(No Model.)

F. A. FLANEGIN.

DRILL JAR.

No. 446,622. Patented Feb. 17, 1891.

Fig. 1.

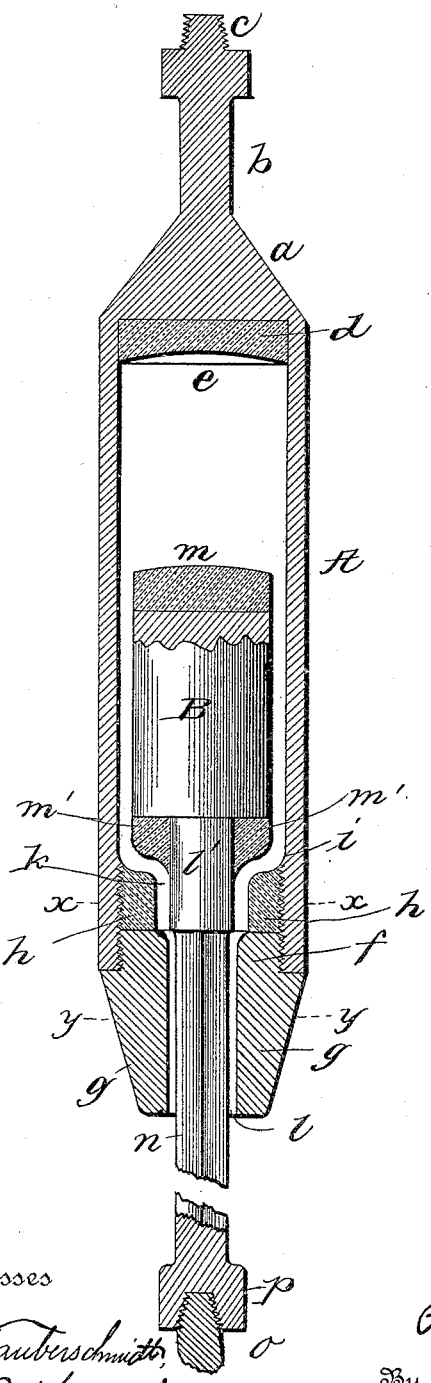


Fig. 2.

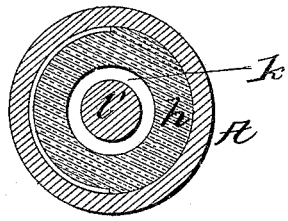


Fig. 3.

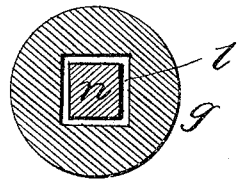
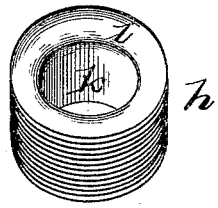


Fig. 4.



Witnesses

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UNITED STATES PATENT OFFICE.

FRANCIS A. FLANEGIN, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR OF ONE-HALF TO DAVID C. REINOHL, OF SAME PLACE.

DRILL-JAR.

SPECIFICATION forming part of Letters Patent No. 446,622, dated February 17, 1891.

Application filed December 12, 1890. Serial No. 374,450. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS A. FLANEGIN, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Drill-Jars; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to drill-jars for well-drilling tools, and has for its object certain improvements in construction, which will be hereinafter described, and more particularly pointed out in the claims.

The drill-jars in practical use are subject to becoming clogged by particles of rock falling into the open and unprotected spaces between the sides or bars and at the ends or seats of the implement, and by burrs of displaced metal, which form on the seats, and when clogged, locked, or choked it becomes an impossibility to release the boring-bit and withdraw the set of tools from the well, thus resulting in great loss.

Another difficulty encountered in drilling wells—namely, "plugging" the well—is caused by the sticking of the drill-jar, due to the expansion or displacement of metal on the inside of the sides or bars of the drill-jar. The result of the constant pounding of one of the members of the drill-jar upon the seat of the other, which expands or displaces the fiber of the metal at the end or seat, causes it to work into the side bars, lengthening the inside thereof, bulging them, and frequently causing one or the other to break. As soon as the break occurs the bar springs out, engages with the wall of the well, and becomes fast in the well and plugs the bore of the well.

My invention is designed to obviate all these difficulties by producing a drill-jar having a plain smooth cylindrical surface which is not affected by expansion, an interior jar-chamber which no particles of rock large enough to do injury can enter, and in which the jar-surfaces are continually changing and are protected against wear from extraneous or foreign matter.

In the accompanying drawings, which form part of this specification, Figure 1 represents a vertical section, partly in side elevation; Fig. 2, a transverse section on line $x\,x$ of Fig. 1; Fig. 3, a similar view on line $y\,y$, and Fig. 4 a perspective of the upper portion of the sleeve forming the lower buffer.

