W. A. McCAUSLAND.

WELL DRILLING TOOL.

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1,342,855.

Patented June 8, 1920.

FIG. 1.

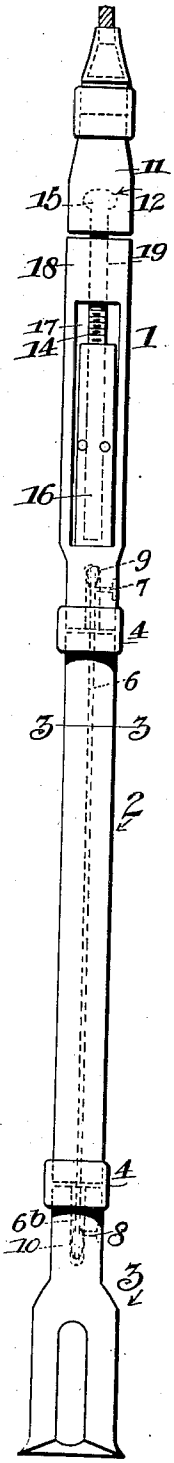
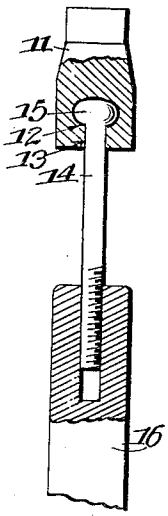


FIG. 2.



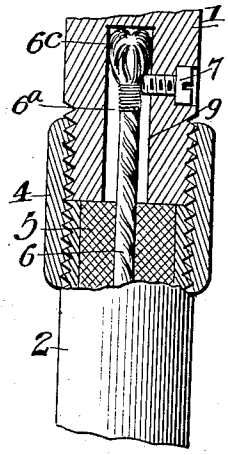
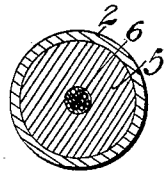


FIG. 4.

FIG. 3.



WITNESSES

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WELL-DRILLING TOOL.

1,342,855. Specification of Letters Patent. Patented June 8, 1920.

Application filed December 14, 1917. Serial No. 207,162.

To all whom it may concern:

Be it known that I, WILLIAM A. McCAUSLAND, a citizen of the United States, and a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Well-Drilling Tools, of which the following is a specification.

My invention relates to improvements in well drilling apparatus, being more particularly an improvement on the well drilling tool disclosed in my Patent Number 1211198, of January 2, 1917, and it consists in the construction, combinations, and arrangements herein described and claimed.

An object of my invention is to provide a drilling tool wherein the important feature lies in the construction of the stem or middle section, which includes a tube having a filler with a member embedded therein, the ends of said member projecting beyond the ends of the tube to provide anchoring means whereby the stem is secured to the drill jar and bit respectively, as an additional safe-guard over the connection afforded by the usual couplings.

Another object of the invention lies in the improvement embodied in the drill jar, which includes the swivel head having a screw connection with the bumper.

Other objects and advantages will appear in the following specification, reference being had to the accompanying drawing, in which:

Figure 1 is a side elevation of a well drilling tool embodying the principles of my invention.

Fig. 2 is a detail sectional view showing certain portions of the jar.

Fig. 3 is a cross section on the line 3—3 of Fig. 1, and

Fig. 4 is a detail sectional view showing the connection of the embedded member in the stem with the drill jar.

In carrying out my invention, I provide the top section or drill jar 1, the middle section or stem 2, and the third section or bit 3. The sections are joined together by couplings 4 which screw upon the threaded ends of the various sections as indicated in Fig. 1.

The middle section or stem 2 constitutes one of the most important features of the invention. The stem 2 consists of a casing or tubing which has a filler 5 in which a member 6 is embedded. The filler 5 may consist of any heavy substance and preferably consists of lead. Lead, however, is not used to the exclusion of all other substances, since obviously tungsten or some other very heavy substance may be employed to carry out the purpose intended, as will be more fully brought out later on. The embedded member 6 preferably consists of a cable, although an iron rod or bar may be employed to equally good advantage.

The ends 6^a and 6^b project beyond the ends of the stem 2. In the event that the embedded member 6 consists of the cable illustrated in Fig. 4, the ends are turned over, bent, knotted or otherwise enlarged as at 6^c, to form an abutment adapted to bind against binding screws 7 and 8 in the ends of the jar 1 and bit 3, respectively. The projecting ends 6^a and 6^b of the cable 6, extend into bores 9 and 10 in the jar 1 and bit 3 respectively, the binding of the screws 7 and 8 against the enlarged ends 6^c forming an anchorage which provides an additional safeguard against the dropping of the bit into the well in the event of the breakage of one of the couplings.

