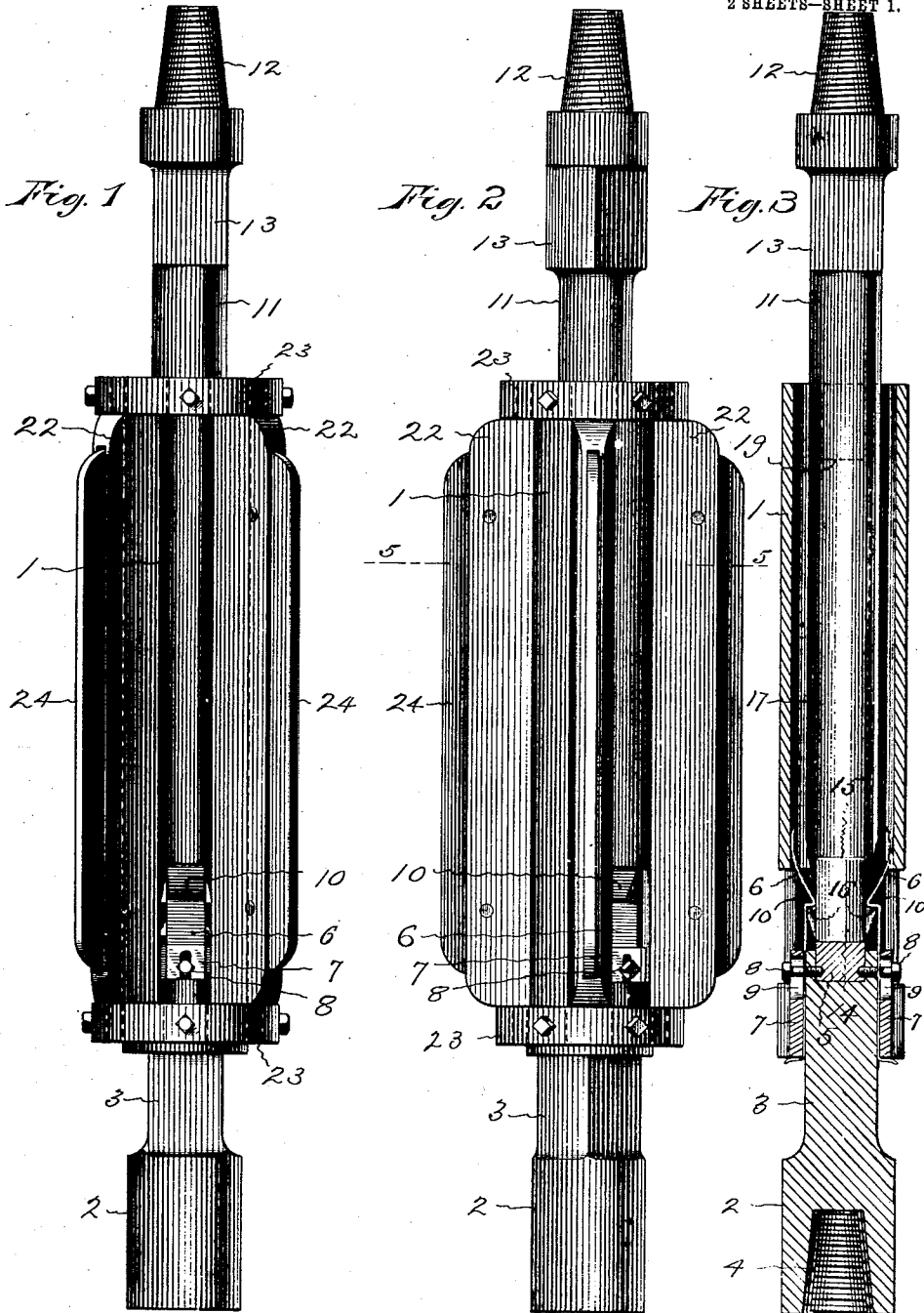


H. B. KING.
 JAR FOR WELL DRILLS.
 APPLICATION FILED JUNE 30, 1908.

935,914.

Patented Oct. 5, 1909.

