

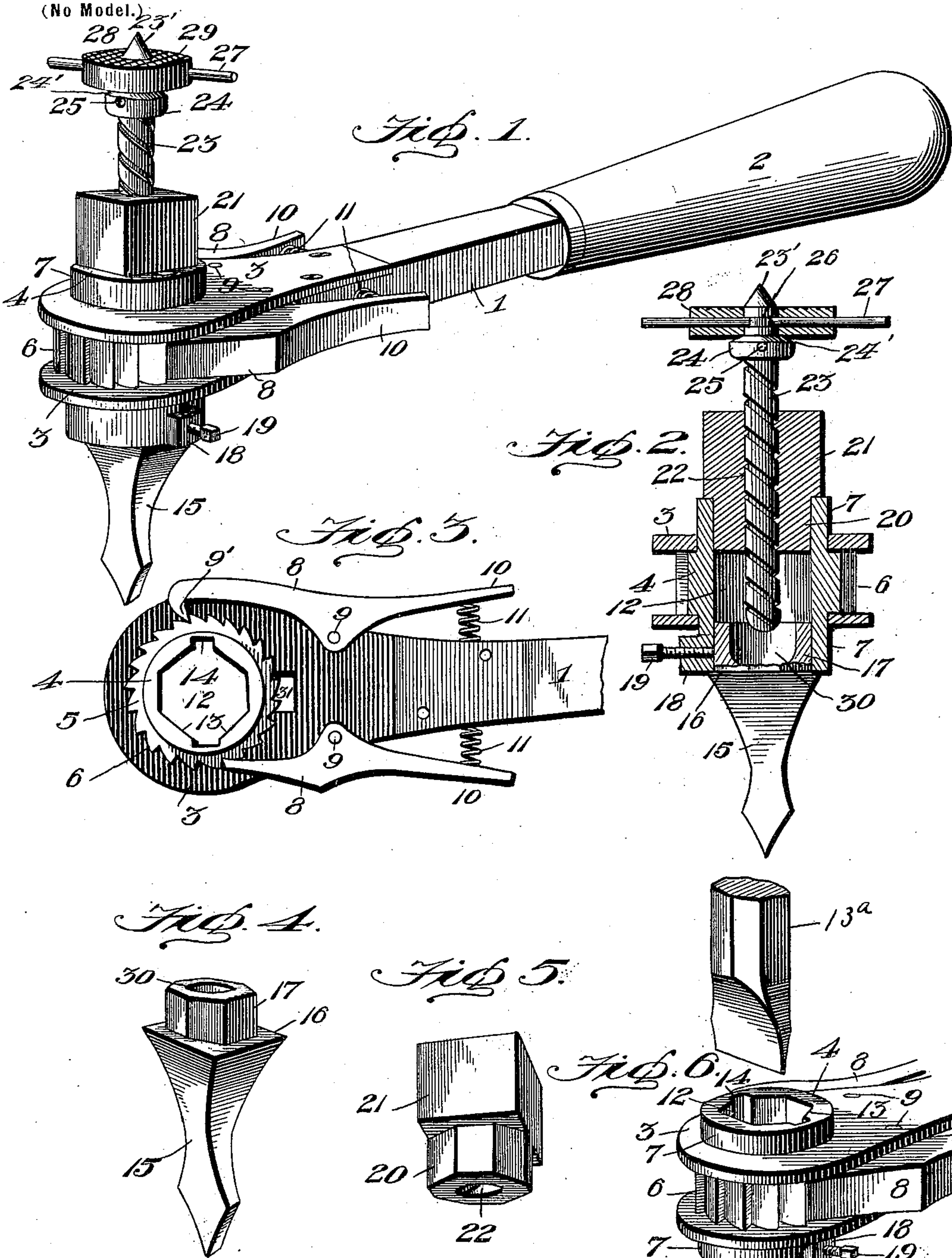
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Patented July 3, 1900.

D. S. WILLIAMS.  
RATCHET DRILL.

(Application filed Dec. 30, 1899.)

(No Model.)



Witnesses  
*Wm. Koerth.*  
*R. M. Smith.*

D. S. Williams Inventor  
By

*E. L. Siggers*  
Attorney



# UNITED STATES PATENT OFFICE.

DANIEL S. WILLIAMS, OF SALIDA, COLORADO, ASSIGNOR OF TWO-THIRDS  
TO FRED R. WATERS AND G. W. BENNETT, OF SAME PLACE.

