W. J. FULKERSON AND G. H. YAHRAUS.

ROTARY WELL REAMER.

APPLICATION FILED MAR. 30, 1920.

1,384,016. Patented July 5, 1921.

Fig. 1.

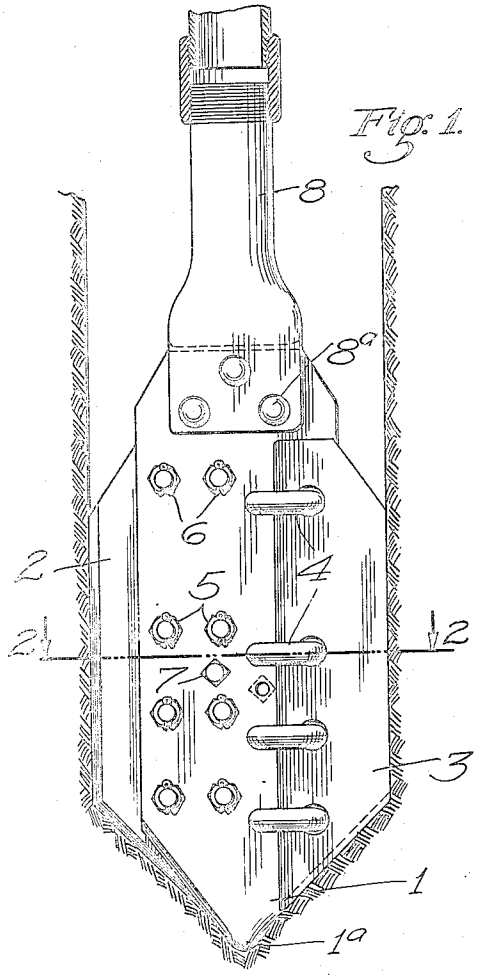
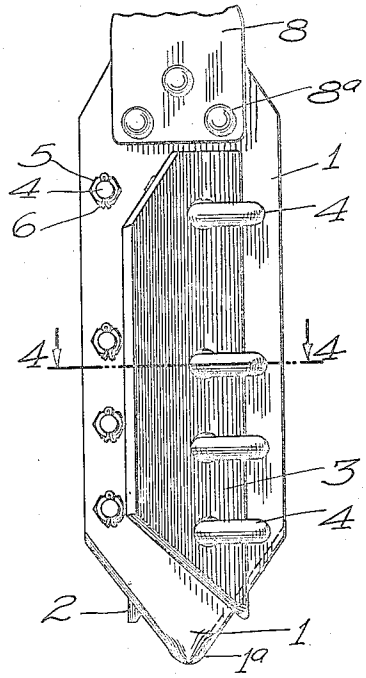


Fig. 3.



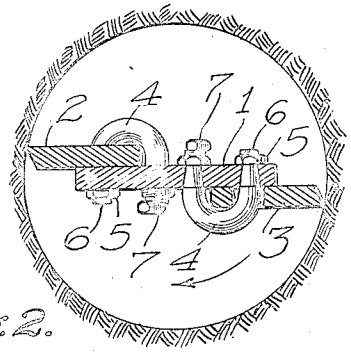


Fig. 2.

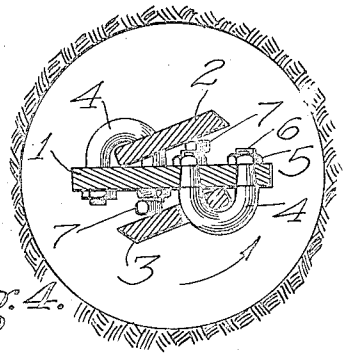


Fig. 4.

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ROTARY WELL-REAMER.

1,384,016. Specification of Letters Patent. Patented July 5, 1921.

Application filed March 30, 1920. Serial No. 369,887.

To all whom it may concern:

Be it known that we, WALTER J. FULKERSON and GEORGE H. YAHRAUS, citizens of the United States, residing at San Diego and Los Angeles, respectively, in the counties of San Diego and Los Angeles, respectively, and State of California, have invented certain new and useful Rotary Well-Reamers, of which the following is a specification.

Our invention relates to a device for reaming holes in the ground particularly adapted for enlarging drilled holes for wells below the casing such as oil wells and the like and the objects of our invention are: First, to provide a reamer for reaming holes in the earth which folds into a smaller form when the direction of the revolution is reversed against the lower end of the casing and opens when turning to the right in the earth; second, to provide a reamer of this class which may be positioned while in its collapsed form in the hole through the casing, then turned to the right which will cause it to open and ream a hole considerably larger than the device in its folded form and may be re-folded again by reversing the direction of its revolution against anything with which its upper end or sides may contact; third, to provide a device of this class which is so shaped and constructed that it will follow a small hole or a direct line in its reaming operation; fourth, to provide a reamer of this class which may be readily taken apart for repairs, sharpening and the like and, fifth, to provide a reamer of this class which is very simple and economical of construction, durable, easy to operate, easy to place in position for operation and to remove from the hole and which will not readily deteriorate or get out of order.

With these and other objects in view as will appear hereinafter our invention consists of certain novel features of construction, combination and arrangement of parts and portions as will be hereinafter described in detail and particularly set forth in the appended claims, reference being had to the accompanying drawings and to the characters of reference thereon which form a part of this application in which:

Figure 1 is a side elevational view of our reamer complete, shown positioned on a fragmentary portion of the pipe coupling and shown in its open and operative position; Fig. 2 is a sectional view through 2—2 of Fig. 1; Fig. 3 is a side elevational view of the reamer in its folded or inoperative position and ready for removal from the hole and Fig. 4 is a sectional view through 4—4 of Fig. 3 and showing the reamed hole in connection therewith.