2 SHEETS—SHEET 1.



WITNESSED:

E. J. McNamee
Josephine H. Strempper.

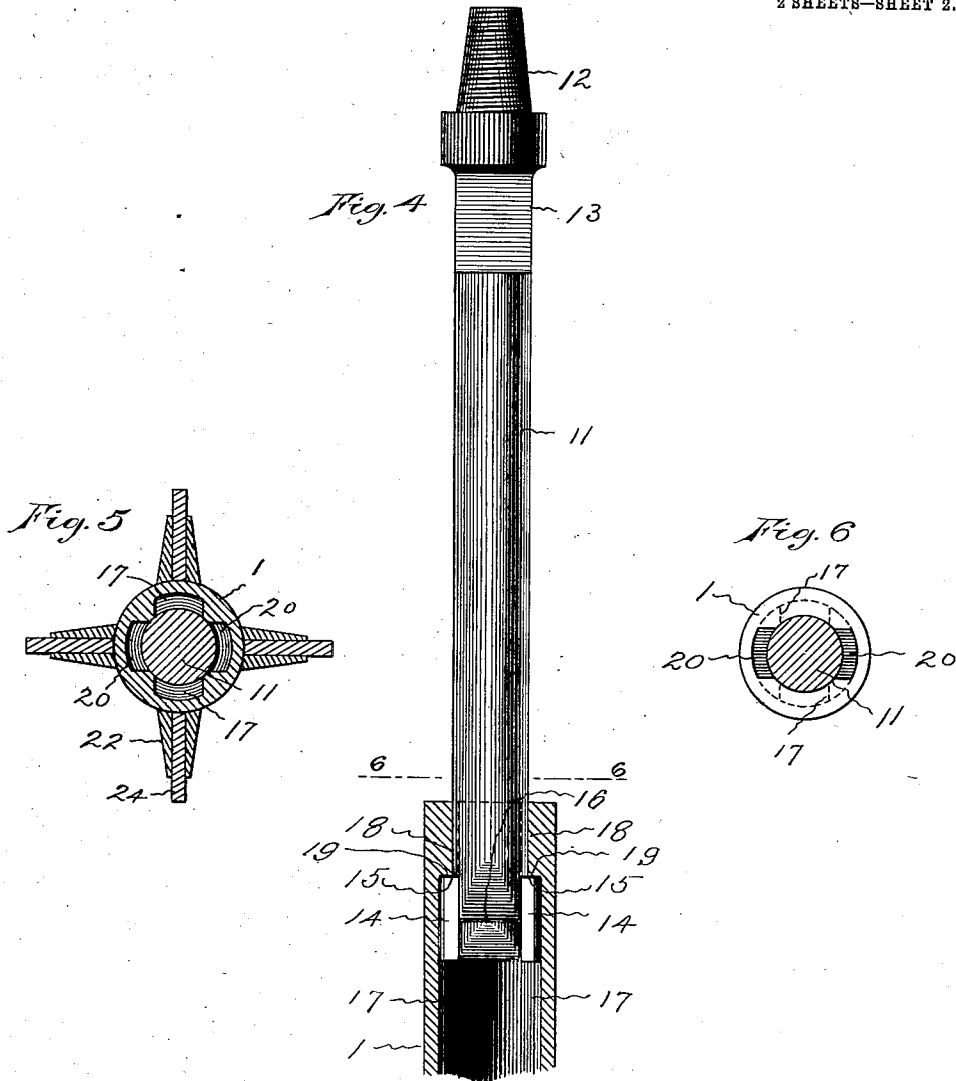
INVENTOR:

Harvey B. King by
Harry R. Williams atty.

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WITNESSES:

E. J. Breckland
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INVENTOR:

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UNITED STATES PATENT OFFICE.

HARVEY B. KING, OF HARTFORD, CONNECTICUT, ASSIGNOR TO FRANK J. KNOX, OF HARTFORD, CONNECTICUT.

JAR FOR WELL-DRILLS.

935,914.

Specification of Letters Patent.

Patented Oct. 5, 1909.

Application filed June 30, 1908. Serial No. 441,133.

