J. BOLE.

Casing-Spear for Oil-Wells.

No. 204,878. Patented June 18, 1878.

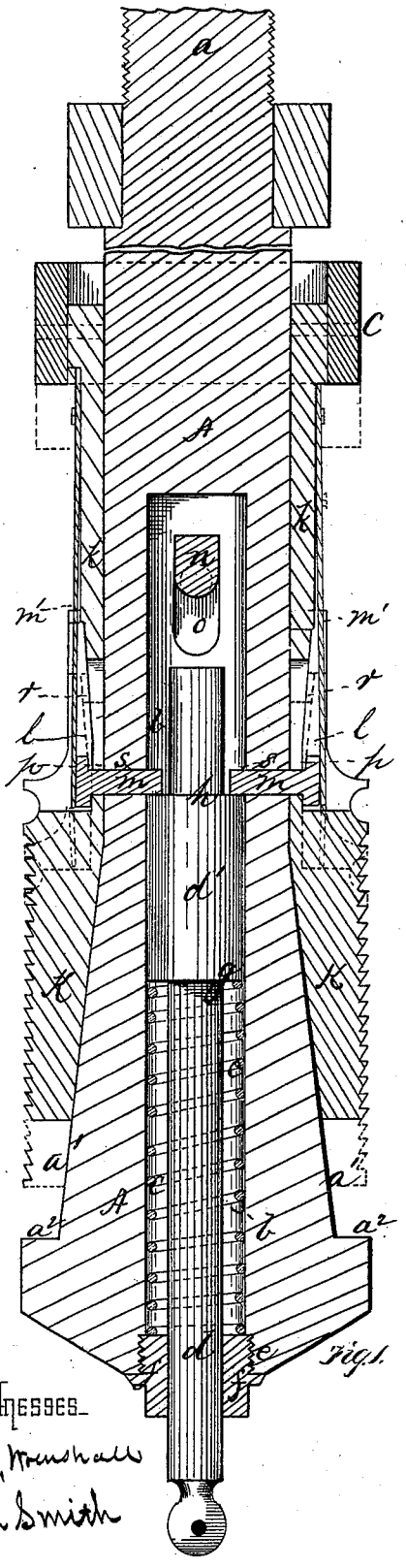

Fig. 1.

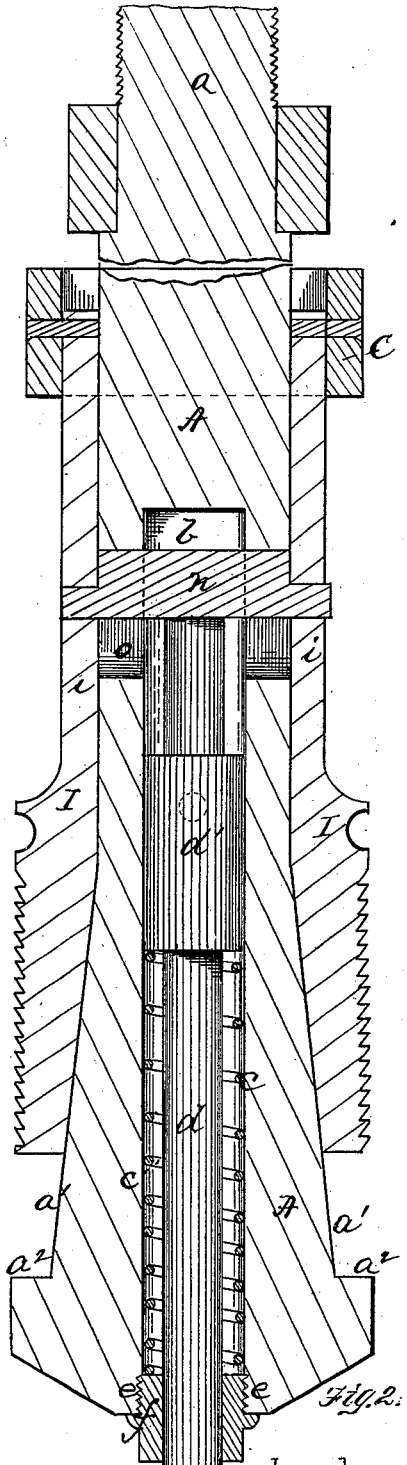

Fig. 2.

