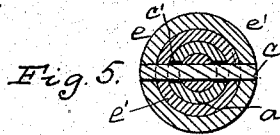
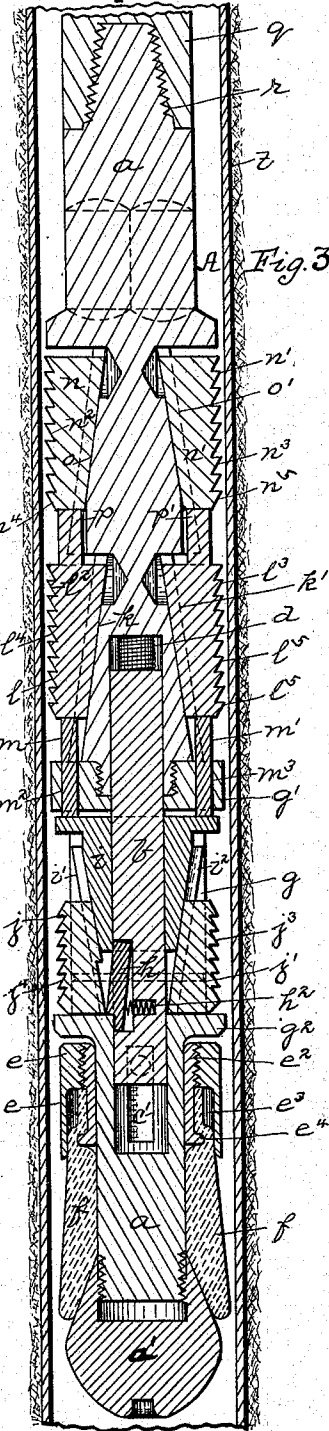
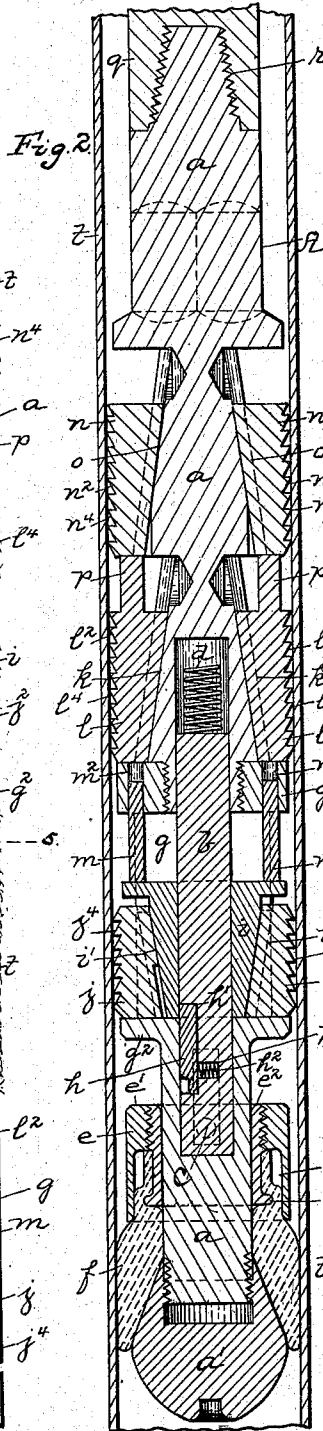
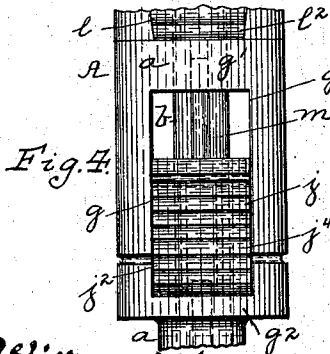
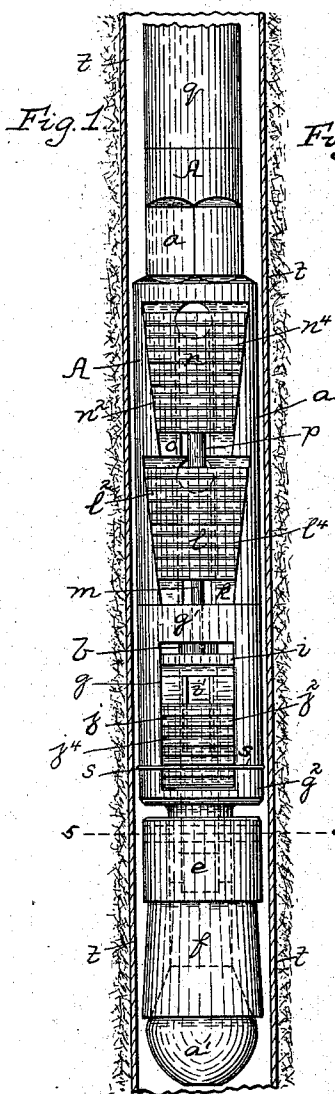


