(No Model.)

G. PALM.

APPARATUS FOR JARRING CASINGS IN ARTESIAN WELLS.

No. 563,054. Patented June 30, 1896.

Fig. 1.

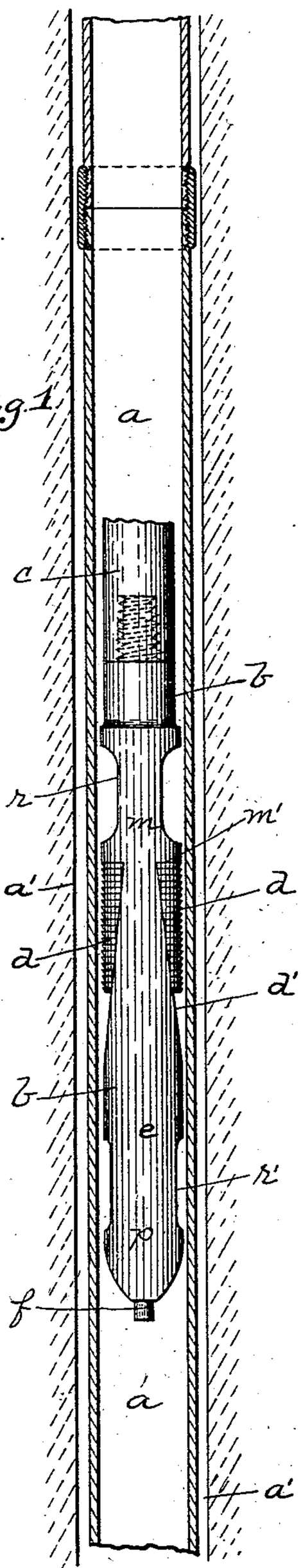

Fig. 2.

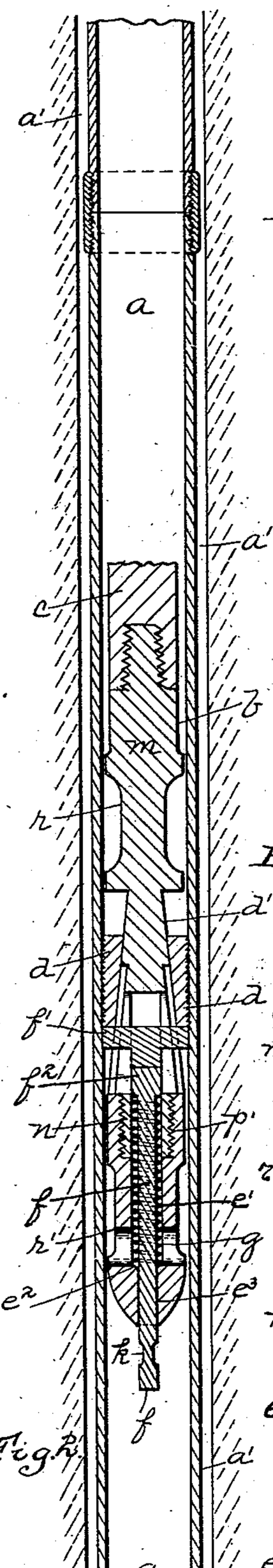

Fig. 3.

