

T. LAW.

TOOL FOR SLITTING AND CUTTING OFF WELL CASINGS.

(Application filed Nov. 17, 1899.)

(No Model.)

2 Sheets—Sheet 2.

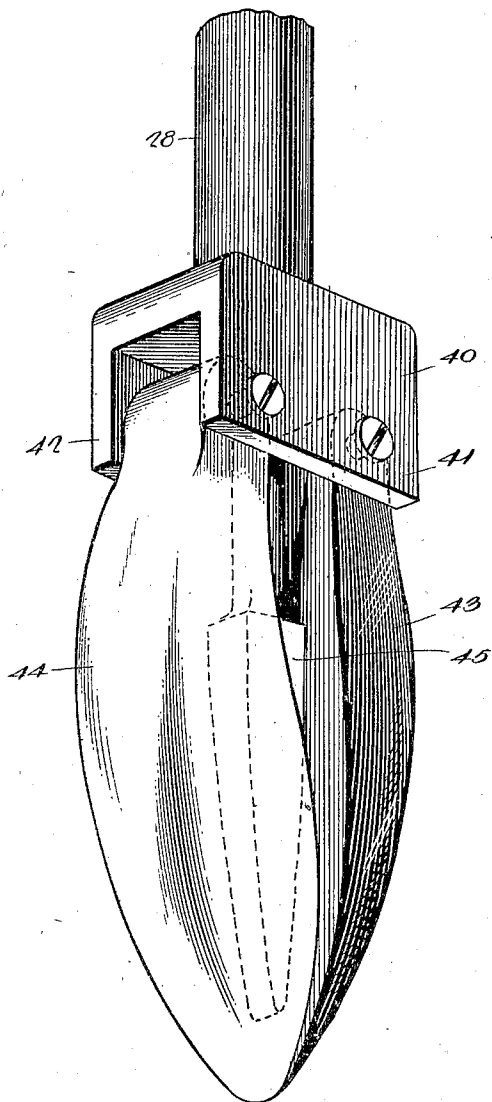


Fig. 5.

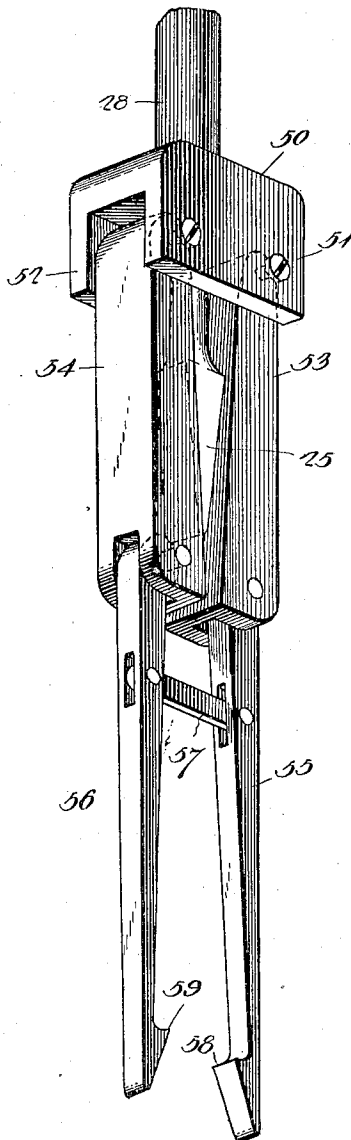


Fig. 6.

Witnesses
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UNITED STATES PATENT OFFICE.

THOMAS LAW, OF SAN JACINTO, CALIFORNIA.

TOOL FOR SLITTING AND CUTTING OFF WELL-CASINGS.

SPECIFICATION forming part of Letters Patent No. 652,367, dated June 26, 1900.

Application filed November 17, 1899. Serial No. 737,349. (No model.)

To all whom it may concern:

Be it known that I, THOMAS LAW, a citizen of the United States, residing at San Jacinto, in the county of Riverside and State of California, have invented a new and useful Tool for Slitting and Cutting Off Well-Casings, of which the following is a specification.

This invention relates to well-tools, and particularly to the means for cutting and slitting the casing under different conditions, the principles involved being also applicable to means for removing bends and dents from the casing and for grabbing and raising a drill when it shall become disconnected and have fallen to the bottom of the well.

The object of the invention is to provide a means for positively operating the different special tools employed for these different purposes and to produce such implements as will be simple in their construction and efficient in their operation.

In the drawings forming a portion of this specification, and in which similar numerals of reference designate like and corresponding parts in the several views, Figure 1 is a perspective view showing the pipe-cutter, the cutting-disks being disposed for splitting the pipe or casing. Fig. 2 is a central vertical section of the implement shown in Fig. 1, the jar-rod and a portion of the wedge being shown in elevation. Fig. 3 is an elevation showing the inner face of one of the jaws with the dovetailed slot therein. Fig. 4 is a detail perspective view, partially broken away, showing the sleeve which is connected to the upper end of the wedge and in which the jar-rod acts. Fig. 5 is a perspective view showing a drift constructed in accordance with the present invention. Fig. 6 is a perspective view showing a drill-grab embodying the invention.

