

(No Model.)

L. S. LEWIS.
WELL DRILL.

No. 566,989.

Patented Sept. 1, 1896.

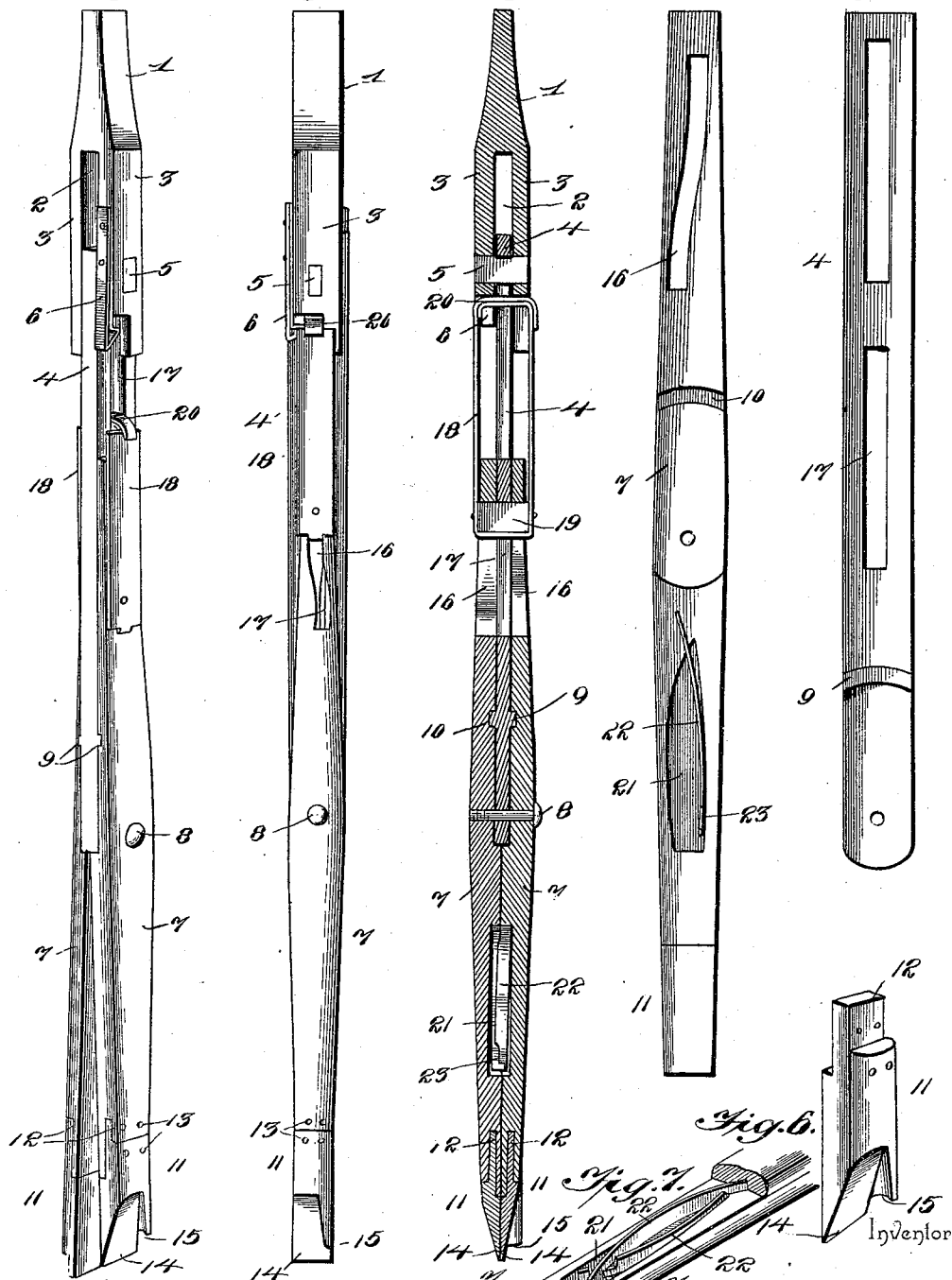
Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 5.