(No Model.)

J. CARRUTHERS.
CASING SPEAR.

No. 557,968.

Patented Apr. 7, 1896.



Witnesses:
J. B. Switzer
W. A. Maple

Inventor:
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UNITED STATES PATENT OFFICE.

JOHN CARRUTHERS, OF CALLERY, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO MYRON J. PETERS, OF SAME PLACE.

CASING-SPEAR.

SPECIFICATION forming part of Letters Patent No. 557,968, dated April 7, 1896.

Application filed October 12, 1895. Serial No. 565,491. (No model.)

To all whom it may concern:

Be it known that I, JOHN CARRUTHERS, a resident of Callery, in the county of Butler and State of Pennsylvania, have invented a new and useful Improvement in Casing-Spears; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to casing-spears for jarring the casing in oil, gas, and Artesian wells.

The object of my invention is to provide an apparatus for jarring and loosening the casing, and, if necessary, lifting the same, so that it can be taken out or shifted, which apparatus can easily be lowered into the casing and then caused to engage with the interior face of the casing and to hold firmly to the same while the tools are jarred upward until the casing is loosened from the well, and then, after the jarring and loosening of the casing, to provide for the withdrawal of the engaging devices from the interior wall of the casing, so that the apparatus may be withdrawn from the casing within the well.

To this end my invention consists, generally stated, in a casing-spear, the combination with the tool-body, of a plunger sliding within the tool-body; a movable wedge-block fitting around the plunger having guideways therein, and a set of wedge-slips engaging with said guideways.

It also consists of certain other details of construction and combination of parts, all of which will be more fully hereinafter set forth and claimed.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is an elevation of my invention, showing the devices in position for lowering into the well. Fig. 2 is an enlarged longitudinal central section thereof, showing the devices in position for jarring the casing. Fig. 3 is a like view showing the devices in position for being withdrawn from the well. Fig. 4 is an enlarged elevation of the lower wedge-slips, showing position thereof during jarring; and Fig. 5 is a cross-section on the line 5 5, Fig. 1.

Like letters indicate like parts in each of the figures of the drawings.

A represents the casing-spear, being provided with the tool-body *a* and the knob *a'*, which screws onto the lower part thereof. Fitting within the tool-body *a* is the plunger *b*, which has the pin *c* passing through the same at the lower end, and the spiral spring *d*, resting upon the upper end thereof within the tool-body *a*. Fitting around the lower end of the tool-body *a* is a sliding cap *e*, which is rigidly connected to the plunger *b* by means of the pin *c* therein passing through the sliding cap *e*, the pin *c* sliding within the slots *c'* in each side of the tool-body *a*. The sliding cap *e* is formed of two pieces *e'* *e''*, screwed together, and the outside piece *e'* is hollowed out to form a seat *e³* for the reception of a leather or other flexible packing-piece *f*, which extends down to the knob *a'*, the said flexible packing being held within the cap *e* by means of the flange *e⁴* on the inside piece *e''*. Above the sliding cap *e* an opening *g* is formed through the tool-body *a*, which forms the heads *g'* *g²* above and below the same.

