

No. 774,071.

PATENTED NOV. 1, 1904.

J. R. GRIFFITH.  
EXPANSIBLE WELL DRILL.  
APPLICATION FILED MAR. 7, 1904.

NO MODEL.

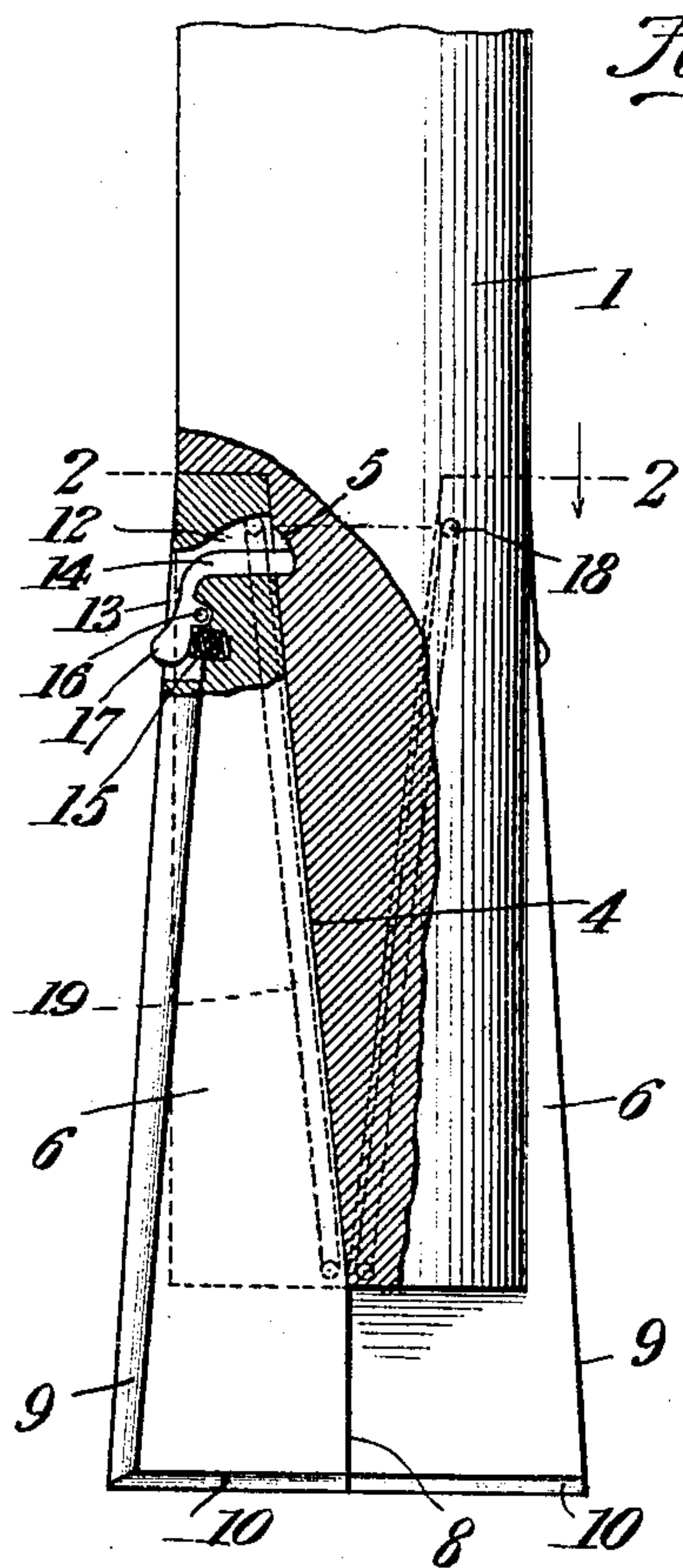


Fig. 1.

