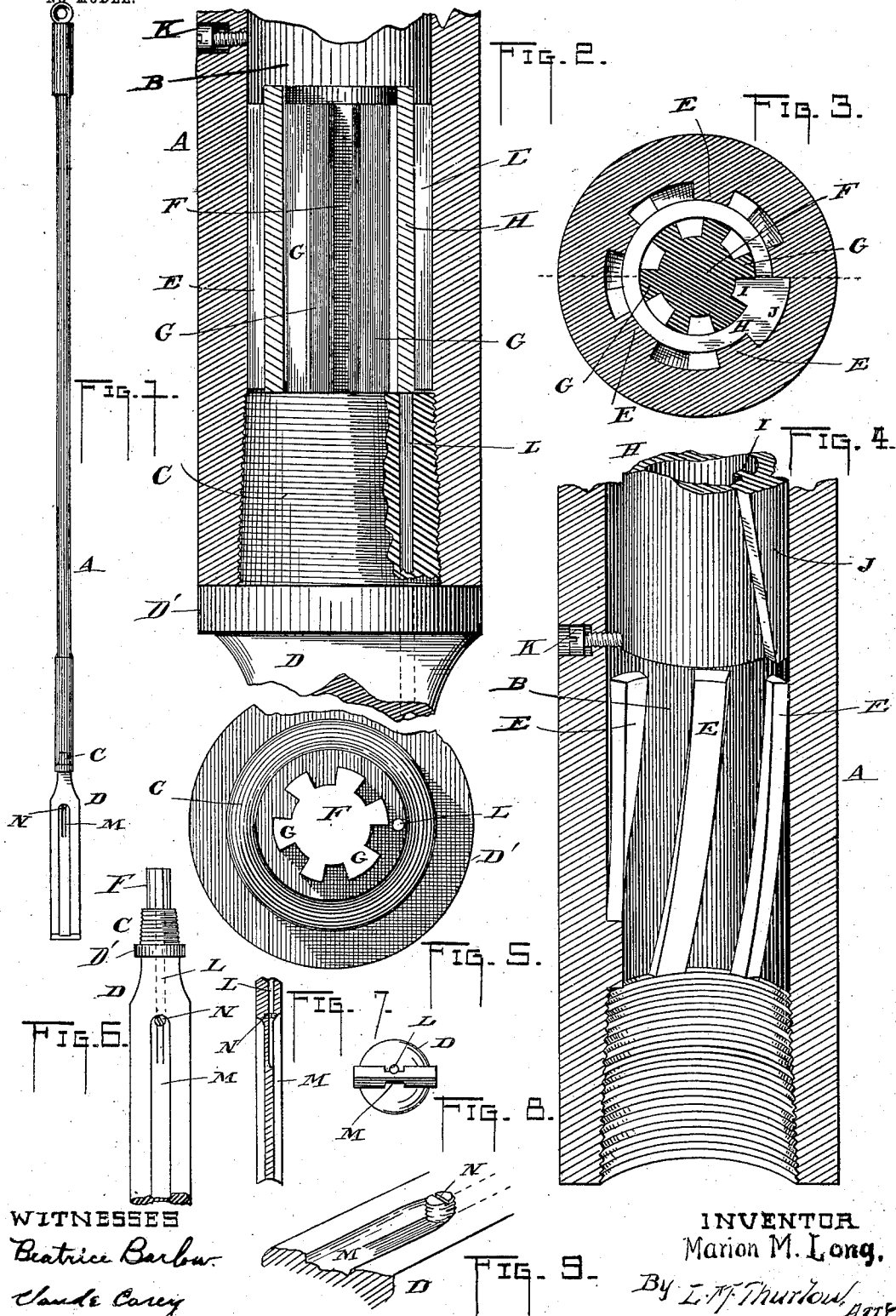


M. M. LONG.
WELL DRILL.

APPLICATION FILED MAY 18, 1903.

NO MODEL.



WITNESSES
Beatrice Barlow.
Claude Carey

INVENTOR
Marion M. Long.

By *L. F. Thurston* ATTORNEY

UNITED STATES PATENT OFFICE.

MARION M. LONG, OF CANTON, ILLINOIS.

WELL-DRILL.

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To all whom it may concern:

Be it known that I, MARION M. LONG, a citizen of the United States, residing at Canton, in the county of Fulton and State of Illinois, have invented certain new and useful Improvements in Well-Drills; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same.

This invention has reference to drills for well-boring purposes.

The primary object of such invention is to furnish means for preventing a well-drill becoming loosened and separated from its stem while at work in the ground.

A further object of the invention is to provide means for continually taking up the looseness between the drill and its stem caused by constant jarring and hammering while at work.

Still another object is to provide locking means between the drill and its stem, but which may be readily disengaged from said drill and stem to allow separation of those members.