Witnesses.

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IMPROVEMENT IN CASING-SPEARS FOR OIL-WELLS.

Specification forming part of Letters Patent No. **204,878**, dated June 18, 1878; application filed April 29, 1878.

To all whom it may concern:

Be it known that I, JOHN BOLE, of Knox P. O., in the county of Clarion 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, reference being had to the accompanying drawing, forming part of this specification, in which—

Figure 1 is a longitudinal central section of devices embodying my invention, showing the position of the parts when the wickers are set for lowering the spear into the well. Fig. 2 is a similar section at right angles to Fig. 1, showing the position of the parts while in operation, and also while withdrawing the spear from the casing.

Like letters refer to like parts wherever they occur.

My invention relates to the construction and operation of casing-spears for the removal of casing; and consists, first, in combining with the wickers of a casing-spear a spring or springs, arranged with relation thereto to have a constant action on the wickers, whereby the gripe of the wickers upon the casing can be released at any time without fail, and with limited motion of the spear; secondly, in combining with the wickers of a casing-spear and a spring or springs having constant action on said wickers a device or devices for varying the action of the spring on the wickers, whereby the wickers can be set for the introduction of the spear and the spring released to vary its action on the wickers after the spear is introduced; and, finally, in details of construction hereinafter more specifically set forth.

Heretofore, in the construction of casing-spears wherein means were employed to release the gripe of the wickers upon the casing for the purpose of withdrawing the spear or changing the position of the spear in the casing, several general methods, all of which were more or less objectionable, have been adopted. One method adopted was to operate the wickers, for the purpose of sustaining or releasing the same, by means of a wire or like independent device carried to the top of the well. A second was by means of a spring-catch on the stem, the movement of the stem through the wickers causing the catch to engage with, or be released from, a slot in the collar uniting the wickers, thus securing or releasing the wickers, as the case may be. A third method has been by a central rod, movable in the stem to which the wickers were attached, said rod being locked to the stem by a catch for the purpose of introducing the spear, and held at the desired point by a friction-disk while the stem is given an independent motion to release the catch of the rod and free the wickers. A fourth method has been the use of a spring-bar, which worked in an irregularly-slotted or cam plate, said bar pivoted or otherwise connected to the collar of the wickers, the wickers being engaged or disengaged, according to the position of the pin of the spring-bar in the cam-slot.

The objection to the first-named method is the liability of the wire or like devices being broken in attempting to release or disengage the wicker, or to become wound around or entangled with the rope used to lower the spear and jars. The objection to the second method is, first, that the catch and notch must always be made to register before the wickers can be caught and disengaged, and it is not always practicable when the spear is in the well to obtain the required movement of the parts on each other to cause the catch and slot to register; and, secondly, if the catch is injured by the jarring or otherwise, the parts become inoperative. The objection to the third series of devices is that the engaging and disengaging of the wickers is dependent entirely on the frictional contact of the devices with the casing, which renders the operation of the devices uncertain and insecure. The objection to the fourth method or slotted plate is the difficulty to manipulate the parts at the great depth they are placed in the casing, and the uncertainty and loss of time incident to their use. In more than one instance spears of the classes noted have been lost in the well, plugging the same, and causing much loss of time and money.

The object of my invention is to obtain automatic disengaging devices certain in their operation and not liable to become disarranged.

I will now proceed to describe my invention,

so that others skilled in the art to which it appertains may apply the same.

In the drawing, A indicates the stem, provided above with the usual pin *a* for attaching the spear to the jars or other devices with which the spear is employed. This stem A is usually made polygonal in cross-section, and tapers from below toward the pin *a*, to form inclines a^1, on which the wickers rest and move. At the lower end of stem A are a series of shoulders, a^2, which limit the movement of the wickers. Stem A is bored out centrally, as at *b*, for the reception of a spring, *c*, and central movable rod *d*, and is threaded, as at *e*, for a hollow nut, *f*, which retains the spring within the bore of the stem A, but permits the end of rod *d* to project. This spring *c* should be so graded that its power, when at its full expansion, is just sufficient, or but little more than sufficient, to sustain the weight of the wickers, for reasons which will hereinafter appear. The rod *d* is made with an enlargement or collar, *d'*, at or near one extremity, whereby two shoulders are secured, one as at *g*, against which the upper end of spring *c* bears, and the other at *h*, which engages with pins *m* carried in the wickers. The upper end of the rod *d* also engages with a cross piece or pin, *n*, which connects the wickers.