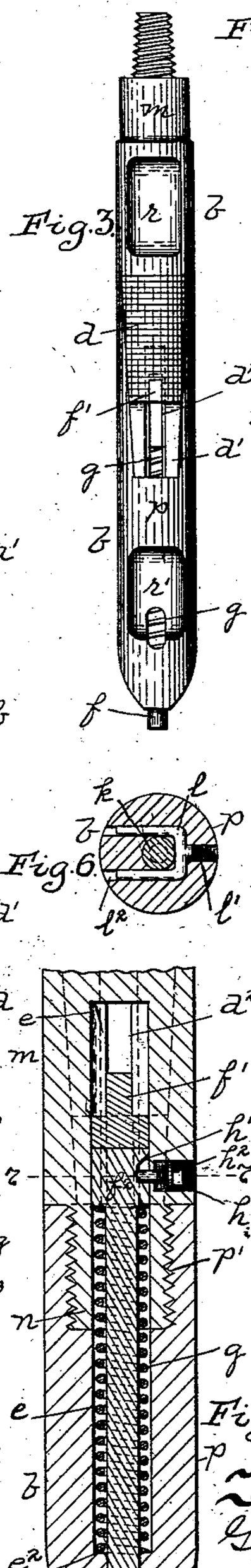

Fig. 6.

Fig. 4.

Fig. 7.

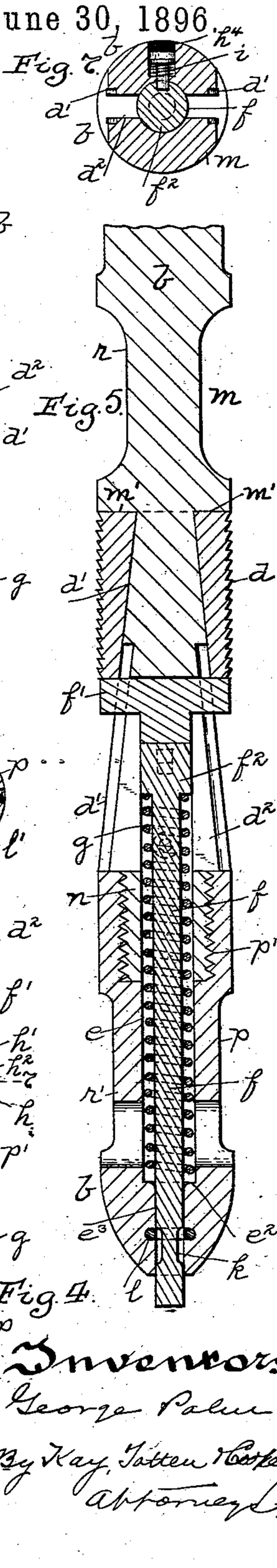

Fig. 5.

Witnesses:
Josiah Barrett,
L. H. Knox

Inventor:
George Palm.
By Kay, Tatten & Cook
Attorneys.

UNITED STATES PATENT OFFICE.

GEORGE PALM, OF BUTLER, PENNSYLVANIA.

APPARATUS FOR JARRING CASINGS IN ARTESIAN WELLS.

SPECIFICATION forming part of Letters Patent No. 563,054, dated June 30, 1896.

Application filed February 3, 1894. Serial No. 498,998. (No model.)

To all whom it may concern:

Be it known that I, GEORGE PALM, a resident of Butler, in the county of Butler and State of Pennsylvania, have invented a new and useful Improvement in Apparatus for Jarring Casings in Artesian Wells; and I do hereby declare the following to be a full, clear, and exact description thereof.

My invention relates to apparatus for jarring casings in Artesian wells, its object being to provide apparatus for loosening the casing, and, if necessary, lifting the same, which apparatus can easily be lowered into the casing and then caused to engage with the interior face thereof and to hold firmly to the same while the tools are jarred upwardly until the casing is loosened from the surrounding body of broken and powdered rock holding the same within the well, and then, after the loosening of the casing, to provide for the withdrawal of the engaging devices or jaws from the wall, so that the apparatus may be withdrawn from the well.

To enable others skilled in the art to make and use my invention, I will describe the same more fully, referring to the accompanying drawings, in which—

Figure 1 is a longitudinal section of a well, showing the apparatus therein in full lines. Fig. 2 is a like view showing the apparatus in section and also showing it engaging with the tubing—that is, in the jarring position. Fig. 3 is a side view of the tool at right angles to Fig. 1. Fig. 4 is an enlarged sectional view of the lower portion of the tool, illustrating the same in position for withdrawal from the well. Fig. 5 is an enlarged sectional view of the tool, showing the parts in the position in which they are withdrawn from the well. Fig. 6 is a cross-section on the line 6 6, Fig. 4; and Fig. 7 is a cross-section on the line 7 7, Fig. 4.