Witnesses

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UNITED STATES PATENT OFFICE.

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WELL-DRILL.

SPECIFICATION forming part of Letters Patent No. 566,989, dated September 1, 1896.

Application filed April 23, 1896. Serial No. 588,707. (No model.)

To all whom it may concern:

Be it known that I, LYMAN S. LEWIS, a citizen of the United States, residing at East Elkport, in the county of Clayton and State of Iowa, have invented a new and useful Well-Drill, of which the following is a specification.

This invention relates to well-drills; and the object in view is to provide a drill in which the drill point or bit is made in sections which are relatively movable, and to provide in connection with such drill point or bit suitable operating mechanism for contracting the bit in the event of the same becoming wedged or stuck in the bore of the well, the said mechanism being connected with and capable of being operated by the main rope or cable.

Other objects and advantages of the invention will appear in the course of the subjoined description.

The invention consists in an improved well-drill embodying certain novel features and details of construction and arrangement of parts, as hereinafter fully described, illustrated in the drawings, and pointed out in the claims hereto appended.

In the accompanying drawings, Figure 1 is a perspective view of the improved well-drill, showing the bit expanded. Fig. 2 is a side elevation of the same, showing the bit contracted. Fig. 3 is an inside face view of one of the drill-bars. Fig. 4 shows the slotted jar-bar detached and in elevation. Fig. 5 is a longitudinal section through the complete drill. Fig. 6 is a detail perspective view of one section of the drill point or bit. Fig. 7 is a detail broken perspective view showing the manner in which the drill-point-expanding springs engage each other.

Similar numerals of reference designate corresponding parts in the several figures of the drawings.

Referring to the accompanying drawings, 1 designates the upper member of the drill-jar, to the upper end of which the operating rope or cable is attached. This jar member is formed with an open longitudinal slot 2 or is bifurcated, as shown, to establish the parallel arms 3, between which is received the slotted upper end of the jar-bar 4. The up-

per jar member and the jar-bar 4 are capable of free longitudinal movement relatively to each other, the slotted end of the bar 4 sliding between the arms 3 of the jar 1 and being guided by means of a cross-piece or web 5, carried by the jar member 1, the said web preferably having a rectangular cross-sectional shape or being provided with flat sides and fitting snugly in the groove in the bar 4, so as to prevent relative turning between the said bar and the jar member 1, said web also constituting a stop for limiting the relative longitudinal movements of said parts. The jar member 1 also carries a pair of spring-dogs 6, one arranged on each side of the bar 4 and connected to one of the parallel arms 3 of the jar, the purpose of which will be hereinafter explained.

7 designates a pair of drill-bars, which are fulcrumed intermediate their ends upon a transverse pin or pivot 8, extending through the lower end of the bar 4. The wear and strain is removed from the pin or pivot 8 by means of segmental ribs 9 upon each side of the bar 4, which coöperate with segmental grooves 10 in the inner adjacent faces of the drill-bars. The drill-bars may thus freely turn upon their pivot, while the longitudinal thrust is received by the said segmental ribs, and wear on the pivot 8 is thereby prevented. At their lower ends the drill-bars carry sectional or half bits 11, which are provided with tongues 12, enabling them to be removably inserted in the lower ends of said bars and held by means of suitable fastenings 13. Each bit-section also comprises a main cutting or chipping bottom edge 14 and a rounded or segmental finishing edge 15, extending substantially at right angles to the bottom edge 14 and arranged in a higher plane, whereby it is protected from injury. The bottom cutting edge 14 does the major portion of the work, while the rounded or segmental lip 15 gives a smooth finish to the side wall of the bore. Each of the drill-bars is provided adjacent to its upper end with a longitudinal slot 16, which extends in a direction slightly oblique to the true longitudinal line of its respective bar. The jar-bar 4 is also provided at a corresponding point with a longitudinal

slot 17, which extends in a straight longitudinal line, as shown in the detail view of said bar.