In the drawings appended, Figure 1 is a side elevation of a well-drill and its carrying-stem. Fig. 2 is a sectional elevation of the drill-stem, showing the drill-shank screwed therinto. Fig. 3 is a cross-section of the stem which carries the drill and also a cross-section of the drill-shank. Fig. 4 is a sectional elevation of the stem, showing ribs therein and a movable collar for locking the drill and stem together. Fig. 5 is a plan view of the drill-shank. Fig. 6 is an elevation of a portion of the drill. Fig. 7 is a sectional longitudinal view of the drill shown in Fig. 6. Fig. 8 is an end view of the drill as viewed from its lower end. Fig. 9 is a perspective view of a portion of the drill.

A indicates the stem which carries the drill, such stem being usually carried at the end of a cable attached to the well-boring machine. Said shank is made hollow at its lower enlarged end, as shown at B in Figs. 2 and 4, and is internally threaded to receive the shank C of the drill D, as shown in Fig. 2, which is also threaded to correspond. The shank and the bore B are tapered, as shown, so that the members will be made tighter as they are

screwed home. The bore B is a straight and perfectly smooth one except for a series of ribs E, located as shown in Figs. 3 and 4, being made integral with the stem or secured thereto, as found most convenient. Made with the shank C of the drill is a fluted stud F. This stud has a series of ribs G and extends up into the bore B, so that the ribs thereon are opposite those of the said stem, as seen in Fig. 2. Now a locking-collar H is provided to slip down between the two series of ribs, as indicated in Fig. 3, said collar being of cylindrical form, having a rib I inside extending the entire length thereof. Also on the outer surface of the collar is a wedge-shaped rib J, whose slanting face is designed to bear against the slanting surface of any one of the ribs E in the stem A, as will be hereinafter pointed out. The cross-section of the rib I corresponds exactly with the spaces between the ribs G on the stud F, as shown in said Fig. 3, all the said spaces being of the same general form, so that the said rib I will freely enter them. The ribs G and spaces between them are arranged vertically, as shown, while those of the stem A slant, as shown in Fig. 4. The tendency of a drill of this kind used in well-boring is to constantly become loosened, so that often it is entirely unscrewed from its stem and lost. Sometimes the drill is recovered after much labor and annoyance; but very often it is hopelessly lost, so that another drill must be attached to the stem before the work can proceed. It is seen that much expense is attached to a loss of this kind, to say nothing of the time consumed in the attempt to recover the lost implement.

The drill if it strikes a solid immovable object below ground in just the right way will loosen and in the greatest number of cases will unscrew slightly at each stroke. This of course, means that the tendency is to unscrew more than tighten, and it is the intention, therefore, to prevent the unscrewing and constantly take up the play between the parts by entering a wedge between the ribs E of the stem each time the drill screws tighter, being entered little by little at each stroke of sufficient force to move the parts within one another. The stem is a solid piece from one end to the other, so that there are no joints

therein to become loosened. The drill is also made of one piece, and the only joint in the entire device is at the point where the drill and stem are screwed together. In assembling the parts the collar H is entered into the bore B, rib J being passed up between the ribs E, the space between the latter being of a width to permit the said rib J to freely pass. When raised above the ribs E, the collar is held by means of a set-screw K in the stem A, as shown in Fig. 4, said screw forcing the collar against the side of the bore opposite it, and thus clamping it against movement. Next the drill is screwed up into the bore until the lower end of the stem is seated on the flange D' of the drill. Then on loosening the screw the collar is allowed to fall upon the ribs of the stem and the stud. By removing the screw K at this time a pointed instrument may be entered through the aperture left thereby, by which the collar may be turned around on end until its ribs I and J reach spaces between the ribs G and the ribs E, or a position substantially as indicated in Fig. 3. In reaching such a position the collar will naturally fall of its own weight until the beveled surface of the rib J meets the beveled surface of one of the ribs E, where the collar will remain until by the jarring of the drill, which is now in condition for work, the stem begins to tighten on the threads of the drill-shank C. It will be evident now that with the rib J entered the drill cannot work loose or turn in the stem to "back out." The collar, as a matter of fact, is held from rotating on the stud F by reason of its rib I, which engages the flutes of that member; but at work the stem A if it moves at all on the shank C will be able to turn in but one direction—i. e., toward the right, or in a direction to tighten the threads—and this movement will be followed by a further entrance of the wedge or rib J between the ribs E, as before stated, it being well understood that said rib J in entering between the members E contacts with the same on both surfaces, so that retracting movement of the drill is absolutely prevented. After long-continued use the collar will finally have reached its lowest position, as indicated in Fig. 2, at which time it is raised from that position and turned around, as before, until the ribs I and J register with properly-located spaces between ribs E and G. It is designed so space the ribs of both the drill and the stem that at some point two of the spaces of these series of ribs will properly register, so as to readily receive the ribs I and J as the collar is turned around for a new entrance.