Like letters of reference indicate like parts in each view.

In the drawings, *a* represents the tubing within the well *a'*, and *b* is the jarring-tool which is connected by a threaded joint with the lower end of the string of tools within the well, such as with the lower end of the drill-jars, as at *c*. The tool *b* has the inclined faces *d'*, over which the jaws *d* move, as is more particularly shown in the section Fig. 7, the jaws being held to the inclines of the tool-body by means of dovetails or like sliding connections, so that they can slide down the inclines and engage with the interior of the tubing or casing *a*. It will be noticed that the jaws have biting-faces, the inclines of the teeth of which extend upwardly, so that they will take into the tubing as the tool is raised, and consequently will act to give a strong hold of the tool upon the tubing when the tool is drawn upwardly, but will have no biting action as the tool is lowered. Below the inclines *d'* of the tool is the annular portion *e*, which incloses the spring-operated bar or support *f* within the central bore *e'* thereof, this spring-operated bar carrying at the upper end thereof the cross-head *f'*, which extends out through longitudinal slots d^2, extending from the central bore of the tool through the inclines *d'* of the tool, so that the cross-head *f'* may engage with and hold up the jaws *d*. The bar *f* has the enlarged upper end f^2 fitting within the central bore and centering the bar therein, and the central bore is reduced at the lower end so as to fit around the main body of the bar. Surrounding the bar *f*, within the central bore *e'*, fitting against the shoulder e^2 at the top of the reduced portion e^3 of the central bore, and pressing against the enlargement f^2 of the bar is the spring *g*, which acts to raise the bar *f* and through its cross-head *f'* raise the jaws *d*. Two operations are required for this bar, one that it shall be held down and the spring *g* compressed when the tool is lowered within the well, so leaving the jaws *d* free to slide on the inclined faces *d'* and engage with the casing, and the other that when the tool is being withdrawn from the well after its function of jarring the tubing or casing loose has been accomplished the spring *g* shall operate to raise the bar and hold up the jaws, so that contact of the jaws with the inner wall of the casing is prevented. For this purpose I employ two latches or spring-locks. The upper spring-latch *h* engages with a seat *h'* of the bar above the spring, the latch *h* in its normal position being withdrawn so that it does not engage with the bar, and for that purpose a spring *i*, fit-

ting around the latch within the seat h^2 thereof in the body of the tool and pressing against a head on the latch so as to withdraw it from the course of the bar, a suitable opening h^3 being formed in the cap or plate h^4, which holds the latch in place, so that by any suitable tool the latch h can be forced inwardly to engage with the seat h' in the bar, and before the tool is lowered into the well, by means of the cross-head f', the bar f is forced downwardly until the seat h' is in line with the latch h, and the latch h is then pressed inwardly into the seat h', when the force of the spring g pressing against the latch-head holds it in the seat, and so holds the bar f down away from the jaws d. Near the lower end of the bar f is the seat k, and, as shown in Fig 6, in the lower part of the tool is the spring-latch l, which is forced inwardly toward the bar by the spring l', this spring-latch being preferably of the form shown in Fig. 6, that is, of forked shape, so that it extends on each side of the bar, and fits in seats l^2 provided therefor, the ends of the latch extending through the body of the tool, so that in forcing the bar f downwardly the spring-latch l may be forced out of its way so as to permit the shoulder k' on the bar f above the seat k to pass the spring-latch or stop l, it being shown in that position in Fig. 4. The upper end of the seat k is inclined so as to force the spring-latch l out of the way, and, as a result, when the bar is freed from the upper spring-latch h, it will be raised by the spring g and pass the spring-latch l, which then secures the bar in its raised position.