18 designates a longitudinally-movable strap, comprising the opposite side portions, which embrace the upper ends of the drill-bars 7 and connected at their lower ends by a slide-block 19, which extends transversely through the slots 16 and 17, above referred to, and is adapted to slide longitudinally therein. The upper ends of the strap 18 are extended inward toward each other and overlapped within the longitudinal slot in the upper end of the jar-bar 4, thus forming shoulders 20, beneath which the spring-dogs 6 engage when the jar 1 is lowered. The oblique slots 16 of the drill-bars are reversely disposed or inclined, so that as the strap 18, with its slide-block 19, is elevated the upper ends, as well as the lower ends, of the churn-rods are moved in opposite directions and inward toward each other, so as to contract the drill point or bit. When the slide-block 19 is forced downward in the slots 16, the drilling-bit is expanded into its operative position. Each of the drill-bars has formed in its inner surface a recess 21, and in such recess is arranged a bow-shaped spring 22. These springs are secured fixedly at corresponding ends, and they are notched adjacent to their free ends as indicated at 23, so that said springs may be crossed near their ends and caused to engage with each other in such manner that the tension of the springs will be exerted to hold the drill point or bit normally expanded. Such construction will enable the bit to be contracted against the tension of the springs as it is passing through one or more sections of the well-casing, and after reaching the lower end of such casing and passing out of the same the bit will be immediately expanded by the action of said springs and will thereafter form a bore of sufficient diameter to easily receive the well casing or tubing.

While in operation the parts of the drilling-tool occupy the relation shown in Fig. 1, with the drill jar member out of engagement with the strap 18. When, however, the drill becomes fast in the bore of the well by reason of small pieces of rock or other hard substances getting behind the drill point or bit, the jar member 1 is lowered until the dogs 6 engage the shoulders 20 of the strap 18. By now drawing upward on the jar member 1, by means of the main operating rope or cable, the slide 19 is caused to move upward in the slots 16 of the drill-bars 7, and thus the lower ends of said bars are moved toward each other and the bit contracted in size, so as to admit of the drill being easily withdrawn from the well. By means of the construction

described much expense, annoyance, and loss of time will be obviated.

It will be understood that the device is susceptible of various changes in the form, proportion, and minor details of construction, which may accordingly be resorted to without departing from the spirit or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed as new is—

1. The combination with the jar-bar provided upon opposite sides with segmental ribs, and means for operating said bar, of the drill-bars fulcrumed on said jar-bar and provided in their adjacent faces with segmental grooves which coöperate with the ribs, and the bit-sections on said drill-bars, substantially as described.

2. In a drill having an expansible bit, the combination with a longitudinally-slotted jar-bar, of the drill-bars fulcrumed on opposite sides thereof and carrying the bit-sections, the upper jar member having a sliding movement longitudinally of the jar-bar and adapted to be detachably connected to the drill-bars whereby said member may slide upon the jar-bar without affecting the drill-bars and yet engage said drill-bars when desired in such manner as to expand or contract the bit, substantially as described.

3. In a drill having an expansible bit, the combination with the jar-bar having a longitudinal slot, of the drill-bars fulcrumed thereon and provided with reversely-inclined slots, the upper jar member slidably mounted on the jar-bar and movable longitudinally thereof, one or more catches carried by said jar member, and a strap carrying a slide extending through and adapted to travel within the slot in the jar-bar and the inclined slots in the drill-bars, said strap being formed for engagement with the catch or catches on the upper jar member, substantially as described.

4. In a drill having an expansible bit, the combination with the jar-bar and operating means therefor, of the drill-bars pivotally mounted on said jar-bar and provided in their adjacent meeting faces with coincident recesses, means for rocking said drill-bars on their pivotal connection, and a pair of springs arranged in said recesses and having their free ends notched and crossed in interlocking engagement, substantially as described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

LYMAN S. LEWIS.

Witnesses:

W. C. LEWIS,
A. A. LEWIS.