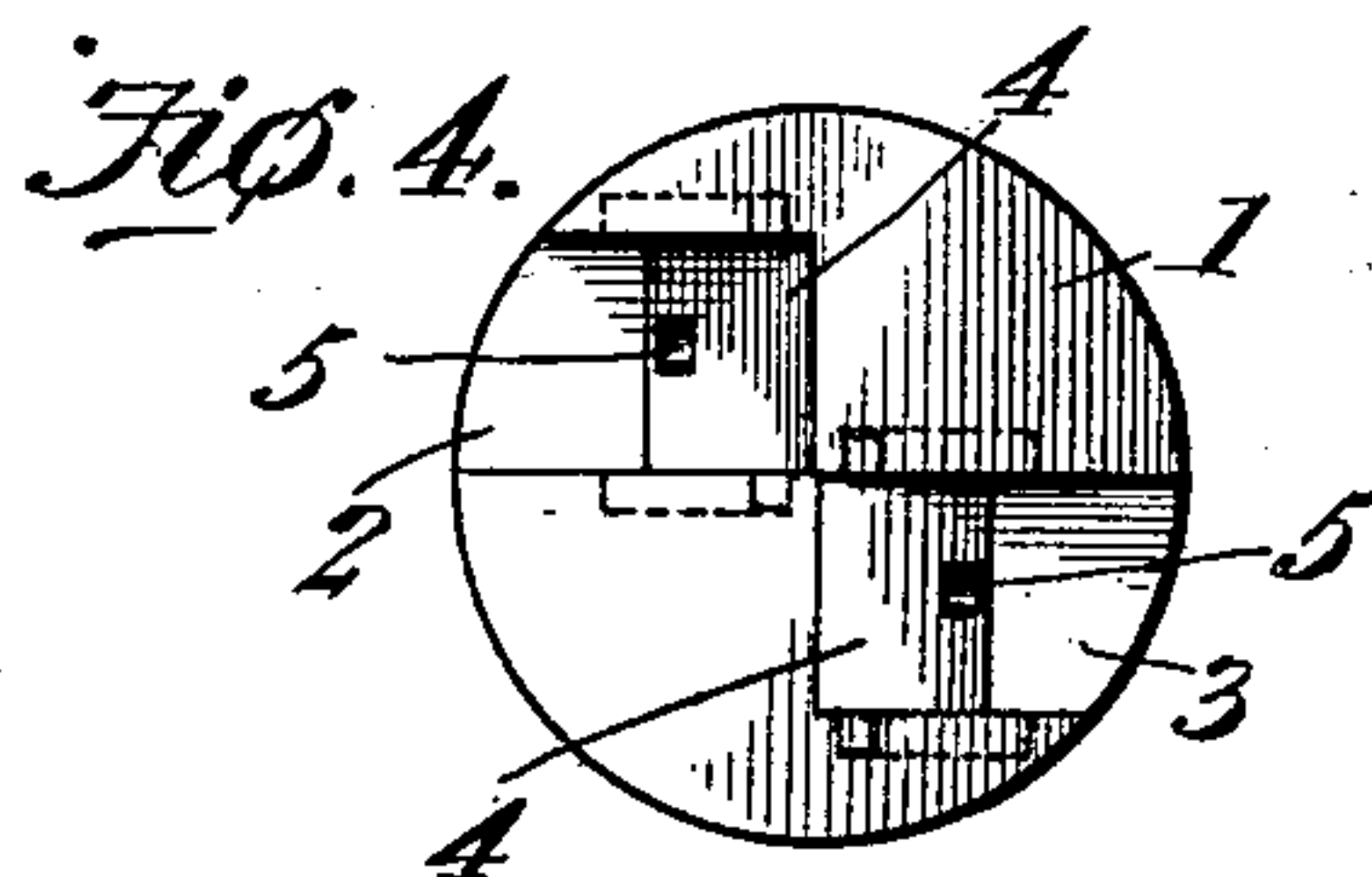


Fig. 4.

Fig. 3.

