Dec. 23, 1930. J. F. DORNACHER 1,786,152

BAILING TOOL AND SAMPLE TAKER

Filed June 23, 1928

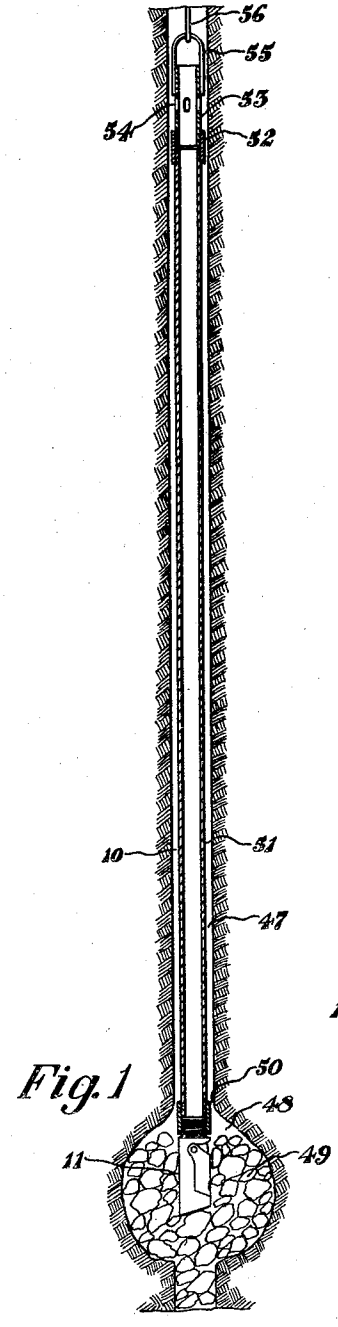


Fig. 1



Fig. 8

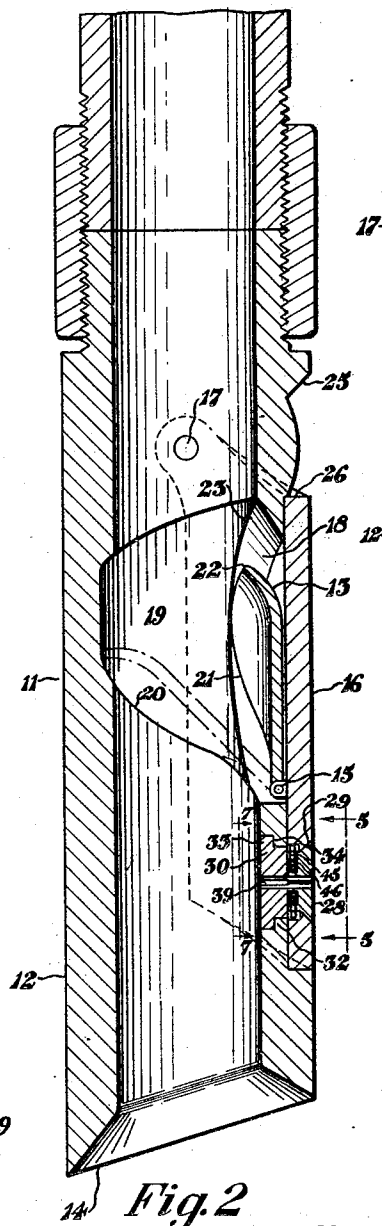


Fig. 2

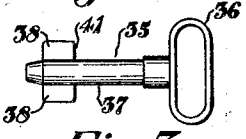


Fig. 3

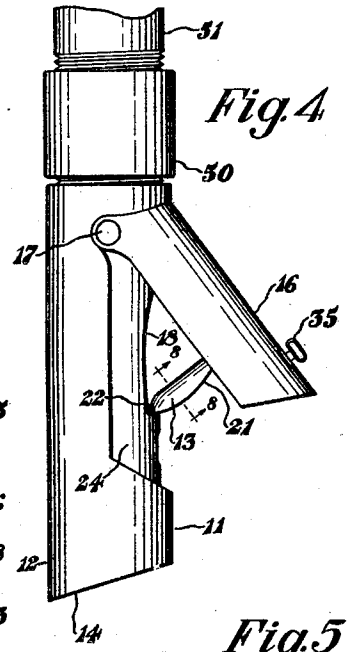


Fig. 4

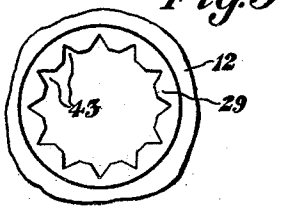


Fig. 5

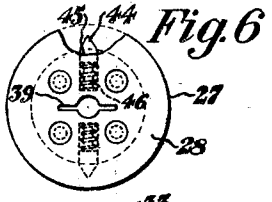


Fig. 6

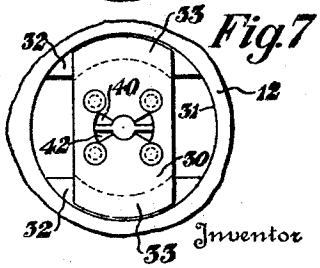


Fig. 7

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Patented Dec. 23, 1930 1,786,152

UNITED STATES PATENT OFFICE

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BAILING TOOL AND SAMPLE TAKER

Application filed June 23, 1928. Serial No. 287,666.

My invention relates to tools for use in drilling holes in the earth for oil, gas, water wells, and the like, for removing loose earth material from such holes.

In such drilling operations a drill bit is first forced vertically downward through a length of the earth material being drilled through, whereby the same is loosened. The drill is then raised from the hole, and a bailing tool, comprising means for removing the material loosened by the drill bit, is lowered in the hole.

Ordinary bailing tools include a bucket, into which the loosened material is forced through a relatively small aperture in the bucket bottom.

In drilling a hole through certain kinds of relatively hard material, the walls of the hole will remain in place after the loosened material is bailed therefrom.

In drilling through certain classes of relatively soft or easily crumbled material, the walls of the drilled hole often cave in, and block the hole with lumps and loosened material known as cavings.

