W. A. SPARKS.

WELL DRILL JAR.

APPLICATION FILED JAN. 24, 1912.

1,108,267.

Patented Aug. 25, 1914.

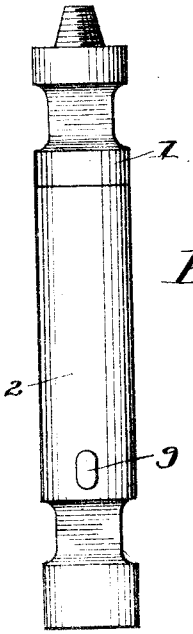


Fig. 1.

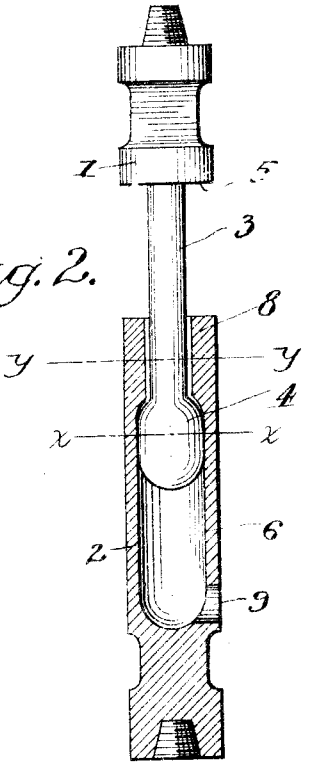


Fig. 2.

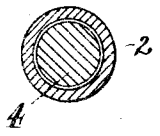


Fig. 4.

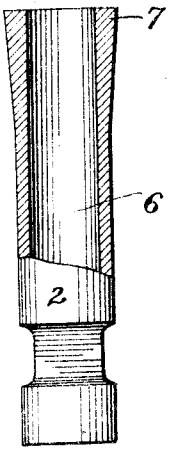


Fig. 3.

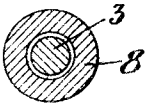


Fig. 5.

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UNITED STATES PATENT OFFICE.

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WELL-DRILL JAR.

1,108,267. Specification of Letters Patent. Patented Aug. 25, 1914.

Application filed January 24, 1912. Serial No. 673,106.

To all whom it may concern:

Be it known that I, WILLIAM A. SPARKS, a citizen of the United States, residing at St. Marys, in the county of Pleasants and State of West Virginia, have invented certain new and useful Improvements in Well-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 well drill jars.

The weakest part of a string of drilling tools has always been the jars and their weakness is generally caused by the welds at each end, which impair the strength of the metal, or by the rivet or screw connection between the parts which complicate the construction as well as weaken the device.

In employing drilling tools having jars of the usual type, it is frequently necessary to insert new jars in drilling a deep well, owing to the wearing of the vital parts of the jars. The jars of the usual type employed by contractors are weak at the joints, due to vitiated or defective metal or to the construction of the joints. Should a jar of the type ordinarily employed become broken during the drilling operation, the operator experiences considerable trouble in the recovery of his drilling tools, requiring an equipment of many extra tools to remove the fractured parts from a well. It is frequently impossible to recover the broken parts, whereupon it is necessary to fill in the well and begin drilling anew, involving considerable financial loss to the contractor. Furthermore, the drilling tools often become locked in a well, or broken by the material caving in the well, the debris clogging the jars.

The objects of my invention are, first, to construct a jar which will give a firm impact or "jar"; second, which is free from weakness at the joints due to welding heating of the parts; third, which will not become clogged or broken by the debris from the caving of the well, and fourth, the construction of a jar which will lessen the cost of the recovery of the broken part from the well, thereby saving great sums of money to the contractor.

Further objects are to simplify the construction and thus provide a better article which can be made a great deal cheaper and render service cheaper than the jars now in general use and can, therefore, be sold for less money.

Other objects will become apparent from the following description.

The invention consists broadly of a set of jars comprising two members each made of a single solid piece of metal free from welds.

The invention also consists in the features of construction and combinations of parts hereinafter described, illustrated in the accompanying drawing, and specified in the appended claims.

In the accompanying drawing: Figure 1 is an elevation of a set of jars, constructed in accordance with my invention, illustrated in their contracted position. Fig. 2 is a central longitudinal section of the jars in their extended position. Fig. 3 is a detailed view of the lower member of the jars as it appears before it is attached to the upper member. Fig. 4 is a transverse section on the line x—x of Fig. 2, and Fig. 5 is a transverse section on the line y—y of Fig. 2.