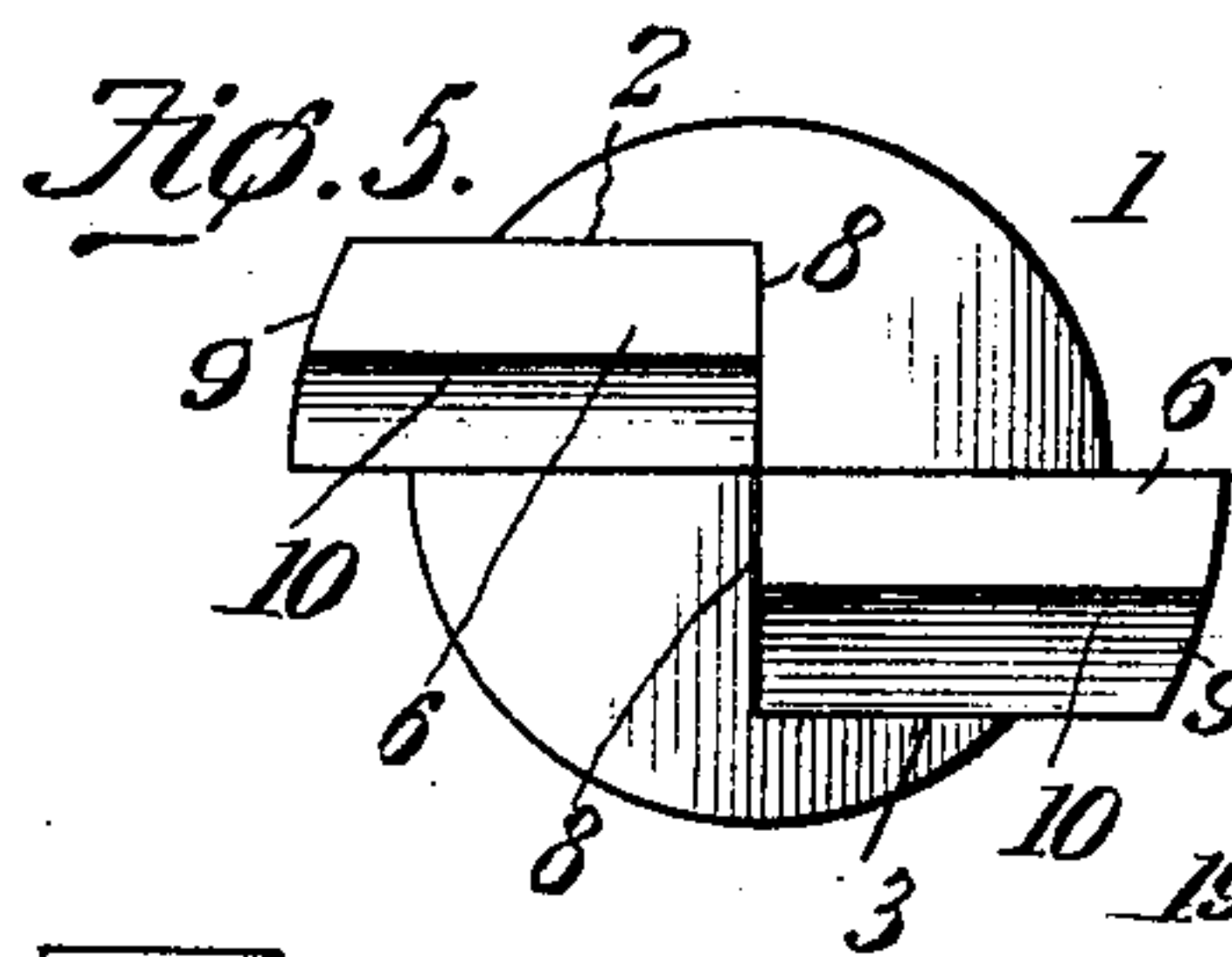


Fig. 5.