These cavings may comprise very large lumps which it is necessary to break up with a drill bit; and, in the use of a drill bit, water is required to make a mud from the drillings so that the drill will function properly.

The ordinary drill bit will work into cavings from 4 to 6 feet, but when pulled out of the mud made by the water used as aforesaid, the undrilled cavings will immediately fall on top of the mud which was washed down by the action of the drill stem and the water, and such pieces of undrilled cavings are too large to enter the usual bailer with a relatively small opening.

In such cases when such cavings are reached it is necessary to run casing through the cavings before further drilling can be effected, and after casing has been partially inserted in a drill hole it is necessary that under-reaming be utilized for making the drill hole of sufficient diameter below the casing to permit the casing to be lowered.

In a very deep drill hole, cavings at several locations may be encountered before the oil or the like is reached, and in such cases several lengths of casings must be inserted.

On the other hand if caving material is removed in a dry state there is no tendency to further enlarge the cave pocket.

Accordingly, the objects of the present improvements include the provision of a bailing tool which will eliminate the necessity of running casings and of under-reaming, in order to drill through caving material.

These and ancillary objects are attained in the improved bailing tool, hereinafter set forth in detail, and claimed, and which may be stated in general terms as including a bucket, an opening at the lower end of the bucket having an area very slightly less than the full cross-sectional area of the hole being drilled, an automatic closure for said opening, and improved means facilitating the removal of material collected in the bucket.