In order to easily remove the collar H after being seated at its lowest position or when desiring to separate the drill and stem, a hole L is drilled vertically through the shank C of the drill just beneath the collar, said hole terminating within a channel of the drill at M, and said channel is further deepened by a milling-tool to form a large opening through

which a "drift" may be entered to force the collar H up into the bore B of the shank. Thus it will be seen that said collar may be very easily handled from the outside in raising it and adjusting it for reentrance. In order that mud and water may be kept from entering the stem A, the hole L is closed by means of a set-screw N. This is removed when it is desired to enter the drift to raise the collar. The set-screw K also prevents entrance of mud and water, and the tight joint between the drill and shank also holds out the water, so that the interior is kept absolutely clean.

It is evident that the only proper method of locking the drill and stem together is by some such arrangement as I describe. The outer surfaces of the members must be kept smooth, so as not to interfere with the boring operation, and nothing must be permitted outside. Therefore the interior is the place for employing a locking device, and by its use other tools such as are used in well-drilling can be employed, thereby making the drill-stem interchangeable with various implements.

It is evident that the drill and stem may be secured together by other means than screw-threads, and I do not wish to confine myself to any particular construction in this respect.

I claim—

1. In a drill for well-boring, locking means therefor, the drill, the stem for carrying it and a device for entrance between the drill-shank and the stem for preventing separation of said drill and stem for the purposes described.

2. In a drill for well-boring purposes, a drill, a stem for carrying it, said portions being screwed together, a fluted stud on the drill-shank, ribs on the inner surface of the stem and a locking device adapted to engage the said fluted portion of the drill and the said ribs of the shank for preventing separation of the parts.

3. A well-drilling implement comprising a drill, a stem for carrying the same, said drill and stem being screwed together, and means within the stem for engaging said stem and drill for preventing unscrewing of the drill from the stem.

4. A well-drilling implement comprising a drill, a stem for carrying the same, said drill and stem being attached to one another by means of screw-threads, a series of vertical ribs on the drill, a series of ribs on the stem, a device for entrance between the ribs of the respective members and ribs on said device for engaging the two series of ribs for the purposes set forth and described.

5. A well-drilling implement comprising a drill, a stem for carrying it and from which it is detachable, ribs in the drill-shank, ribs in the stem such ribs being opposite one another, there being an annular space between said ribs of the drill and stem and a ribbed collar adapted to enter between the drill-

shank and stem for engaging the ribs of both these members and preventing such members becoming loosened or separated except at will as set forth.

5 6. A well-drilling implement comprising a drill, a stem to which said drill is detachably secured by means of screw-threads, vertically-disposed ribs on the drill-shank, substantially vertically disposed ribs on the interior of the
10 shank into which the drill is screwed, there being an annular space between the two series of ribs, a collar adapted to descend vertically between said series of ribs, a straight rib on the interior surface of the collar, and a
15 wedge-shaped rib on the outer surface thereof for engaging the ribs on the drill and those on the stem respectively for the purposes set forth and described.

7. In an implement for well-boring purposes, a drill, a carrying-stem therefor, said drill and stem being connected as by screw-threads, the stem being hollow, a vertical extension on the drill adapted to enter the hollow stem, a series of vertical ribs disposed
25 around the said extension substantially as described, a series of ribs disposed around the inner surface of the hollow stem said ribs having a slanting or beveled surface substantially as described, there being an annular
30 space between the two series of ribs, a collar adapted to enter and fill said annular space, a vertical rib on the inner surface of the collar for entering between the ribs of the drill extension, and a rib on the outer surface of
35 the collar the same having a beveled surface to engage the beveled ribs of the drill substantially as and for the purposes explained.

8. A well-drilling implement comprising the

drill D, having the shank C, the stem A having the opening B therein, said shank and
40 opening B being screw-threaded for allowing one to engage the other as set forth, the stud F on the drill-shank, the vertical ribs G on said stud arranged substantially as illustrated, ribs E disposed around the interior of
45 the stem A substantially as shown and described, there being an annular space created between the two series of ribs, the collar H having the straight rib I on its inner surface for engaging the spaces between the ribs G,
50 and also having the tapering rib J for entering between the ribs E as set forth.

9. A well-drilling implement comprising the drill D having the shank C, the stem A having the opening B therein, said shank and open-
55 ing B being screw-threaded for allowing one to engage the other as set forth, the stud F on the drill-shank, the vertical ribs G on said stud arranged substantially as illustrated, ribs E disposed around the interior of the
60 stem A substantially as shown and described, there being an annular space between the two series of ribs, the collar H having the straight rib I on its inner surface for engaging the spaces between the ribs G and also
65 having the tapering rib J on its surface for entering between the ribs E as set forth and for the purposes explained, there being a hole L in the drill-shank beneath the said collar H as shown and described.
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In testimony whereof I affix my signature in presence of two witnesses.

MARION M. LONG.

Witnesses:

E. A. HEALD,
L. C. WEBSTER.