Similar characters of reference refer to similar parts and portions throughout the several views of the drawings.

The main supporting plate 1, hinged reaming plates 2 and 3, U bolts 4, nuts 5, cotter pins 6, supporting bolts 7 and main plate support 8, constitute the principal parts and portions of our rotary well reamer.

The main supporting plate 1 is preferably a steel plate of suitable width and thickness and its lower end is cut tapering toward the center on opposite sides forming a point 1^a in the middle at its normally lower end and the tapering edge is beveled in opposite directions on opposite sides of the point 1^a as shown. This point 1^a is preferably provided with a twist in auger form. This plate is provided with a plurality of rows of tapering holes in which are mounted the U bolts 4 which are held rigidly in position therein by means of the nuts 5 and further secured by means of cotter pins 6 to prevent the nuts loosening. These bolts are positioned in rows on opposite sides of the plate 1 and on opposite sides of the middle of said plate as shown and pivotally mounted on these U bolts are the reaming plates 2 and 3 so that they may swing on said U bolts from the folded position shown best in Figs. 3 and 4 to the open positions shown best in Figs. 1 and 2 or the reverse, depending upon the direction the plate 1 is revolved. It will be noted that these plates 2 and 3 on their normally lower ends are tapered so that they approximately conform to the taper on the member 1 when in their open position as shown best in Fig. 1 of the drawings and are beveled on their tapered and outer side edges as shown, to form cutting edges for reaming and the normally upper ends of these plates 2 and 3 are tapered also to engage the lower end of the casing so that when reversed against the lower edge of the casing or other object the members 2 and 3 will fold backwardly as shown in Figs. 3 and 4. Mounted in the plate 1 on opposite sides are set screws secured tightly therein which form an adjustable abutment for the

plates 2 and 3 to rest against when in their folded position and prevent them from closing too close so that they would not open when revolved in the right direction. To the normally upper end of this plate 1 is secured the plate support 8, it being preferably bifurcated and the plate inserted between the two members and secured thereto by means of rivets 8ª. The opposite end of the support 8 is threaded with the ordinary pipe thread adapted for the conventional pipe coupling into which a pipe is screwed so that links of pipe and couplings form the shaft for revolving the reamer.

Though we have shown and described a particular construction, combination and arrangement of parts and portions we do not wish to be limited to this particular construction, combination and arrangement but desire to include in the purview of our invention the construction, combination and arrangement substantially as set forth in the appended claims.

It is obvious that with this construction there is provided a reamer in which the plates 2 and 3 may be positioned in folded form as shown best in Figs. 3 and 4 and inserted into the hole through the casing in the position where it is desired to ream, then turned to the right which will cause the plates 2 and 3 to open, taking the position shown in Figs. 1 and 2 of the drawings; that the point 1ª and the tapering portions therefrom will cause the reamer to be held in a central position in the hole and to retain its straight, downward course and that the hole will be reamed in accordance with the predetermined size depending upon the width of the reamer in its open form and that upon the reversal of the direction of its revolution, the plates 2 and 3 will assume the folded positions shown in Figs. 3 and 4 and may be readily removed from the hole and that if for any reason the plates do not fold then the reamer may be raised until the beveled upper edges engage the lower edge of the casing and the device revolved backwardly, then the plates will unfold.

Having thus described our invention what we claim as new and desire to secure by Letters Patent is:

1. A rotary well reamer, including a main supporting plate provided with a tapering end, a pair of reaming plates pivotally mounted on opposite sides of said plate in such position that when they are swung outwardly they extend past the edge of said main plate and adjustable means mounted on opposite sides of said plate for regulating and controlling the folding of said reaming plates against the main supporting plate.

2. A rotary well reamer, including a main supporting plate provided with tapered upper and lower ends, the lower end being provided with oppositely beveled cutting edges, a pair of reaming plates pivotally mounted on opposite sides of said plate in such position that when they are swung outwardly they extend past the edges of said main plate, said reaming plates being provided with tapering ends and the lower ends beveled forming cutting edges conforming to the cutting edges on said supporting plate.

3. A rotary well reamer, including a main supporting plate provided with a point in the middle, the long way of said plate and tapering backwardly on opposite sides from said point and provided with oppositely disposed beveled cutting edges on the pointed end of said plate and reaming plates pivotally connected to the opposite sides of said supporting plate provided with tapering upper and lower ends conforming to the taper on said supporting plate and the extending points extending to an alinement with the cutting edges of said supporting plate.

4. A rotary well reamer, including a main supporting plate provided with a point in the middle and tapering backwardly on opposite sides, reaming plates pivotally connected to opposite sides of said supporting plate provided with tapering lower ends conforming to the taper on said main plate and means for regulating the backward movement of said plates relatively to the main plate.

5. A rotary well reamer, including a main central supporting plate provided with U bolts secured in rows on opposite sides of said plate and on opposite sides of the middle of said plate, reaming plates each provided with beveled edge and with one end tapered conforming with the tapered end of said main plate mounted on said U bolts adapted to swing outwardly and inwardly on said U bolts and means for regulating the inward swing of said plates.

6. A rotary well reamer, including a main central supporting plate provided with U bolts secured in rows on opposite sides of said plate and on opposite sides of the middle of said plate, reaming plates each provided with beveled edge and with its ends tapered, the one end conforming with the tapered end of said main plate mounted on said U bolts and adapted to swing outwardly and inwardly on said U bolts, means for regulating the inward swing of said plates and means for connecting said main supporting plate with the conventional pipe coupling.

In testimony whereof, we have hereunto set our hands at Newport Beach, California, this 18th day of March, 1920.

WALTER J. FULKERSON.
GEORGE H. YAHRAUS.