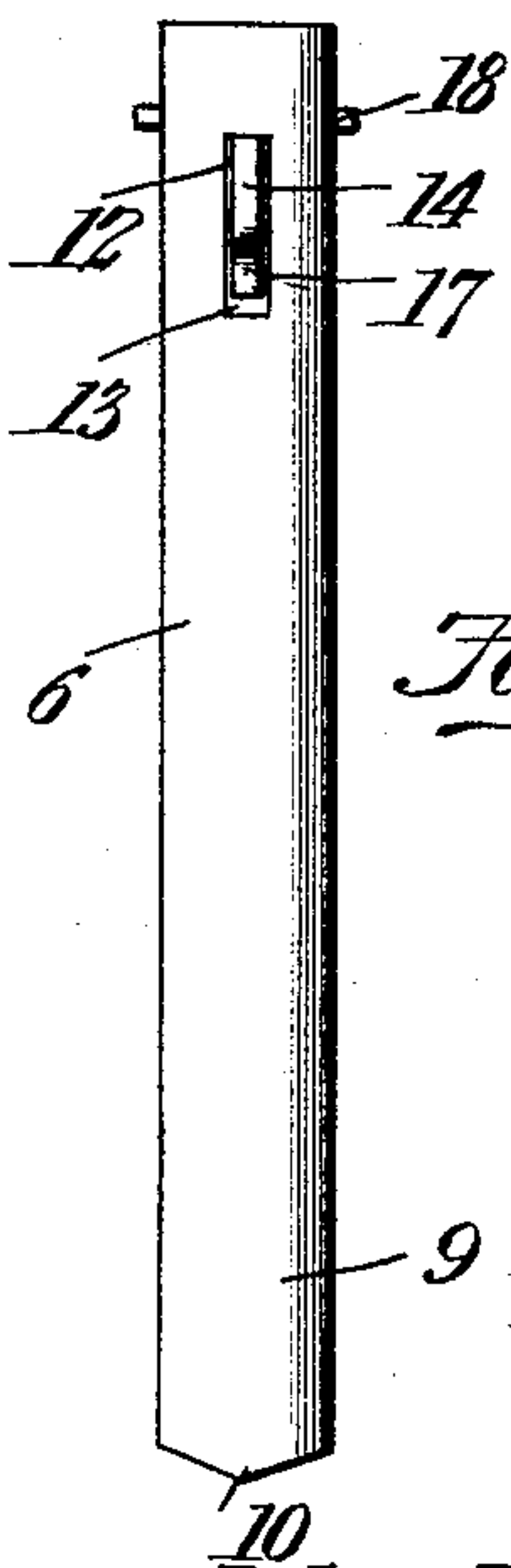


Fig. 6.