A preferred embodiment of the improvements is illustrated in the accompanying drawings forming part hereof, in which

Figure 1 is a fragmentary view with portions in section, illustrating the improved bailing tool hereof in use in a drill hole;

Fig. 2, an enlarged longitudinal axial sectional view of the improved bailing tool hereof;

Fig. 3, an elevation view illustrating the key used for emptying the bailing tool;

Fig. 4, an elevation view, enlarged with respect to Fig. 1 and reduced with respect to Fig. 2, illustrating the improved bailing tool hereof, with its parts in position for emptying the tool;

Fig. 5, a fragmentary view as in the direction of the lines 5—5, Fig. 2, illustrating the improved means for mounting the latch for the bailing tool, the latch being removed;

Fig. 6, a detached view of the latch for the bailing tool looking towards the outer face thereof;

Fig. 7, a fragmentary view as in the direction of the arrows 7—7, Fig. 2 of the bailing tool adjacent the latch, illustrating the latch in use for securing the parts of the tool in operative position; and

Fig. 8, a sectional view, as on line 8—8,

Fig. 4, with distant parts removed, illustrating the preferred contour for the automatic closure for the bailing tool.

Similar numerals refer to similar parts throughout the several views.

The improved bailing tool indicated generally at 10 includes a bucket indicated generally at 11 and the bucket 11 preferably includes a relatively long tubular trepanning drill 12 having walls forming a continuous unobstructed passage-way having a uniform cross-section from end to end thereof, and an improved automatic closure 13 located within the tubular drill 12 a suitable distance above the preferably ground angled peripheral cutting edge 14 thereof.

The closure 13 has preferably a downwardly concave oval spoon shape, and is pivotally mounted at its lower end as at 15 upon a substantially semi-cylindrical side gate 16, which is pivotally mounted at its upper ends as at 17 upon the outside of the tubular drill 12. A suitably shaped opening 18 is provided in the side wall of the tubular drill 12 intermediate and spaced from the ends of the drill, which opening 18 is normally covered by the side gate 16; and the spoon shaped closure 13 may extend from its pivotal mounting on the side gate 16 through the opening 18.

The continuous unobstructed passage-way through the tubular drill 12 preferably has an enlargement 19 intermediate and spaced from the ends of the drill 12, adjacent and communicating with the opening 18. The pivot 15 of the closure 13 is located adjacent the enlargement 19 so that the closure 13 is mounted for movement within the enlargement; and the enlargement forms a suitably shaped upwardly angled ledge seat 20 at the intersection of the enlargement and the passage-way upon which seat the outer edge 21 of the downwardly concave oval spoon shaped closure 13 may seat, for closing the lower end of the bucket.

As best illustrated in Fig. 2, the spoon closure 13 is provided preferably with an inwardly extending upper tip 22 which is spaced at a distance from the upper edge 23 of the opening 18 for a purpose which will hereinafter be set forth in detail.

Externally, the tubular drill 12, has formed therein a suitable recessed seat in the outer surface of the tubular member surrounding the opening 18 indicated generally at 24 for the semi-cylindric side gate 16, whereby when the side gate is closed, the external surfaces of the tool will be substantially cylindric, although at the upper end of the tool the external surfaces of the tool are preferably formed so as to provide a downwardly angled stop flange 25 against which the upper end 26 of the side gate 16 may abut to limit the upward movement of the side gate, as illustrated in Fig. 4.

For securing the side gate 16 in the position illustrated in Fig. 2, which is the normal position for bailing operations, the side gate 16 is provided in its lower end with an improved key operated latch 27 which includes a head 28 mounted for rotation in a suitable bearing 29 formed at the lower end of the side gate, and which head has secured upon its inner end, a locking segment 30, adapted in one position for passing through a segmental opening 31 in the tubular drill 12, and when rotated, for end engagement with suitable flanges 32 forming the sides of the segmental opening.

As illustrated the inner surface of the locking segment 30 preferably conforms with the inner surface of the tubular drill 12, and the outer curved ends 33 of the segment 30 are rabbeted and the flanges 32 are rabbeted for inner engagement with each other as at 34, and the rabbeted surfaces may be angled for providing a clamping engagement between the segment 30 and the tubular drill 12, whereby the side gate 16 may be secured in the position illustrated in Fig. 2.