The construction of the jar 1 constitutes another important feature of the invention. The jar 1 includes the swivel head 11 which has a circular recess 12 terminating in an outlet 13. The shank of a swivel bolt 14 and the head 15 of the bolt, occupy the outlet 13 and recess 12, respectively. The lower end of the swivel bolt 14 is threaded into a bumper 16. The bumper 16 occupies a rectangular opening 17 in the bumper body 18 of the jar 1. The swivel bolt 14 is movable in the bore 19 in the upper portion of the bumper body 18 above the rectangular opening 17. The function of the bumper 16 in the body 18 of the jar 1, is to loosen the bit 3 on the up-stroke of the drilling tool and prevent any sticking which might otherwise occur. The purpose of the swivel connection of the drilling tool on the swivel head 11 of the jar 1, is to allow the drilling tool to turn more freely in the bore of the well.

The advantages of the peculiar construction of the drilling tool disclosed, will be

readily apparent. The drilling cable to which the drilling tool is attached, does not run through the jar at the top as is the case in my former Patent 1,211,198 of January 2, 1917. In the present instance, the jar is occupied by the swivel connections and the bumper, and the cable is attached by a suitable coupling on the order of the one shown in the drawing. The head 15 of the swivel bolt 14 is loosely fixed in the recess 12 of the swivel head 11, in any suitable manner. The weight of the drilling tool is supported by the head 15, and by reason of the swivel connection of the drilling tool to the swivel head 11, the tool may freely rotate in the bore of the well and not cause the objectionable twisting of the supporting cable.

The casing of the stem 2 is filled with lead for weight. As before stated, the filler of the casing of the stem may consist of some other material which may either be heavier or lighter than lead. The employment of lead, for instance, enables the accomplishment of a very important purpose in a tool of this kind. It is possible to make the drilling tool considerably shorter by employing an arrangement as shown, than is possible where the ordinary solid iron stem is used. For instance, a stem 4½ inches in diameter and 32 feet long, filled with lead weighs about 2487 pounds, whereas a 50 foot stem of solid iron weights about 2480 pounds. Here it will be seen that the weights are substantially the same, but there is a difference of 18 feet in the length of the respective stems, the lesser length being in favor of the stem constructed in accordance with my invention.

Should either of the joints or couplings 4 break, the additional anchorage provided by the projecting ends 6^a and 6^b of the embedded cable 6, will prevent the bit 3 from dropping to the botom of the well. A laborious and time consuming "fishing" job is thus effectively avoided by the use of this particular feature in the arrangement of the drilling tool. It is desired to emphasize the fact that the stem 2 is anchored in the bottom of the jar 1, or more properly speaking, the embedded cable 6 of the stem 2, is anchored in the bottom of the jar 1. By this arrangement the running through of the supporting cable in the jar 1 is avoided, and with far better results in this instance.

While the construction and arrangement of the device as illustrated in the accompanying drawing is that of a generally preferred form, obviously modifications and changes may be made without departing from the spirit of the invention or the scope of the claims.

I claim:

1. A well drilling tool, including a jar and a bit, and an interposed connecting stem, filled with a heavy substance as lead, to constitute a relatively short connection but having requisite weight.

2. A well drilling tool, including a jar and a bit, a stem, means for connecting the stem to the jar and bit, means carried by the stem and attachable to the jar and bit to provide emergency holding means should said connecting means fail, and means carried by the jar and bit for engaging said attachable means.

3. A well drilling tool, including a jar, a stem, means for securing the stem to the jar, auxiliary stem securing means embedded in the stem with a projecting portion receivable by the jar, and means carried by the jar for clamping said portion in place.

4. A well drilling tool, including a jar having a solid end with a bore, a tubular stem with a heavy filler, coupling means for joining the stem to the jar, auxiliary joining means embedded in said filler including a projecting end insertible in said bore, and means carried by the jar for engaging said inserted end.

5. A well drilling tool including a jar having a bore, a stem, coupling means for joining the stem to the jar, auxiliary coupling means including a member carried by the stem, having a projecting end provided with an enlargement entering the bore when the parts are assembled, and means carried by the jar and engaging said enlargement.

6. A well drilling tool, including a jar and a bit, and connecting means for the two, comprising a tubular stem having a filler of a heavy substance, providing a relatively short connection without sacrificing the requisite weight.

7. In a well drilling tool, the combination of the jar, the stem, and the bit, coupling members for joining said members in coaxial alinement, a member embodied by the structure of the stem and including ends projecting beyond the ends of the stem, and binding members carried by the jar and bit for engaging said projecting ends and providing an auxiliary attachment for holding the parts together in the event of breakage of one of the coupling members.

8. A well drilling tool, including a stem comprising a tube with a heavy filler, and a cable embedded in the filler, with enlarged ends projecting beyond the ends of the tube, to coöperate with clamping means.

9. In a well drilling tool, a bumper body having an opening with a bore, a bumper movable in the opening, a swivel bolt carried by the bumper and extending through the bore, the swivel bolt having a head, and a swivel head having a recess for receiving the bolt head and a communicating outlet for receiving a portion of the swivel bolt.

10. A well drilling tool, comprising a swivel head attachable to a cable, a bumper body having a swivel connection to said head, a bit supported by the bumper body, and an interposed stem with connecting means including an embedded cable having ends projecting beyond the ends of the stem and secured in the bumper body and bit, to provide auxiliary connecting means.

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Witnesses:
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R. H. HARTLEY.