Referring now to the drawings, and more particularly to Figs. 1, 2, 3, and 4, 10 represents the head-block of the pipe-cutter, and which block has a transverse slot 11 in its under side, resulting in the formation of two arms 12 and 13. In the slot 11 are pivotally mounted two jaws 14 and 15, which are substantially triangular in elevation and lie normally with their inner faces parallel.

In the outer face of the jaw 14 is formed a curvilinear recess 16, opening into which are

screw-threaded perforations 60, one of which is disposed transversely of the jaw and the other longitudinally thereof and at right angles to the first perforation. These perforations are adapted to interchangeably receive a pin 17, having an antifriction-roller 18 rotatably mounted thereon, and which roller may be thus disposed to rotate in a plane longitudinally of the jaw or in a plane transversely thereof. In the outer face of the jaw 15 is a rectangular recess 19, in which is mounted a casing 20, and in this casing is disposed a cutting-disk 21, carried by a shaft 22, which is mounted in the casing 20. As shown in the drawings, the roller 18 projects beyond the face of the jaw 14, while the cutter-disk 21 projects beyond the face of the jaw 15, and these parts operate in the manner hereinafter described.

In the inner faces of the jaws 14 and 15 are formed downwardly-tapering dovetailed grooves 23, with which are engaged correspondingly-formed wear-blocks 24, which are adapted to receive direct engagement of a reciprocatory wedge 25, which is adapted to be forced downwardly between the wear-blocks 24 to spread the jaws and force the roller 18 and disk 21 against the inner surface of the well-casing.

In order to reciprocate the wedge 25, the stem 26 thereof is passed upwardly through a perforation 27 in the block 10, and which perforation is enlarged in its upper portion and is screw-threaded for engagement of the threads upon the lower end of a tube 28, which extends upwardly and is formed in sections having connections 29, whereby this tube may be continued and formed sufficiently long to project above the upper end of the well.

The stem 26 of the wedge 25 extends upwardly and into the lower portion of the tube 28, and upon its upper end and inclosing the upper extremity is disposed a sleeve 30, having longitudinal slots 31 in its opposite faces. The jar-rod 32, which may be formed in sections, as shown in Fig. 2, has its lower end slidably disposed within the sleeve 30 and has radially-extending pins 33, which lie in the slots 31 and are adapted for reciprocation therein. The jar-rod 32 is sufficiently long to extend above the tube 28 and is

adapted to be raised until the pins 33 reach the tops of the slots 31 and to be then dropped to strike the upper end of the stem of the wedge 25 and force the wedge downwardly 5 between the wear-blocks, as above described.

If it be desired to split a portion of the casing of the well, the implement is let down through the top of the casing to the proper distance, after which the jar-rod is raised and 10 then dropped a sufficient number of times to force the wedge 25 downwardly and force the jaw 15 outwardly to an extent sufficient to sink the cutting-disk 21 into the inner surface of the casing to the proper degree. By 15 means of the tube 28 the implement is then reciprocated, causing the disk 21 to roll up and down the casing and to cut into the material thereof after the manner of the common form of pipe-cutting tool. After the 20 first cut has been made the jar-rod is again operated to further sink the cutting-disk 21, and this operation will be continued until the disk has cut entirely through the casing.

It will be noted that the casing 20 is rectangular in form, and this construction permits the casing to be removed and to be reinserted with the cutting-disk 21 in a horizontal plane instead of in a vertical plane, 30 as shown. With this horizontal arrangement of disk the implement is adapted for cutting off the casing, and it will be seen that if the disk be arranged horizontally and the implement inserted in the well the operation of the jar-rod will cause the cutting-disk to sink 35 into the inner surface of the casing, and by then rotating the pipe 28 the jaws 14 and 15 will be correspondingly moved and the cutting-disk will be caused to travel completely around the inner surface of the casing. By 40 repeating the operation of the jar-rod the disk 21 may be further moved to cut a deeper groove, and the pipe will be finally cut off, the roller 18 being at this time horizontal.

In Fig. 5 of the drawings is shown what is 45 known as a "drift," and which implement is employed in straightening out the well-casing and in removing dents. This implement comprises a head 40, which is bifurcated to form arms 41 and 42, between which arms are 50 pivoted the expansible jaws 43 and 44. These jaws are equipped upon their inner faces with wear-blocks similar to blocks 24, above described, and are adapted to be forced outwardly upon their pivots through the medium 55 of a wedge 45, which is operated in the same manner as above described.

