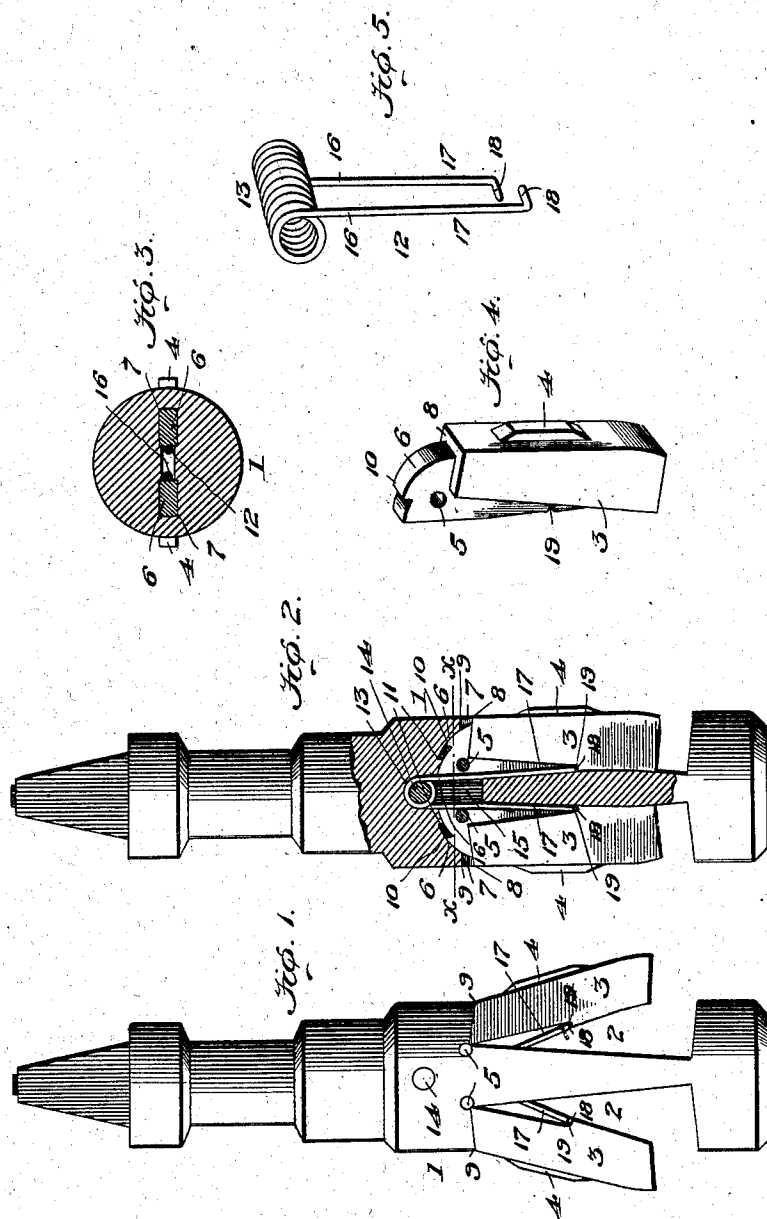


No. 729,743.

PATENTED JUNE 2, 1903.

M. H. DUNN.
UNDERREAMER FOR DRILLING OIL WELLS.
APPLICATION FILED MAY 9, 1903.

NO MODEL.



Witnesses.

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UNITED STATES PATENT OFFICE.

MOSES H. DUNN, OF FULLERTON, CALIFORNIA.

UNDERREAMER FOR DRILLING OIL-WELLS.

SPECIFICATION forming part of Letters Patent No. 729,743, dated June 2, 1903.

Application filed May 9, 1902. Serial No. 106,638. (No model.)

To all whom it may concern:

Be it known that I, MOSES H. DUNN, a citizen of the United States, residing at Fullerton, county of Orange, and State of California, have invented certain new and useful Improvements in Underreamers for Drilling Oil-Wells, of which the following is a specification.

My invention relates to underreamers for drilling oil-wells and other purposes.

The object of the invention is the provision of an improved and novel underreamer of simple and durable construction which will be adapted for easy operation and when once in the pipe can be passed up and down without danger of engaging with or locking with the pipe and one in which the bits open automatically on passing out from the lower end of the pipe and also adapted to readily close when pulled back into the pipe.

Other objects of the invention are the provision of an improved underreamer whose bits will be of such novel construction that they will be guided in the pipe and injurious contact therewith prevented and friction on the pipe will be reduced to a minimum, strain on the parts distributed to the best advantage, and which will not be liable to get out of order.

Having the foregoing objects in view, as well as others not specifically mentioned, the invention consists of an underreamer of improved and novel construction, as set forth in detail hereinafter and recited in the appended claims.