The body of the tool is preferably made in sections, the upper section m having the inclines d, and above the inclines the shoulders m' to limit the upward movement of the jaws d, and below the inclines the threaded extension n, which engages with a threaded socket p' in the lower section p, so providing for the screwing of the parts together and the insertion of the bar f within the socket or central bore e' of the tool. The two sections have any suitable angular or like places to provide for the screwing up, such as the angular portion r on the upper section m and the angular portion r' on the lower section p.

The operation of the tool is practically as follows: The tool is secured at the end of the string of tools, generally hanging below the drill-jars, being suspended above the same by the ordinary drilling-rope connected to the walking-beam. The operator forces down the bar f, drawing aside the latch l to let it pass downwardly, and lowering the bar until its seat h' comes in line with the upper latch h, when that latch is forced inwardly into the seat h', and the pressure of the spring g against the latch holds it in place, and so holds the bar f in the position shown in Fig. 4 with the spring g compressed. He then lowers the tools into the well until the jar-ring-tool reaches the desired position, the jaws sliding along the interior wall of the casing, but not holding thereto, as the incline of the teeth thereon is in an upward direction. When the tool reaches the desired position, the jaws d will of course slide down their inclines and bear against the casing. He then, through the walking-beam, gives upward jars to the tool, drawing the jaws upwardly by means of the walking-beam, so that they engage with the inner wall of the casing sufficiently to hold against dropping, and he lowers the walking-beam, so as to close the drill-jars, and raises it again, so as to give the upward jar and so force the jaws d into the tubing and cause them to hold fast thereto. He continues this upward-jarring action after the jaws of the tool have grasped the tubing, and by means of such upward-jarring action, through the jaws holding to the tubing, imparts an upward jar to the tubing, continuing this until he has jarred the tubing loose. In so doing, as the jaws d slide down the inclines d' they will strike against the cross-head f' of the spring-operated bar f and will compress the same, and as a result will overcome the pressure of the spring g, operating through the bar f, upon the upper latch h, leaving that latch free to be withdrawn by its spring i, and therefore leaving the bar f free to rise within the tool and to follow up the movement of the jaws d. As soon as the tubing is jarred loose and the operation of loosening the same is completed, in order to withdraw the tool it is necessary to release the jaws from engagement with the tubing, and the operator then changes the movement and, through the drill-jars, imparts a downward jar to the tool, which forces the tool-body downwardly between the jaws d, holding to the casing, and, through the dovetail or like connections of the jaws with the tool, withdraws the jaws, and as soon as the jaws are thus withdrawn the spring-bar f, through its cross-head f', raises the jaws d until they strike against the shoulder m and holds them in such raised position. As the spring-bar passes upwardly the lower end thereof is drawn up therewith until the seat k comes in line with the spring-latch l, when that spring-latch engages with the seat and holds it in its raised position, so forming a positive means for holding the jaws in their raised position, as shown in Fig. 5, so that as the tool is raised from the well, even if the teeth of the jaws should contact with the interior wall of the tubing, they cannot obtain any firm hold therein. The tool is then ready to be raised and can be drawn from the well.

The tool is thus made practically automatic in its operation when within the well, both to permit the engagement of the jaws with and the firm holding of the jaws to the tubing to be jarred, and, when that jarring operation is completed, to free the jaws and to raise them into such position that they can-

not engage with the tubing, an efficient tool for this purpose being therefore provided.

What I claim as my invention, and desire to secure by Letters Patent, is—

In jarring-tools for tubing, the combination of the tool-body having a single pair of inclined surfaces d', the jaws d, the bar f, the cross-head f' adapted to engage with said jaws d, said cross-head working in the slots d^2 in the tool-body, the spring g, a latch for holding said cross-bar out of the way of said jaws, the spring-latch l, said bar f having the seat k, substantially as set forth.

In testimony whereof I, the said GEORGE PALM, have hereunto set my hand.

GEORGE PALM.

Witnesses:
J. N. COOKE,
L. H. KNOX.