted on this same pivot; so that, when the point of the knife engages with the casing, the knife is not only turned about its pivot, but the pivot also moves longitudinally. The result of this peculiar motion is that the point of the knife is forced straight outwardly through the casing, making a large perforation with ease.

In my preferred form of the present invention I use a longitudinally movable member mounted upon the bearing plate through the medium of suitable toggles. The knife pivot is directly mounted upon these longitudinally movable members and has a movement with reference thereto limited by a suitable stop. The whole construction, in its preferred form, is extremely simple and strong; it is not liable to become disabled within the well; and it is operated from the top of the hole with simplicity and accuracy.

I have shown the preferred form of my invention in the accompanying drawings, in which:

Figure 1 is a side elevation showing my device as it would appear in operation in a well. Fig. 2 is an edge elevation of the same. Fig. 3 is an end view taken as indicated by line 3—3 of Fig. 1. Fig. 4 is a section taken as indicated by line 4—4 of Fig. 1.

In the drawings 10 designates a casing

within which my perforator is operated. The perforator may be made of any suitable size to fit casing of any diameter; but I prefer to make the perforator of a certain minimum size and to then provide its bearing plate 11 with wooden or metal lagging (which may be secured by bolts through the holes 11^a) and thus build it out to any required larger diameter. The bearing plate 11 is of some longitudinal vertical extent and is made in curved cross section so as to bear solidly against the interior of the casing at one side. Bearing plate 11 is provided with a yoke and link 12 and 13 at its upper end for attachment of a cable or any other suitable supporting device. By means of this cable the perforator may be lowered and raised in the casing and held at any desired point.

The bearing plate 11 carries suitable tabs or ears 15, preferably forged out of the same piece of material with plate 11. To these portions 15 there are attached four links 16 carrying at their outer end two vertical longitudinal plates 17 secured together in safe relation by suitable rivets 18 and stops 19 and 20. These stops 19 and 20 perform various functions which I will hereinafter describe.

Mounted upon the longitudinal plates 17, which together become a longitudinally movable member, there is a knife pivot 25. Knife 26 is mounted upon this pivot and moves thereon with relation to the plates 17. When the knife is in its position shown in dotted lines Fig. 1, then it engages with stop 20; when it is in the position shown in whole lines in Fig. 1 it engages with stop 19. In this manner the movement of knife 26 with relation to the plates 17 is limited; so that further movement of the knife will cause the movement of the plates and knife together. The knife 26 has a perforating point 26^a and a cutting edge 26^b. Its movement is accomplished through the medium of a suitable rod 27 having a yoke 28 on its lower end which pivotally connects with the inner end of the knife, as at 29. Yoke 28 has shoulders 30 which engage with the upper links 16 to prevent further upward movement of the rod 27 after the parts have reached the position shown in full lines

in Fig. 1. To limit the downward movement of the plates 17, there is a pin 35 set in the plates and projecting at each end. When the plates and links have moved to the position shown in dotted lines in Fig. 1, their lowermost position, the pin 35 will move downwardly against the lower links 16 and thus prevent further downward movement.

I will now explain the operations of my device, whence will be clear the reasons for and advantages of its peculiar construction. When the device is being lowered into the casing, the rod 27 is allowed to fall so that the parts are in their dotted position, the weight of the whole device being borne by the cable 40 attached to the link 13 (parts shown in Fig. 1). Having lowered the perforator to the point at which it is desired to begin operations, the cable 40 is then secured stationarily, so as to hold bearing plate 11 in a stationary position. The rod 27 is then moved upward. This has the partial effect of rotating the device 26 from the position shown in dotted line in the direction indicated by the arrow until the point 26^a engages with the inner surface of the casing. Further upward movement of the rod 27 will then cause the upward movement of the pivot 25, the perforating point 26^a remaining stationary on the casing. The parts are then gradually moved toward the position shown in full lines in Fig. 1, the point 26^a being forced directly outwardly through the casing. The cutting edge 26^b follows the point 26^a through the casing, making a long vertical slit or perforation through the casing. This form of slit is much desired, as it makes an opening of maximum area with a minimum weakening of the cross section of the casing. When the perforation has been completely formed, the rod 27 is lowered and the whole device restored to the position indicated in dotted lines. The perforator may then be rotated or raised and the operation repeated as many times as desired.

From the foregoing it will be seen that the gist of my invention consists in my own mounting of the perforating knife upon the stationary portions of the mechanism. With my combination of rotary movement of the knife and of straight movement of its point through the casing I am enabled to perforate the heaviest well pipe with a greatly lesser pull upward on the rod 27 than has heretofore been possible in any form of device. And it is this peculiar feature of my invention that I wish to claim most broadly, believing that the minor features may be altered without departing from the spirit of my invention.

Having described my invention, I claim:

1. A casing perforator, comprising an upright lateral bearing plate, a pivot spaced

from and movable vertically with relation thereto, a knife pivoted on said pivot, supporting means for the bearing plate, and means connected with said knife whereby it may be moved about said pivot.

2. A casing perforator, comprising an upright lateral bearing plate, a member spaced from the plate and longitudinally movable with relation thereto, a casing perforating knife pivoted on said member, and means directly connected with the knife for causing its movement about its pivot and for also causing movement of the pivot and said member when the knife engages a casing.

3. A casing perforator, comprising an upright lateral bearing plate, a member supported on the plate and freely movable vertically with relation thereto, a casing perforating knife pivoted on said member and having a casing engaging point capable of being projected beyond said member, and means directly connected to the knife to move it about its pivot, whereby the pivot and said member are moved longitudinally when the knife point engages a casing.

4. A casing perforator, comprising a lateral bearing plate, transverse links pivoted at one end to said plate, a longitudinally movable member carried on the other ends of the links, and a casing perforating knife pivoted to said member.

5. A casing perforator, comprising a lateral bearing plate, transverse links pivoted at one end to said plate, a longitudinally movable member carried on the other ends of the links, a casing perforating knife pivoted to said member, and stops on said member engageable by said knife.

6. A casing perforator, comprising a lateral bearing plate extending vertically, a vertical member attached to the plate to move vertically, a casing perforating knife pivoted to said member, and means independent of each other for supporting the bearing plate and for moving the knife.

7. A casing perforator, comprising a lateral bearing plate, a member spaced from and movable vertically with relation to the bearing plate, a casing perforating knife pivoted to the said member, stops limiting the movement of the knife on said member, and means independent of each other for supporting the bearing plate and for moving the knife.

8. A casing perforator, comprising a stationary bearing plate, a pivot spaced from and vertically movable with respect to said bearing plate, a casing perforating knife pivoted on said pivot, and means for rotating the knife about its pivot to move the pivot vertically when the knife engages a casing.

9. A casing perforator, comprising a lateral bearing plate, a pivot spaced from and

movable vertically with respect to said lateral bearing plate, a casing perforating knife pivoted on said pivot, and means independent of each other for supporting the
5 bearing plate and for moving the casing perforating knife.

In witness that I claim the foregoing I

have hereunto subscribed my name this 10th day of April, 1912.

E. L. MILLS.

Witnesses:

G. H. MELLARD,

ELWOOD H. BARKELEW.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."