Reference being had to the drawings and the letters thereon, A indicates a plain smooth cylinder, which may be made of tubing, closed at its upper end by welding the head a into the end of the tube and forming a homogeneous body of metal. The head a is provided with an extension b and a connection c for attaching a sinker-bar. (Not shown.) On the inside of the head a and welded thereto and to the cylinder A is a buffer d, made of steel and provided with a concave impact-face e. The lower end of the cylinder is open and provided with a sleeve f, which may be attached by screw-threads, as shown, or it may also be welded into the end of the cylinder after the plunger has been inserted. In practice the sleeve is passed on the rod or extension of the plunger, the plunger inserted in the cylinder, the sleeve welded into the end of the cylinder, and the lower end of the rod subsequently welded on. The lower end g of the sleeve may be made of wrought-iron, and upon its upper end may be welded a buffer h of steel, or the entire sleeve and buffer may be made of steel. The buffer h is also provided with a concave impact-surface i and with a cylindrical opening k. The opening l in the lower portion of the sleeve is angular.

Within the cylinder is a plunger B, cylindrical in form and of considerably less diameter than the interior of the cylinder A, to fit loosely and accommodate any deflections or changes of alignment of the drill and auger-stem. This is also compensated by the difference between the cross-sectional area of the openings in the buffer h and in the sleeve f. The body of the plunger may be made of wrought-iron, and to the upper end thereof is welded a buffer m of steel, which is provided with a rounded or convex impact-surface corresponding with the adjacent end of the buffer d.

From the lower end of the plunger B ex-

tends a rod which may be cylindrical at the upper end l' for convenience in welding the buffer m' to the lower end of the plunger and for affording increased strength at the point where the greatest strain is exerted by the jar. From the cylindrical portion l' the rod is angular, to conform to the opening in the sleeve f, for the purpose of turning the auger-stem and the drill from the bull-rope, and for affording a convenient surface for the application of a wrench while screwing the auger-stem o into the box p on the lower end of the rod.

In forming the several welds for attaching the buffers the skill of the forger or blacksmith will suggest the most approved forms into which to work the adjacent surfaces, such as cones and corresponding recesses.

The space around the angular portion of the plunger-rod is sufficiently large to allow egress of any sand or fine particles of rock that may enter the cylinder as the tools descend in the bore of the well.

In the operation of my improved drill-jar any deflection from the perpendicular of the drill and auger-stem in their descent are compensated by the lateral movement of the plunger in the cylinder, and the impact of the jar is distributed over nearly the entire area of the buffers, avoiding cutting the impact-surfaces.

From the form of the several parts of this implement it is obvious that breakage is rendered almost impossible; but should any portion break and remain in the bore of the well when the string of tools are withdrawn the remaining part can be readily removed by the use of the ordinary "fishing-tools," that it cannot lock, clog, or choke with rock or burrs formed on the jar or impact-surfaces, and that the whole structure can be made in a blacksmith-shop without the use of lathe-work.

The drill-jar can be made in various lengths, but the diameter of the cylinder should always be about an inch less than the bore of the well.

Having thus fully described my invention, what I claim is—

1. A drill-jar consisting of a cylinder having a closed upper end and an opening in the lower end, in combination with a loosely-fitting plunger in the cylinder and having a rod passing loosely through the opening in the cylinder to admit of free lateral movement of the plunger in the cylinder, and suitable means for connecting with a sinker-bar and an auger-stem.

2. A drill-jar consisting of a cylinder having a closed upper end and an opening in the lower end, in combination with a loosely-fitting plunger in the cylinder, a rod passing loosely through said opening to admit of free lateral movement of the plunger in the cylinder, and buffers for both ends of the plunger.

3. A drill-jar consisting of a cylinder having a closed upper end and an angular opening in the lower end and a buffer at each end of the cylinder, in combination with a plunger fitting loosely in the cylinder, and an angular rod passing through the opening in the cylinder.

4. A drill-jar consisting of a cylinder having one end formed integral with the cylinder and the opposite end open, in combination with a sleeve provided with an angular opening and secured in the cylinder, a plunger having free lateral motion in the cylinder, and buffers at both ends of the cylinder.

5. A drill-jar consisting of a cylinder having buffers at each end provided with concave impact-surfaces and an opening in one end, in combination with a plunger fitting loosely in said cylinder and provided with buffers having convex impact-surfaces, and a rod passing loosely through the opening in the cylinder.

6. A drill-jar consisting of a cylinder having a buffer at each end and a cylindrical opening in the lower buffer, in combination with a plunger fitting loosely in said cylinder and having a buffer at each end, and a rod provided with a cylindrical portion adjacent to the plunger and an angular portion extending through the cylinder.

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

FRANCIS A. FLANEGIN.

Witnesses:
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