To all whom it may concern:

Be it known that I, HARVEY B. KING, a citizen of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented a new and useful Jar for Well-Drills, of which the following is a specification.

This invention relates to a device which is designed to be used with any type of drilling apparatus and any form of drill for boring holes for plunger elevator shafts or shafts for other purposes, or deep or shallow wells for water, oil or other liquid, gas or minerals, through loam, sand, clay, gravel or boulders, ledge or solid rock, for the purpose of keeping the drill vertical so that the hole will be straight and plumb, and for loosening the drill in case it becomes jammed or otherwise fastened in the hole.

The object of this invention is to produce a simple device which is readily connected in the string between the drill and the lifting rod or cable, and which can be easily adjusted to fit a hole of any usual size so that it will keep the drill straight, and which is so constructed that under ordinary conditions it is rigid, and provides a firm connection between the drill and the lifting means, and yet if the drill becomes jammed or fastened in the hole, its stem is released from the body of the device so that it may be used to jar the drill loose.

Figure 1 of the accompanying drawings shows a side elevation of the jar in condition for use, that is, with the stem and body rigidly connected so that they act as one piece. Fig. 2 is a similar view of the same turned one eighth way around. Fig. 3 is an elevation with the body cut in central section so as to expose the yielding means which connect the body and the stem. Fig. 4 shows a side view of the stem and the upper portion of the body with the parts in the relation assumed after the stem has been loosened from the body and is free to jar the drill. Fig. 5 is a transverse section taken on the plane indicated by the dotted line 5-5 on Fig. 2. Fig. 6 is a section taken on the plane indicated by the dotted line 6-6 on Fig. 4.

The body 1 of this jar is tubular. Cast integral with or otherwise firmly secured to the lower end of the body is a head 2 which has a square neck 3 and a threaded socket 4 into which the stem of a drill of any char-

acter is adapted to be screwed. Set in the upper end of the head in the body is a removable anvil block 5 and in mortises in the sides of the head and extending into the body are heavy leaf springs 6. These springs are preferably secured in place by blocks 7 which are free to move in the mortises and are adjustably held by screws 8 that extend through slots 9 in these blocks (Fig. 3). The free ends of these springs rest against the inner walls of the tubular body, and between the free ends and where they are held by blocks are holding shoulders 10. By sliding these blocks upwardly or downwardly the stiffness of these springs that is, the strength of their hold can be regulated.

The stem 11 of the jar at its upper end has a thread 12 which is adapted to be screwed into the coupling which connects the jar with the lifting rod or cable, and below the threaded end is a squared section 13 for the application of a wrench which may be used for screwing the parts together. The cylindrical stem fits the inner walls of the cylindrical body, and the lower end of the stem is provided with a head 14 which projects outwardly in two directions so as to form shoulders 15 on its upper edge. On the sides of the stem head are shoulders 16 which are adapted to be engaged by the shoulders 10 of the springs 6. The lower end of the head is preferably tapered on the sides so that it will readily pass between the springs when it is dropped downwardly, and when the end of the head rests upon the anvil block 5, the shoulders of the springs engage the shoulders of the head and hold the stem and body together as one piece. In the walls of the tubular body are longitudinal grooves 17 in which the projecting sides of the head fit.

When the device is operating under normal conditions, the springs engage the head and hold the stem and body of the jar so that it lifts and drops as one piece. If the drill for any reason becomes jammed or stuck in the hole as by the dropping in of pieces of rock or other matter, and it requires an excessive force to release the drill, the additional strain which is thus caused is sufficient to pull the head from the springs and allow the stem to lift freely, the head of the stem drawing up in the grooves in the body without lifting the body. This in-

stantly relieves the hoisting machinery and the engine so that they are not suddenly stopped, which stopping is likely to damage or break some of the parts of the apparatus or the engine. When the stem is released in this manner by excessive strain, caused by the jamming of the drill the stem is lifted to the upper part of the tubular body as shown in Fig. 4 and drawn up and down so that the head of the stem will knock with an upward motion against the flange 18 around the interior of the upper part of the tubular body. The knocking of the shoulders 15 against the bottom edge 19 of this flange jars the drill loose without putting undue strain upon the apparatus. Grooves 20 are made through this flange at the upper end of the tubular body for the purpose of allowing the head of the stem to enter the body. The stem is inserted into the body with its head in these grooves and lowered until the head reaches the opening 21 at the lower end of the tubular body, then the stem is turned one-quarter way around and the head drawn into the grooves 17, after which the anvil block 5 is placed in position so that the stem cannot drop low enough for the head to turn around and get out of these grooves.