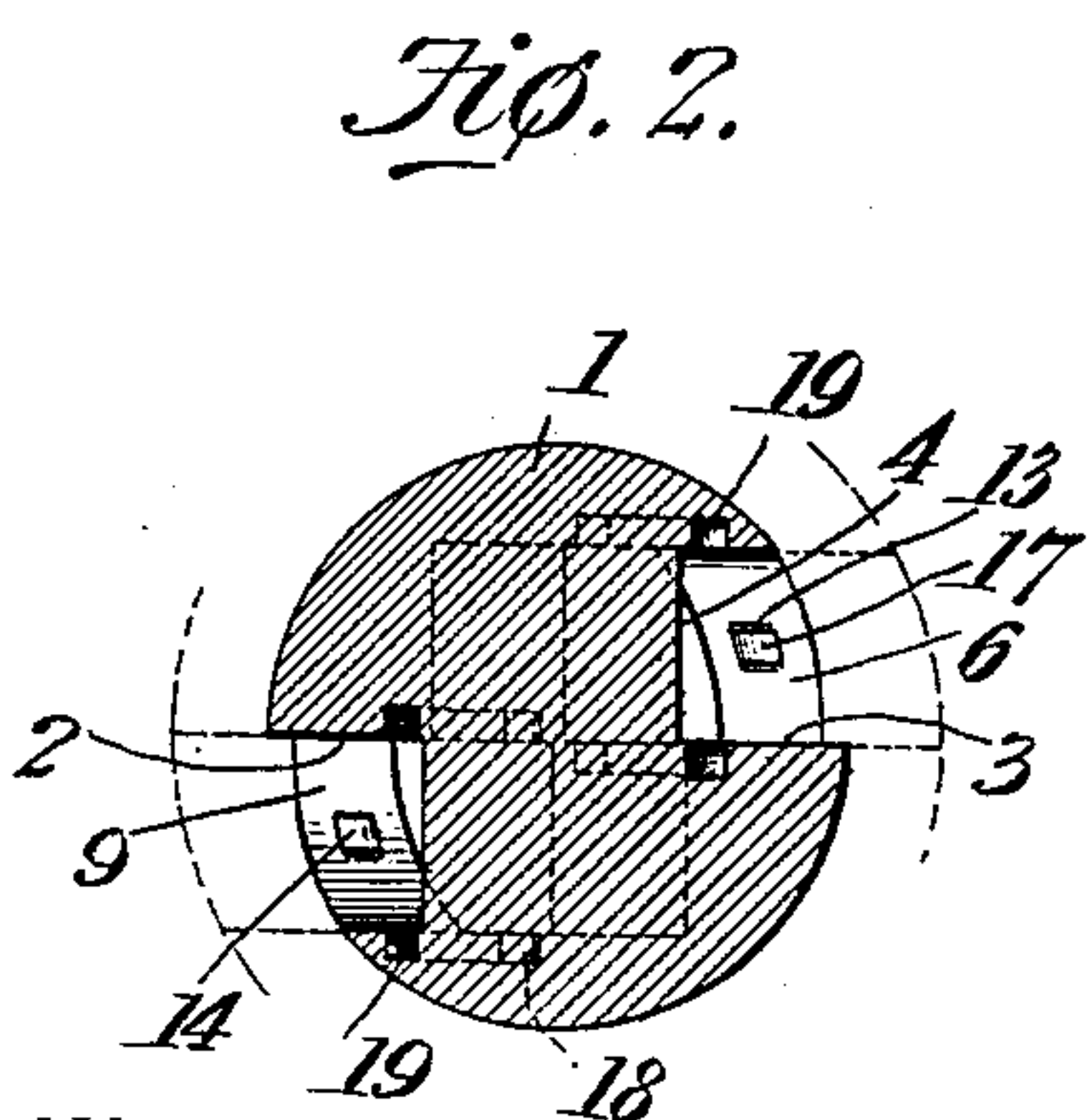


Fig. 2.

Witnesses  
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# UNITED STATES PATENT OFFICE.

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## EXPANSIBLE WELL-DRILL.

SPECIFICATION forming part of Letters Patent No. 774,071, dated November 1, 1904.

Application filed March 7, 1904. Serial No. 197,026. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN R. GRIFFITH, a citizen of the United States, residing at Zion City, in the county of Lake and State of Illinois, have invented a new and useful Expansible Well-Drill, of which the following is a specification.

This invention relates to the art of well-drilling, and has for its object to provide an improved drilling-tool particularly adapted for use in deepening drilled wells which are provided with the usual casings.

My invention contemplates a novel arrangement of drilling-bits whereby the latter may be drawn together or contracted for convenience in lowering the tool through the well-casing and are also capable of being separated or expanded to a diameter greater than that of the casing after the tool has been lowered below the bottom thereof, thereby to drill a hole of greater diameter than the casing to permit of the latter being sunk therein to the desired depth. It is furthermore designed to provide for locking the bits in their operative positions, so as to prevent accidental displacement thereof during the drilling operation, and also to provide for conveniently releasing and contracting the bits within the compass of the tool for convenience in withdrawing the latter from the well without removing the casing.

With these and other objects in view the present invention consists in the combination and arrangement of parts, as will be hereinafter more fully described, shown in the accompanying drawings, and particularly pointed out in the appended claims, it being understood that changes in the form, proportion, size, and minor details may be made within the scope of the claims without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings, Figure 1 is a side elevation of a portion of a well-drilling tool embodying the features of the present invention. Fig. 2 is a sectional view taken on the line 2-2 of Fig. 1. Fig. 3 is a detail view, partly broken, showing the drill-bits in their lowermost position. Fig. 4 is an inverted plan view of the drill-stock with the bits removed. Fig. 5 is a simi-

lar view with the bits in place. Fig. 6 is a detail view of one of the bits.

Like characters of reference designate corresponding parts in each and every figure of the drawings.

In explanation of the present device, reference being had to the accompanying drawings, the numeral 1 designates an ordinary drill-stock, which is changed but slightly in carrying out the present invention. This change consists in forming longitudinal sockets or recesses 2 and 3 in the lower portion of the stock, each socket intersecting the bottom of the stock and the outer side thereof. As clearly indicated in Figs. 3 and 4 of the drawings, it will be seen that the sockets intersect opposite sides of the stock, with their adjacent sides in diametric alinement, whereby it will be understood that the sockets are located in opposite quarter-sections of the stock. The back of each socket (indicated at 4) is inclined inwardly and downwardly, whereby the socket diminishes in size upwardly and the back forms a beveled or wedge face for a purpose as will hereinafter appear. Formed in the back of each socket and near the upper end thereof there is a recess or seat 5.