In the accompanying drawings, Figure 1 is a side view with the bits open; Fig. 2, a longitudinal section; Fig. 3, a cross-section on line *xx* of Fig. 1; Fig. 4, a detail of one of the bits, and Fig. 5 a perspective detail of the spring.

The numeral 1 designates the body of the underreamer, which is made solid and has its sides cut out or recessed at 2 for the accommodation of the bits to lie flush with the sides of the body when closed. The bits are shown at 3, two of the bits being employed. Each bit is provided on its outer face with an antifriction guide-rib 4, extending in the direction of the length of the underreamer and which in practice will be about one inch in width. These ribs afford the sole bearing between the

bits and the pipe or tube, so that the friction is reduced to a minimum while the underreamer is being passed up and down in the pipe and injurious engagement of the bits with the pipe prevented. The bits are pivoted at 5 to the body and have their upper portions 6 received in slots 7 in the body, whereby the strain incident to the operation of the bits is practically removed from the pivotal connections 5. On each bit there is provided a shoulder 8, adapted to abut the edge 9 on the body, and each bit also has an offset or shoulder 10, adapted to abut a shoulder 11 in the slot 7, whereby when the bit is thrown outwardly both the shoulders 8 and 10 will abut the body, and this, combined with the location of the portion 6 of the bit in the slot 7, will firmly position the bit during its operation and release the strain on the pivotal connection 5, as also resist any further outward play of the bit, thus insuring a steady cutting or underreaming action. When the bits are closed, they enter the spaces 2, as shown in Fig. 2.

To accomplish the automatic spreading of the bits, I provide a spring 12, having a coil 13, which surrounds a pin 14 and is located in a recess 15 in the body. The upper portions 16 of the arms 17 of the spring are thus confined by the walls of the recess 15, whereby the resiliency of the spring is increased by reason of the confinement of said portions. The arms 17 of the spring are provided at their ends with fingers 18, which extend in opposite directions and are received in apertures 19 in the respective bits, said arms 17 being located between the bits—that is, on their inner sides. The constant tendency of the spring is to throw the bits outwardly, and in consequence of this action immediately upon the underreamer leaving the lower end of the pipe or tube the bits will spring outwardly; but their movement will be arrested by the shoulders 8 and 10. On drawing the underreamer back into the pipe the bits will be closed by the contact of the antifriction guide-ribs 4 with the lower end of the pipe, said ribs being preferably provided with inclined ends 20 to facilitate this operation and also the entrance of the underreamer into the pipe when it is inserted at the top of the pipe.

It may be found desirable to use a suitable clamp for holding the bits closed on the entry

of the underreamer into the upper end of the pipe, which can be removed after the bits have been entered in the pipe.

I am aware that many changes of construction could be resorted to in carrying out my invention, and I do not, therefore, limit myself to the specific construction shown and described, but consider that I am entitled to all modifications falling within the spirit and scope of the invention.

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

1. In an underreamer, the combination with a body, of bits pivoted thereto, means for spreading the bits from the body, and guide-ribs extending lengthwise of the bits and located on the outer faces thereof which prevent injurious contact of the bits with the well-tubing.

2. In an underreamer, the combination with a body, of bits pivoted thereto, means for spreading the bits from the body, and guide-ribs located on the outside of the bits and extending longitudinally thereof and tapered or beveled at both ends, whereby entry of the underreamer into the tube is facilitated and tilting of the reamer prevented during transit in the tube.

3. In an underreamer, the combination with a body, of bits pivoted thereto, a spring for spreading the bits comprising a coil intermediate the ends of the spring, arms bearing against the bits, and an independent fastening member extending through the coil of the spring at a point separated from the pivoted connection of the bits and securing it to the body.

4. In an underreamer, the combination with a body provided with a recess in its interior, of bits located entirely outside the re-

cess and having pivotal connections with the body at points below the recess, a spring having arms which bear against the bits and are adapted to spread them and an intermediate portion which is received in the recess in the body and held therein and confined by the walls of the recess.

5. In an underreamer, the combination with a body provided with a recess in its interior, of bits located entirely outside the recess and having pivotal connections with the body at points below the recess, a spring formed of a single piece of material which is provided with a coil intermediate its ends, said coil being received in the recess aforesaid and confined therein, arms on the spring bearing against the respective bits and adapted for spreading them, and a fastening extending through the coil of the spring and connecting it to the body.

6. In an underreamer, the combination with a body provided with slots, of bits having portions received in said slots and pivoted therein, and a spring having its intermediate portion secured to the body at a different point from the pivoting of the bits, and its ends bearing on the bits.

7. In an underreamer, the combination with a body having slots and two shoulders in each slot, of bits having portions received in the slots and pivoted therein and each provided with two shoulders adapted to abut the shoulders in the slots when the bits are spread, and a spring for spreading the bits.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

MOSES H. DUNN.

Witnesses:

MABEL CUNNINGHAM,
T. B. VAN ALSTYNE.