The latch 27 is arranged to be rotated as by means of a key 35 which includes a handle 36 mounted at one end of a shaft 37, at the other end of which laterally extending wings 38 are secured.

The rotatable head 28 of the latch 27 is provided with a suitably shaped key hole 39 arranged to receive the shaft and wings of the key 35, and the segment 30 of the latch is provided with an enlarged sectoral aperture 40 permitting sufficient rotation of the key 35 to provide an engagement between the inner ends 41 of the wings 38, and the inner face 42 of the head 28, whereby the key 35 may serve as a handle for opening the side gate 16.

For normally maintaining the rotary latch 27 in any desired position, but permitting automatic operation of the same by the use of the key 35, the bearing 29 for the latch head 28 is provided with a plurality of inwardly opening laterally extending V notches 43 into which the wedge ends 44 of spring pressed bolts 45 carried in the head 28 may extend; the pressure of the springs 46 for the spring pressed bolts 45, and the wedge and notch angles being such, as to permit rotation of the latch by the key 35, but to prevent rotation of the latch during the normal use of the tool.

In Fig. 1, a drill hole is indicated at 47, in which a cave-in of the side walls has occurred forming a cave pocket 48 in which cavings 49 are contained.

The improved bailing tool 10 is secured as by means of a collar 50 at the lower end of a pipe 51, the diameter of the particular tubular drill 12 for the bailing tool being substantially equal to the diameter of the drill hole, and the tubular wall of the drill 12, being only of sufficient thickness to secure the proper strength, the opening through the drill having a cross-sectional area, only slightly

less than the cross-sectional area of the drill hole.

The upper end of the pipe 51 is secured as by a coupling 52 with a relatively short connecting pipe 53 which is preferably provided with side holes 54 through which excess material may escape. The connecting pipe may be provided at its upper end as illustrated with a bail 55 which may be connected to a drill line 56, or the connecting pipe may be secured by well known means to a set of jars hung upon the drill line as may be desired.

Without introducing water upon the cavings 49, the tool 11 is alternately dropped into and raised out of the cavings. The spoon closure 13 when the tool is dropping, swings to the position illustrated in full lines in Fig. 2 within the enlargement 19 permitting free passage of the cavings along the passage-way formed by the drill walls 12. As the tool trepans through the cavings, and the cavings enter upwardly into the pipe 51, when the tool is raised, the closure automatically swings to the position illustrated in dash and dot lines in Fig. 2 within the enlargement entirely closing off the continuous passage-way 12, thereby trapping cavings in the bucket thus formed, and the inturned upper end 22 of the spoon closure, insuring that the closure will drop into place without the use of any springs.

After the pipe 21 has been filled with cavings thus collected, the tool is then raised from the hole, and the key 35 is used to swing back the side gate 16. The bailing tool having been swung away from the entrance to the drill hole, to a suitable dump, the side gate is swung away from its normal position as illustrated in Fig. 4 for withdrawing the closure member 13 from the enlargement 19 through the side wall opening 18, and the bucket will empty itself.

In one drill hole there were 40 feet of cavings, which were drilled and bailed in the old manner for 150 hours without making the hole a foot deeper.

The tool of the present invention was used as aforesaid, and all the 40 feet of cavings were removed in three hours' time without running a drill stem or without setting any casing, and after the cavings were removed, the hole was drilled in the usual manner until oil sand was struck.

In addition to the aforesaid use of the improved tool hereof as a bailing tool, it may be used for cleaning out oil wells, as it can be put on the drill line of a small drill rig and used to remove the cavings which have collected in a shot hole without requiring the stringing up of a drill stem.

The improved tool hereof may also be utilized as a sample taker in a manner similar to its use as a bailing tool.