A seat *h'* is formed in the plunger *b*, within which fits the pawl *h*, said pawl *h* being adapted to come in contact with the lower head *g²*, as hereinafter described, and having the spiral spring *h²* fitting behind the same within the seat *h³* in the plunger *b*. Between the heads *g'* *g²* in the opening *g* and rigidly secured around the plunger *b* is the sliding wedge-block *i*, having the downwardly-inclined dovetailed guideways *i'* *i²* on each side thereof for the reception of the lower wedge-slips *j* *j'*, which are provided with the downwardly-projecting barbs *j³* on their engaging faces *j⁴*. Above the head *g'* in the tool-body *a* are the dovetailed guideways *k* *k'* upon which slide the intermediate wedge-slips *l* *l'*, these dovetailed guideways being inclined in the opposite direction from the guideways *i'* *i²*. Pins *m* *m'* slide through openings *m²* *m³* in the head *g'* and connect with the top of the wedge-block *i* and the wedge-slips *l* *l'* to operate the same. The intermediate wedge-slips *l* *l'* are provided with the upwardly-projecting barbs *l²* *l³* on their engaging faces *l⁴* *l⁵*. Above the intermediate wedge-slips *l* *l'* are the upper

wedge-slips $n n'$, which travel in the dovetailed guideways $o o'$, said guideways $o o'$ being formed within the tool-body a , inclined in the same direction as the guideways $k k'$ and opposite from the guideways $i i'$. The upper wedge-slips $n n'$ are provided with the upwardly-projecting barbs $n^2 n^3$ on their engaging faces $n^4 n^5$ and are operated by means of the pins $p p'$, formed as part of the intermediate wedge-slips $l l'$ and engaging with the lower end of the upper wedge-slips $n n'$. The upper end of the casing-spear a is connected to the lower end of the string of tools within the well, such as the lower end of the drill-jars g , by means of the threaded joint r engaging therewith.

The operation of my improved casing-spear is practically as follows: The tool is connected at the end of a string of tools generally hanging below the drill-jars, being suspended above the same by means of the ordinary drilling-rope connected to the walking-beam. The operator forces in the pawl h into its seat h' from the position shown in Fig. 3 by means of any suitable instrument, which allows sliding wedge-block i , the pawl h , and plunger b to drop down, and allowing the pawl h to be held in the plunger b , slightly below the head g^2 , in the position shown in Fig. 2, the intermediate wedge-slips $l l'$ and the upper wedge-slips $n n'$ then assuming the position shown in Fig. 1. The lower wedge-slips $j j'$ are then brought down to the position shown in Fig. 1 and a wire, cord, or band s placed around the same and the tool-body a to hold the lower wedge-slips $j j'$ in their lowest position. The casing-spear A is then lowered into the well until it reaches the desired position for jarring, the wedge-slips $j j'$ being held by the band s , and the wedge-slips $l l'$ and $n n'$ can move slightly in sliding down through interior wall of the casing t as they touch, but do not hold thereto. When the casing-spear A reaches the desired position, the operator, by drawing upward on the tools, breaks or severs the cord or band s , so freeing the wedge-slips $j j'$ and allowing the wedge-slips $l l'$ and $n n'$ to engage with the casing. He then, through the walking-beam, gives an upward jar to the spear a , so moving the sliding wedge-block i , with the plunger b , downwardly and causing the lower wedge-slips $j j'$ to be forced outwardly, with their engaging faces j^3 , against the inner wall of the casing t , in order to bite into the same and hold fast thereto. The intermediate wedge-slips $l l'$ and the upper wedge-slips $n n'$ at the same time are brought down to the position shown in Fig. 2 by means of the pins $m m'$ and $p p'$ and also bite into the casing. He continues this upward jarring action after the wedge-slips of the spear A have grasped the casing s , and by means of such jarring action, through the wedge-slips holding to the casing, jars or loosens the casing t from the well. While in this position the flexible packing f is forced against the casing and all for-

eign matter is prevented from entering around the tool.