Referring more particularly to the drawing, 1 designates the upper member and 2 the lower member of the set of jars there illustrated. The upper member has the usual depending plunger 3 integral therewith, which is of reduced diameter and terminating at its lower end in the enlargement or ball 4. The ball 4 is preferably elongated, *i. e.* having its longitudinal axis preferably greater than its transverse axis, as is shown in Fig. 2, for a purpose to be hereinafter set forth. At the upper end of said plunger there is a circumferential shoulder 5 adapted to strike the upper end of the lower or socket member 2 simultaneously with the lower end of the ball upon the bottom of the socket 6 in said lower member.

As illustrated in Fig. 3, the lower member, before it is attached to the upper member, has its socket 6 formed with a rounded base serving as a seat for the ball member, and

with a straight and uniform bore to its upper open end, and is provided with an excess of metal on the outer surface of its upper end, as at 7. After the two members are assembled by inserting the ball 4 well down into the socket 6, the upper end of the lower member, where the excess of metal 7 is provided, is heated and swaged in around the reduced shank of the plunger 3, forming a rounded seat for the ball member 4 at the upper end of the cylindrical socket, thereby forming oppositely positioned ball seats in the socket, as shown in Fig. 2. When this swaging operation is completed, the lower member is of uniform external diameter to its upper end, as illustrated in Figs. 1 and 2, the excess of metal being transferred to the inner surface of said upper end, as at 8, Fig. 2, where it forms a plunger guide or stop and producing an upper rounded ball seat, which stop limits the upward movement of the ball 4, thereby retaining the two members in operative connection with one another.

The ball 4, as previously stated, is preferably elongated, that is, having its longitudinal axis greater than its transverse axis, the transverse axis being substantially the same as the transverse axis of the cylindrical socket. This ball is slidably fitted within the cylindrical socket of member 2, which, combined with the long bearing surface of the socket member contacting with the stem 3, operates to direct the movement of the members of the jars relative to each other to insure the alinement of the head of member 1 with the walls of socket member 2 at all times, thereby precluding "wobbling" of the jar members during the drilling operation, and eliminating any tendency of the members to become jammed in the well, or to cause the caving in of the walls of the well. The employment of a ball member engaging rounded seats at opposite ends of a socket member insures longer life to a set of jars, as such construction of the parts prevents the contacting parts of the cooperating members from becoming so battered out of shape as to render the set of jars inoperative, or at least affect the efficiency of the jar. It will therefore be observed that each set of jars comprises two members of solid metal joined together without splitting the metal, or using welding heat, thereby producing a set of jars of substantially a single solid piece of metal which it is almost impossible to break under ordinary care and use. However, should a set become broken while within a well, it would probably be a separation of the shank 3 from the head 1, or the ball 4 from the shank, in which event the ball would drop down into the socket, making it an easy "fishing" operation to recover the parts lost in the well, as will be readily understood by those skilled in the art. It will be observed, further, that the provision of the ball and socket connection, such as described herein, permits of a turning or rotating movement as well as the usual reciprocating movement of the jar members relative to each other, thereby relieving the jars of torsional strains. It is preferred to equip the socket member with exit ports or openings 9 for the purpose of freeing the socket of any water, slush, or other foreign matter that may pass therein between the shank 3 and the bearing 8.

I claim:

1. A set of drill jars comprising two members each made of a single solid piece of metal entirely free from welds and united by a ball and socket joint, the socket being imperforate except for a waste opening at one end thereof.

2. A set of drill jars comprising an upper member having a depending plunger provided with a ball near its lower end, a lower member having a socket, for said ball, and an integral stop near the upper end of said socket for limiting the upward movement of said ball and retaining the two members in operative connection.

3. A set of drill jars comprising two members connected by a ball and socket joint, capable of reciprocating and rotating movements.

4. A set of drill jars comprising two members each made of a single piece of metal free from welds, one of said members being provided with a socket, and the other of said members with a ball integral therewith, said ball being completely housed by said socket.

5. As a new article of manufacture, a jar for well-boring comprising two members of solid metal, one of said members having a ball integral therewith, and the other of said members being provided with a socket having rounded seats at opposite ends thereof, said rounded seats conforming substantially to the portion of the ball with which they engage.

6. A set of drill jars comprising an upper member and a lower member, each made from a single piece of metal free from welds, the upper member having a depending plunger and an elongated ball integral therewith, the lower member comprising a substantially cylindrical socket adapted to incase said elongated ball, said socket having rounded ball seats at each end thereof.

7. A set of drill jars comprising two members, one of said members having a plunger and an elongated ball integral therewith, and the other member comprising a substantially cylindrical socket, adapted to completely house said elongated ball, and a

stop forming a plunger guide, said socket having rounded ball seats at each end thereof, said plunger and elongated ball of one member coöperating with said plunger guide and the walls of the socket of the other member to retain the vertical alinement of the members.

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

WILLIAM A. SPARKS.

Witnesses:
L. P. WALKER,
D. W. DILLON.