I I and K K indicate wickers, preferably four in number, (the stem A being preferably provided with four inclined surfaces,) said wickers being provided with reins or straps *i i k k*, by which they are detachably connected to a collar, C.

The loose collar C, that holds the wickers, is bored out sufficiently large to slip over the fixed collar of the mandrel or stem. The ends of the wicker-reins are turned on the mandrel or stem to fit the bore of the loose collar C, and the parts are finally drilled, so that the wickers can be detachably secured to the collar by screws, whereby a secure and effective connection of the parts is obtained.

The wickers I I are connected by a cross-piece or cross-pin, *n*, which works in a slot, *o*, in stem A, extending across the bore *b*, and engaging with the upper end of spring-rod *d*. The wickers K K are each provided with a pin, *m*, carried in a slotted groove, *l*, in the wicker, or rein *k* thereof, said groove being flat at its bottom for a limited distance, as at *p*, to permit a little play of wicker and pin on each other without operating the pin, and inclined, as at *r*, to operate the pin when the movement of the wickers exceeds a certain limit. The pins *m* have, or should have, heads inclined upon their under surface, and said pins project through holes S in the stem into the path of the spring-rod *d;* and, in order to retain the pins *m* in position and prevent their loss, springs *m'*, or equivalent devices, may be employed. The pins *m* of the wickers K are arranged lower down than the cross-piece *n* of the wickers I I.

The parts, being constructed and arranged substantially as shown and described, may be employed as follows: The spear is secured to the jars in the usual manner. The spring-rod *d* is then seized by its lower end and drawn down, to slightly compress spring *c*, which is held between shoulder *g* of the rod and top of nut *f*, and until the shoulder *h* takes under pins *i* of the wickers, thus sustaining the wickers at the highest point and reducing the size of the spear to its least diameters. In this condition (clearly shown in Fig. 1) the spear is lowered into the casing until the desired point is reached. When the spear is opposite the desired point in the casing, the jars are operated to "jar up" in the usual manner, when the downward movement of the wickers causes the inclines *r* in slot *l* to retract the pins *m*, which free the spring-bar, (and tension of the spring,) permitting the wickers to fall far enough down the incline to almost engage with the casing, when the upper end of spring-rod *d* engages with the cross-piece *n*, connecting wickers I I. As the power of spring *s* is only sufficient to sustain the wickers, the continued "up jarring" will vibrate or compress the spring and permit the wickers to engage with the casing, when the further operations of the spear will be the same as those now in use. When the spear is to be withdrawn, a little "down jarring" will release the gripe of the wickers, when the force of the spring, as soon as the jarring is stopped, will be sufficient to lift and disengage the wickers, when the spear can be readily withdrawn. Before it is again lowered the spring-rod *d* will have to be drawn down to set the wickers, as before specified.

The advantages of my devices, in addition to those before specified, are that the parts, if broken or injured, are readily detached and replaced, the devices are simple and durable, and the construction is such as to insure the protection of the disengaging mechanism.

Having thus described the nature and advantages of my invention, what I claim, and desire to secure by Letters Patent, is—

1. The combination, with the stem and wickers of a casing-spear, of a spring or springs connected therewith and adapted to act constantly on the wickers, substantially as and for the purpose specified.

2. The combination, with the stem and wickers of a casing-spear, of a spring or springs adapted to act constantly on the wickers, and devices, substantially as described, for varying the power of the spring, substantially as and for the purpose specified.

3. The combination of the hollow stem with the spring-rod, the wickers, and the wicker-pins, operated by inclines on the wickers, substantially as and for the purpose specified.

4. The combination of the hollow stem, the spring-rod, and the wickers, part of said wickers connected by a cross-pin and part provided

with retractable pins or catches, substantially as and for the purpose specified.

5. The combination, with the stem of a casing-spear, of the loose wicker-collar C and the series of detachable wickers, connected to the collar C by screws, the whole constructed substantially as and for the purpose specified.

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

JOHN BOLE.

Witnesses:
R. H. WHITTLESEY,
F. W. RITTER, Jr.