Fitted in each of the longitudinal sockets of the drill-stock is one of the present forms of bits 6. The front and rear or inner and outer faces 8 and 9, respectively, of the bit are converged upwardly at the same angle as the inclined back of the socket in the drill-stock, whereby the bit is tapered longitudinally and is wider at the bottom than at the top. The bottom of the jaw or blade is beveled downwardly in opposite directions from the upright sides of the bit to provide a central cutting edge 10. Piercing the upper portion of the bit from front to rear thereof is a perforation or passage 12, and a comparatively short longitudinal groove 13 leads downwardly from the outer end of this passage, thereby forming an inverted substantially L-shaped opening. Within this L-shaped opening is a substantially L-shaped latch or dog 14, the horizontal arm of which works in the passage or perforation 12, with its inner end projected at the inner face of the bit, and is yieldably held in this position by means of a spring 15, in-



terposed between the lower portion of the dog and the back of the groove. Upon the inner face of the upright member of the dog is a knuckle or projection 16, which bears  
 5 against the back of the groove and constitutes a bearing or fulcrum upon which the dog is designed to rock. The outer edge of the dog is inclined downwardly and outwardly, as at  
 10 17, so as to enlarge the dog sufficiently to project externally at the front of the bit and constitute a beveled or cam-shaped trip for use as will be hereinafter described.

When the bits are in the respective sockets, they are capable of sliding up and down there-  
 15 in, and in view of the inclined backs of the sockets the bits will be forced apart or separated by said backs when the bits are drawn upwardly, and, reversely, the bits will be drawn together when they are moved down-  
 20 wardly. To insure a positive lateral working of the bits, it is designed to have a positive and slidable tongue-and-groove connection between each bit and the drill-stock, as best shown in Fig. 3 of the drawings, wherein 18  
 25 indicates the tongue or projection, which slides in a groove or way 19, the latter being substantially parallel with the back of the bit-socket, so as to compel the bit to work later-  
 30 ally when it is raised and lowered. The groove or way is of course closed at its lower end to limit the downward movement of the projection, and thereby constitute a stop to limit the downward movement of the bit.

In employing the present tool the well-cas-  
 35 ing is first elevated sufficiently to permit of the working of the tool below the bottom of the casing, after which the tool is lowered through the casing, the dogs or latches 14 hav-  
 40 ing been previously disengaged from the seats or recesses 5 in the upper ends of the bit-sockets, whereby the bits are permitted to drop down to their lower limits and are thereby drawn together, so as to occupy transversely  
 45 less space than the diameter of the tool, to permit of the latter being conveniently lowered through the well-casing. When the lower  
 50 ends of the bits strike the bottom of the well, they are stopped thereby; but the drill-stock is still further lowered, so as to slide down  
 55 over the bits, whereby the latter are drawn apart through the medium of the tongue-and-groove connections between the bits and the stock until the dogs or latches snap into the  
 60 respective seats 5, whereby the bits are firmly locked in position for operation.

To withdraw the tool from the well, it is merely necessary to haul up the tool without  
 65 any previous preparation and without removing the well-casing. This is made possible by reason of the strips or cam portions 17 of the  
 latches or dogs projecting externally of the drill-stock, so as to contact with the bottom edge of the well-casing, and thereby rock the  
 dogs to withdraw the same from engagement  
 with the stock and permit the bits to gravi-

tate to their lowermost positions, where they will be drawn together, as hereinbefore explained, and the tool may be conveniently drawn through the casing.

An important feature of the present inven- 70  
 tion resides in having the locking device 14 carried by the bit, whereby it lies within the path of the stock when being lowered and raised through a well-casing, and therefore it is impossible for the locking device to engage 75  
 with the well-casing and become wedged or caught thereon and interfere with the convenient lowering and raising of the tool.

Having thus described the invention, what is claimed, and desired to be secured by Letters 80  
 Patent, is—

1. A well-drilling tool comprising a socket-  
 ed stock, a bit slidable within the socket of the stock, and means carried by the bit to detach-  
 ably interlock the latter with the stock and 85  
 having a part projected externally of the stock to form a trip for engagement with a well-casing to release the bit from the stock when  
 in its operative position, and located within 90  
 the path of the stock in the inoperative posi-  
 tion of the bit to permit lowering and raising  
 of the tool through a well-casing without fric-  
 tional engagement between the trip and the casing.