In practice the heads 10 and 40 may be adapted for interchangeable connection with the lower end of the tube 28, and before the 60 implement is used the proper head may be attached to the tube.

A third tool is shown in Fig. 6 of the drawings and is known as a "drill-grab," and consists of a head 50, having arms 51 and 52, 65 between which are pivoted links 53 and 54, which are provided upon their inner faces with wear-blocks similar to blocks 24, which

are adapted for engagement by the wedge 25. Pivotally connected with the links 53 and 54 are additional links 55 and 56, these links 55 70 and 56 being mutually connected by means of a strap 57, to which they are pivoted. The links 55 and 56 extend beyond the strap 57 and upon their lower ends are provided with 75 barbs 58 and 59. In the employment of this implement or tool the head, with the links attached, is substituted for the head 10 upon the tube 28, and the tool is then entered through the top of the well-casing when it is 80 desired to remove the drill or other obstruction which may have fallen into the well. When the tool has reached the proper point, the wedge 25 is operated to spread the toggle-links outwardly and to move the barbs 85 58 and 59 inwardly and engage them with the article to be lifted from the well. By reciprocation of the jar-rod the desired grip of the barbs 58 and 59 can be secured, after which by drawing upwardly upon the pipe 28 the 90 tool is removed and draws the obstruction with it.

From the foregoing description it will be seen that there has been provided a plurality of special tools adapted for interchangeable 95 connection with a common tube provided with a wedge and an operating jar-rod, and it will of course be understood that in practice any number of each species of tool may be employed for operation under different conditions and in casings of various diameters. 100 Also it will be understood that the specific construction shown may be altered and that any desired materials and proportions may be employed without departing from the spirit of the invention. 105

As shown in Fig. 2 of the drawings, the wear-blocks are thicker at their lower ends than at the upper ends, and thus as the wedge 25 is fixed downwardly the jaws will have a 110 greater separation than if the blocks had parallel faces, and thus the tool may be employed in connection with casings of different diameters.

What is claimed is—

1. A device of the class described, comprising 115 a head having jaws pivoted therein, a tube connected with the head, a wedge slidably mounted in the head, said wedge lying at one end between the jaws, and at the other end 120 within the tube, a sleeve carried by the wedge, and a jar-rod connected with the sleeve and adapted for reciprocation therein to force the wedge against the jaws.

2. A device of the class described, comprising 125 a head, jaws pivotally mounted in the head, a wedge between the jaws and adapted for engagement therewith to force them outwardly, and a jar-rod connected with the wedge and adapted for reciprocation to force the wedge against the jaws. 130

3. A device of the class described, comprising a head, jaws pivotally mounted in the head, a tube connected with the head, a wedge 135 disposed between the jaws and extending into

the tube, and a jar-rod adapted to move the wedge against the jaws.

4. A device of the class described, comprising a head, jaws pivotally mounted in the head, wear-blocks removably connected with the inner faces of the jaws, a tube connected with the head, a wedge disposed between the jaws and extending into the tube, a sleeve upon the upper end of the wedge, slots in the sleeve, and a jar-rod disposed in the sleeve and having pins lying in the slots and adapted for reciprocation therein as the rod is raised and lowered.

5. A device of the class described, comprising a head having jaws pivotally mounted therein, a tube removably connected with the head, a wedge disposed between the jaws and extending into the tube, and a jar-rod connected with the wedge and adapted to force it against the jaws.

6. A device of the class described, comprising a head, jaws pivotally mounted in the head, a bearing carried by one of the jaws, a cutter carried by the other jaw, a tube connected with the head, a wedge disposed between the jaws and extending into the tube, a slotted sleeve upon the wedge, and a jar-rod having pins disposed in the slots and adapted for reciprocation therein as the rod is moved to force the wedge against the jaws.

7. The combination with a tube and a wedge having one end disposed within the tube, of

a jar-rod connected with the wedge and adapted for reciprocation with respect thereto, said tube being adapted for interchangeable connection with a plurality of heads each having jaws adapted for engagement by the wedge to force them outwardly.

8. The combination with a tube, of a wedge having one end disposed within the tube, a sleeve connected with the wedge and having slots, a jar-rod disposed in the sleeve and having pins entered in the slots and adapted for reciprocation therein to permit the rod being moved with respect to the wedge, said tube being adapted for interchangeable connection with a plurality of heads, each of said heads having jaws pivoted thereto and adapted to receive the wedge between them to force them outwardly.

9. A pipe-cutter comprising a movable portion adapted to be forced in the direction of the surface to be cut, and a cutting-disk rotatably mounted in the movable portion and adapted for adjustment to operatively engage the surface to be cut when the movable portion is moved in different directions.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

THOS. LAW.

Witnesses:

R. M. MCKIM,
E. B. KNAPP.