I claim:

1. A tool for bailing and the like, including a tubular member having walls forming a continuous unobstructed passage-way from end to end thereof, there being an enlargement in the passage-way intermediate and spaced from the ends thereof, and a downwardly concave oval spoon shaped closure member pivotally mounted in the walls adjacent the enlargement for movement within the enlargement, the closure member being adapted to be swung to one position within the enlargement for entirely closing off the continuous passage-way and to another position within the enlargement permitting free passage of material being bailed along the passage-way.

2. A tool for bailing and the like, including a tubular member having walls forming a continuous unobstructed passage-way from end to end thereof, there being an enlargement in the passage-way intermediate and spaced from the ends thereof, and a closure member pivotally mounted in the walls adjacent the enlargement for movement within the enlargement, there being a seat in the walls at the intersection of the enlargement and tubular passage-way, and the closure member being adapted to be swung to one position within the enlargement on the seat for entirely closing off the continuous passage-way and to another position within the enlargement away from the seat permitting free passage of material being bailed along the passage-way.

3. A tool for bailing and the like, including a tubular member having walls forming a continuous unobstructed passage-way from end to end thereof, there being an enlargement in the passage-way intermediate and spaced from the ends thereof, and a downwardly concave oval spoon shaped closure member pivotally mounted in the walls adjacent the enlargement for movement within the enlargement, there being a seat in the walls at the intersection of the enlargement and tubular passage-way, and the closure member being adapted to be swung to one position within the enlargement with the outer edge of the downwardly concave closure seated on the seat for entirely closing off the continuous passage-way and to another position within the enlargement away from the seat permitting free passage of material being bailed along the passage-way.

4. A tool for bailing and the like, including a tubular member having walls forming a continuous unobstructed passage-way from end to end thereof, there being an enlargement in the passage-way intermediate and spaced from the ends thereof, and there being an opening in the side wall of the tubular member intermediate and spaced from the ends thereof and adjacent and communicating with the enlargement, a gate member piv-

otally mounted on the tubular member for normally covering said opening, a closure member pivotally mounted on the gate member and extending through the opening for movement within the enlargement, the closure member being adapted to be swung to one position within the enlargement for entirely closing off the continuous passage-way and to another position within the enlargement permitting free passage of material being bailed along the passage-way, and the gate member being adapted to be swung away from its normal position for withdrawing the closure member from the enlargement through the side wall opening.

5. A tool for bailing and the like, including a tubular member having walls forming a continuous unobstructed passage-way from end to end thereof, there being an enlargement in the passage-way intermediate and spaced from the ends thereof, and there being an opening in the side wall of the tubular member intermediate and spaced from the ends thereof and adjacent and communicating with the enlargement, a gate member pivotally mounted on the tubular member for normally covering said opening, a closure member pivotally mounted on the gate member and extending through the opening for movement within the enlargement, there being a seat in the walls at the intersection of the enlargement and tubular passage-way, the closure member being adapted to be swung to one position within the enlargement on the seat for entirely closing off the continuous passage-way and to another position within the enlargement away from the seat permitting free passage of material being bailed along the passage-way, and the gate member being adapted to be swung away from its normal position for withdrawing the closure member from the enlargement through the side wall opening.

6. A tool for bailing and the like, including a tubular member having walls forming a continuous unobstructed passage-way from end to end thereof, there being an enlargement in the passage-way intermediate and spaced from the ends thereof, and there being an opening in the side wall of the tubular member intermediate and spaced from the ends thereof and adjacent and communicating with the enlargement, a gate member pivotally mounted on the tubular member for normally covering said opening, a downwardly concave oval spoon shaped closure member pivotally mounted on the gate member and extending through the opening for movement within the enlargement, there being a seat in the walls at the intersection of the enlargement and tubular passage-way, the closure member being adapted to be swung to one position within the enlargement with the outer edge of the downwardly concave closure seated on the seat for entirely closing off the continuous passage-way and to another position within the enlargement away from the seat permitting free passage of material being bailed along the passage-way, and the gate member being adapted to be swung away from its normal position for withdrawing the closure member from the enlargement through the side wall opening.