2. A well-drilling tool comprising a stock 95  
 having a socket intersecting the bottom and one side of the stock, a bit slidable within the socket and capable of working through the  
 lower end thereof, and means carried by the bit to detachably lock the latter with the stock 100  
 and having a portion projected outwardly through the open side of the socket to consti-  
 tute a trip for engagement with a well-casing to release the bit from the stock when in its  
 operative position, and located within the path 105  
 of the stock in the inoperative position of the bit to permit lowering and raising of the tool  
 through a well-casing without frictional en-  
 gagement between the trip and the casing.

3. A well-drilling tool comprising a socket- 110  
 ed stock, a bit slidable within the socket of the stock, and a spring-actuated latch carried by  
 the bit and having a detachable interlocking engagement with the stock, a portion of the  
 latch being projected externally of the stock 115  
 and forming a trip disposed for engagement with a well-casing to disengage the latch from  
 the stock when in its operative position, and located within the path of the stock in the in-  
 operative position of the bit to permit lower- 120  
 ing and raising of the tool through a well-casing without frictional engagement between  
 the trip and the casing.

4. A well-drilling tool comprising a socket-  
 ed stock, a bit slidable within the socket of the 125  
 stock, and an intermediately-pivoted spring-actuated latch carried by the bit, one end of  
 the latch having a detachable interlocking en-  
 gagement with the stock, and the opposite end  
 of the latch being projected externally of the 130



stock to form a trip disposed for engagement with a well-casing to release the latch from the stock when in its operative position, and located within the path of the stock in the inoperative position of the bit to permit lowering and raising of the tool through a well-casing without frictional engagement between the trip and the casing.

5. A well-drilling tool comprising a socketed stock, a bit slidable within the socket of the stock, and a substantially L-shaped latch carried by and intermediately pivoted upon the bit, the inner end of the latch having a detachable interlocking engagement with the stock, and the outer end being projected externally of the stock to form a trip disposed for engagement with a well-casing to release the latch from the stock when in its operative position, and located within the path of the stock in the inoperative position of the bit to permit lowering and raising of the tool through a well-casing without frictional engagement between the trip and the casing.

6. A well-drilling tool comprising a socketed stock, a bit slidable within the socket of the stock, and a rocking latch piercing the bit and carried thereby, one end of the latch having a detachable interlocking engagement with the stock, and its opposite end being projected externally of the stock to form a trip disposed for engagement by a well-casing to release the latch from the stock when in its operative position, and located within the path of the stock in the inoperative position of the bit to permit lowering and raising of the tool through a well-casing without frictional engagement between the trip and the casing.

7. A well-drilling tool comprising a socketed stock, a bit slidable within the socket of the stock, and provided with a passage piercing the bit from front to rear and also having a groove formed in the outer face of the bit

and in communication with the passage, and a substantially L-shaped spring-actuated latch having one member working in the passage with its inner end in detachable interlocked engagement with the stock, and the other member of the latch having a portion projected externally of the stock to form a trip disposed for engagement with a well-casing to disengage the latch from the stock when in its operative position, and located within the path of the stock in the inoperative position of the bit to permit lowering and raising of the tool through a well-casing without frictional engagement between the trip and the casing.

8. A well-drilling tool comprising a stock having a socket intersecting the bottom and one side thereof, an endwise-slidable and laterally-movable bit working in the socket, a projection and groove-guiding connection between the bit and the stock and disposed at an inclination to the longitudinal axis of the stock to work the bit laterally during its endwise movement, and a latch carried by the bit with one end having a detachable interlocked engagement with the stock and its opposite end projected outwardly through the open side of the socket to form a trip disposed for engagement with a well-casing to release the latch from the stock when in its operative position, and located within the path of the stock in the inoperative position of the bit to permit lowering and raising of the tool through a well-casing without frictional engagement between the trip and the casing.

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

JOHN R. GRIFFITH.

Witnesses:

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R. L. MADDEN.