Flanges 22 may be cast integral with or otherwise secured to the outer wall of the tubular body. These flanges, of which four are shown in the drawing, may be secured to the body by collars 23 at their upper and lower ends, which are fastened by any suitable means. It is desirable to make these flanges with mortises in which can be placed wings 24.

If the jar is to be used for guiding a drill in a relatively small well hole, it may be used without the flanges and wings. If it is to be used for a large well hole or a small elevator shaft hole, the flanges may be added to the tubular body, and if it is to be used for an extra large hole, as for a large elevator plunger or other purpose, wings of the proper size may be inserted in the mortises in the flanges so as to bear against the walls of the opening or the casing in the opening.

This jar is capable of use for guiding and keeping in line drills designed to bore holes of any desired size, from that of a small well hole to a large plunger hole, and the guiding flanges and wings can be quickly applied or removed so that the jar will fit the walls of the hole and thus keep the drill perfectly straight, which is an absolute necessity for the class of drilling for which this jar is designed.

The parts work together as one piece when the tools are operating under normal conditions, for the springs are adjusted to keep the parts together under normal strain. Should the drill become jammed or cramped

by reason of the dropping in of pieces of rock or other substance so that it could not be lifted with the usual force and an abnormal strain is brought upon the parts, the springs release the stem and relieve the machinery of shock and then the stem is used to jar the drill loose. After the drill has been loosened, the stem is dropped until its head is again engaged by the springs, after which the normal operation is resumed.

The invention claimed is:

1. A drill jar having a body adapted to be connected with a drill, a stem adapted to be connected with a lifting apparatus, means permanently attached to one part and yieldingly connected with the other part whereby the parts are raised as one piece under normal strain, but automatically freed when the upward strain is excessive, and means arranged on one part and adapted to engage means on the other part to prevent the complete separation of the parts, substantially as specified.

2. A drill jar having a body adapted to be connected with a drill, a stem adapted to be connected with a lifting apparatus, springs permanently connected with one part and yieldingly engaging the other part whereby the parts are normally connected together by said springs, and means for adjusting the tension of the springs, substantially as specified.

3. A drill jar having a body adapted to be connected with a drill, a stem adapted to be connected with a lifting apparatus, springs connected with the body and adapted to engage the stem and normally connect the body and the stem, and means for adjusting the tension of the springs, substantially as specified.

4. A drill jar having a tubular body adapted to be connected with a drill, a cylindrical stem adapted to be connected with a lifting means, said stem having shoulders near its lower end, leaf springs connected with the body and having shoulders adapted to engage the shoulders on the stem, substantially as specified.

5. A drill jar having a tubular body adapted to be connected with a drill, a cylindrical stem adapted to be connected with a lifting means, said stem having shoulders, leaf springs connected with the body, said springs having shoulders adapted to engage the shoulders on the stem, and means for adjusting the tension of the springs, substantially as specified.

6. A drill jar having a body adapted to be connected with a drill, a stem adapted to be connected with a lifting apparatus, springs permanently attached to one part and yieldingly engaging the other part so as to normally connect the parts together, and flanges extending from the exterior of the body, substantially as specified.

7. A drill jar having a body adapted to be connected with a drill, a stem adapted to be connected with a lifting apparatus, springs permanently connected with one part and
5 yieldingly engaging the other part so as to normally connect the parts together, flanges projecting from the body, said flanges hav- ing longitudinal recesses and wings remov- ably secured in said recesses and projecting from the flanges, substantially as specified. 10
HARVEY B. KING.

Witnesses:

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HARRY R. WILLIAMS.