7. A tool for bailing and the like, including a tubular member having walls forming a continuous unobstructed passage-way from end to end thereof, there being an enlargement in the passage-way intermediate and spaced from the ends thereof, and there being an opening in the side wall of the tubular member intermediate and spaced from the ends thereof and adjacent and communicating with the enlargement, a gate member pivotally mounted on the tubular member for normally covering said opening, there being a second opening in the side wall of the tubular member adjacent the gate member, a latch on the gate member for engagement within the second opening when the gate member is in normal position, a closure member pivotally mounted on the gate member and extending through the opening for movement within the enlargement, the closure member being adapted to be swung to one position within the enlargement for entirely closing off the continuous passage-way and to another position within the enlargement permitting free passage of material being bailed along the passage-way, and means for releasing the latch for swinging the gate member away from its normal position for withdrawing the closure member from the enlargement through the side wall opening.

8. A tool for bailing and the like, including a tubular member having walls forming a continuous unobstructed passage-way from end to end thereof, there being an enlargement in the passage-way intermediate and spaced from the ends thereof, there being an opening in the side wall of the tubular member intermediate and spaced from the ends thereof and adjacent and communicating with the enlargement, and there being a recessed seat in the outer surface of the tubular member surrounding the side wall opening, a gate member pivotally mounted on the tubular member normally seated in said recessed seat covering said opening, a closure member pivotally mounted on the gate member and extending through the opening for movement within the enlargement, the closure member being adapted to be swung to one position within the enlargement for entirely closing off the continuous passage-way and to another position within the enlargement permitting free passage of material being bailed along the passage-way, and the gate member being adapted to be swung away from its normal position for withdrawing the

closure member from the enlargement through the side wall opening.

9. A tool for bailing and the like, including a tubular member having walls forming a continuous unobstructed passage-way from end to end thereof, there being an enlargement in the passage-way intermediate and spaced from the ends thereof, there being an opening in the side wall of the tubular member intermediate and spaced from the ends thereof and adjacent and communicating with the enlargement, and there being a recessed seat in the outer surface of the tubular member surrounding the side wall opening, a gate member pivotally mounted on the tubular member normally seated in said recessed seat covering said opening, there being a second opening in the side wall of the tubular member communicating with said recessed seat, a latch on the gate member for engagement within the second opening when the gate member is in normal position, a closure member pivotally mounted on the gate member and extending through the opening for movement within the enlargement, the closure member being adapted to be swung to one position within the enlargement for entirely closing off the continuous passage-way and to another position within the enlargement permitting free passage of material being bailed along the passage-way, and means for releasing the latch for swinging the gate member away from its normal position for withdrawing the closure member from the enlargement through the side wall opening.

10. A tool for bailing and the like, including a tubular member having walls forming a continuous unobstructed passage-way from end to end thereof, there being an enlargement in the passage-way intermediate and spaced from the ends thereof, there being an opening in the side wall of the tubular member intermediate and spaced from the ends thereof and adjacent and communicating with the enlargement, and there being a recessed seat in the outer surface of the tubular member surrounding the side wall opening, a gate member pivotally mounted on the tubular member normally seated in said recessed seat covering said opening, there being a second opening in the side wall of the tubular member communicating with said recessed seat, a latch on the gate member for engagement within the second opening when the gate is in normal position, a downwardly concave oval spoon shaped closure member pivotally mountd on the gate member and extending through the opening for movement within the enlargement, there being a seat in the walls at the intersection of the enlargement and tubular passage-way, the closure member being adapted to be swung to one position within the enlargement with the outer edge of the downwardly concave closure seated on the seat for entirely closing off the continuous passage-way and to another position within the enlargement away from the seat permitting free passage of material being bailed along the passage-way, and means for releasing the latch for swinging the gate member away from its normal position for withdrawing the closure member from the enlargement through the side wall opening.

In testimony that I claim the above, I have hereunto subscribed my name.

JOSEPH F. DORNACHER.