As soon as the casing t is jarred loose and the operation of loosening the same is completed, in order to withdraw the spear A it is necessary to release the wedge-slips from engagement with the casing, and the operator then changes the movement and through the drill-jars imparts a downward jar to the spear A , which forces the plunger b and sliding wedge-block i upwardly from between the wedge-slips $j j'$, holding to the casing, so allowing the pawl h to catch on the head g^2 , as shown in Fig. 3, and allowing the wedge-slips $j j'$ to drop down against the head g^2 on the lower end of the wedge-block i , and, through the dovetail or like connections on the tool-body a with the wedge-slips $l l'$ and $n n'$ pins $m m'$ and $p p'$, forces up the wedge-slips $l l'$ and $n n'$ to the position shown in Fig. 3. The wedge-slips $j j'$, $l l'$, and $n n'$ are thus withdrawn and the pawl h holds them in such position, so allowing the casing-spear to be raised and be withdrawn from the well.

The spear is very simple in its operation and provides one which is automatic and positive in its working.

The spear can easily be withdrawn from the well without any liability of the slips engaging with the casing. It is very strong and cheap, and an efficient tool for the purposes is provided.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a casing-spear, the combination with the tool-body, of a plunger sliding within the tool-body, a movable wedge-block fitting around the plunger having guideways therein, and a set of wedge-slips engaging with said guideways, substantially as and for the purposes set forth.

2. In a casing-spear, the combination with the tool-body, of a plunger sliding within the tool-body, a set of wedge-slips mounted upon movable inclined guideways around the plunger, and one or more sets of wedge-slips above the movable guideways and adapted to be operated therefrom, substantially as and for the purposes set forth.

3. In a casing-spear, the combination with the tool-body, of a plunger sliding within the tool-body, a set of wedge-slips mounted upon movable inclined guideways around the plunger, and one or more sets of wedge-slips above the movable guideways and adapted to be operated therefrom, and a spring-pawl for releasing the several wedge-slips, substantially as and for the purposes set forth.

4. In a casing-spear, the combination with the tool-body, of a plunger sliding within the tool-body, a movable wedge-block fitting around the plunger having guideways therein, a set of wedge-slips engaging with said guideways, and a wire band or cord adapted to engage said tool-body and wedge-slips to hold the wedge-slips in their lowest position, substantially as and for the purposes set forth.

5. In a casing-spear, the combination with the tool-body, of a plunger sliding within the tool-body, a movable wedge-block fitting around the plunger having inclined guideways therein, a set of wedge-slips engaging with said guideways, one or more sets of wedge-slips above the movable wedge-block sliding in guideways in the tool-body and adapted to be operated therefrom, and a spring-pawl for releasing the several wedge-slips, substantially as and for the purposes set forth.

6. In a casing-spear, the combination with the tool-body, of a plunger sliding within the tool-body, a movable wedge-block fitting around the plunger having inclined guideways therein, a set of wedge-slips engaging with said guideways, an intermediate set of wedge-slips above the movable wedge-block sliding in guideways in the tool-body, pins within the tool-body connecting the movable wedge-block with the intermediate wedge-slips, and a spring-pawl for releasing the several wedge-slips, substantially as and for the purposes set forth.

7. In a casing-spear, the combination with the tool-body, of a plunger sliding within the tool-body, a movable wedge-block fitting around the plunger having inclined guide-

ways therein, a set of wedge-slips engaging with said guideways, an intermediate set of wedge-slips above the movable wedge-block sliding in guideways in the tool-body, pins within the tool-body connecting the movable wedge-block and the intermediate wedge-slips, a set of upper wedge-slips above the intermediate wedge-slips sliding in guideways in the tool-body, pins on said intermediate wedge-slips engaging with the upper wedge-slips, and a spring-pawl for releasing the several wedge-slips, substantially as and for the purposes set forth.

8. In a casing-spear, the combination with the casing, of a tool-body, a plunger mounted within the tool-body, a cap on the lower end of the tool-body having a seat therein, a slot within the tool-body, a pin on said plunger passing through the slot into the cap, and a flexible packing within the seat connected to the cap and adapted to engage with the sides of the casing, substantially as and for the purposes set forth.

In testimony whereof I, the said JOHN CARRUTHERS, have hereunto set my hand.

JOHN CARRUTHERS.

Witnesses:

A. M. BLAKELEY,
J. N. COOKE.