## RATCHET-DRILL.

SPECIFICATION forming part of Letters Patent No. 652,827, dated July 3, 1900.

Application filed December 30, 1899. Serial No. 742,126. (No model.)

*To all whom it may concern:*

Be it known that I, DANIEL S. WILLIAMS, a citizen of the United States, residing at Salida, in the county of Chaffee and State of Colorado, have invented a new and useful Ratchet-Drill, of which the following is a specification.

My invention relates to a novel metal-drill, and has for its object to embrace within the drill structure a bit-head which when disassociated from the metal-drill as a complete structure may be employed as a holder for rock-drills.

To the accomplishment of this object, the invention consists in providing a metal-drill with a short head or holder of the same internal cross-sectional contour throughout and provided with diametrically-opposed bit-channels in order that the head of the metal-drill may also be used as the bit-holder of the rock-drill; and the invention consists, further, in constructing the metal-drill with a screw-block designed to be detachably fitted into the head or holder and in telescoping the feed-screw carried by said block into the shank of the metal-drill bit in order that the feed requisite in a metal-drill may be obtained in a metal-drill structure which includes a comparatively-short head adapted when disassociated for use as the bit-holder of a rock-drill.

The invention consists, still further, in the construction and arrangement hereinafter more fully described, illustrated in the accompanying drawings, and embraced within the scope of the appended claims.

In the accompanying drawings, Figure 1 is a perspective view of a ratchet-drill constructed in accordance with the present invention, the several parts being operatively associated and ready for use. Fig. 2 is a transverse section through the frame-plates and head, showing the feed-screw, screw-block, and boring-bit or drill-point, said parts, with the exception of the feed-screw and the lower part of the bit or drill, being shown in section. Fig. 3 is a plan view of the device omitting the handle, the adjacent frame-plate being removed to show the engagement between the rotatable head and the box. Fig. 4 is a detailed perspective view of a boring-

bit adapted to be associated with the rotatable head. Fig. 5 is a similar view of the screw-block or nut. Fig. 6 is a fragmentary perspective view illustrating the manner of inserting the boring-bit through the rotatable head.

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

In the drawings, 1 designates the stock of the drill, which is provided at one end with a handle 2 and at its opposite end with parallel members or frame-plates 3, forming bearings for the rotatable head, (indicated at 4.) The central portion of the rotatable head 4 is enlarged or provided with a collar 5, the peripheral edge of which has ratchet-teeth 6, and the width of said collar is equal to the distance between the frame-plates 3, so as to prevent displacement of the head and hold it securely in operative relation to the plates. The end portions of the head 4 are comparatively smaller and are cylindrical in shape to form journal portions 7, which fit rotatably in openings in the frame-plates. Mounted between the frame-plates are dogs 8, which are fulcrumed intermediate their ends on pins 9. The engaging end of one of the dogs is straight, while the smaller end of the other dog is hooked or bent back to form the engaging point 9'. One dog operates with a pushing force and the other with a pulling force on the head when the lever or handle is moved in one direction. The opposite or outer ends of the dogs are extended to form handle portions 10, and such portions are normally pressed outward away from the stock 1 by means of expansion-springs 11, interposed between the handles 10 and the stock, thus enabling either or both of the dogs to be thrown out of engagement with the ratchet-teeth on the rotatable head when required.

The head 4 is provided with a through axial opening 12 of polygonal form or comprising a plurality of flat sides or bit-engaging surfaces 13. The opening is shown as comprising six flat sides corresponding to the cross-sectional shape of the standard rock-drill or bit 13<sup>a</sup>; but it will be evident that the number of flat surfaces comprised by said opening may be increased or diminished at will.



The head also comprises oppositely-located bit-channels 14 in order to adapt the comparatively-wide cutting-point of the rock-drill or bit 13<sup>a</sup> to be inserted through the rotatable head, the said bit-channels being in the nature of radial extensions of the opening 12. By such construction the boring-bit or drill-point may be inserted point first through the head, after which the shank of the bit will be engaged by the flat sides of the opening 12, thus insuring the rotation of the drill-point or boring-bit when corresponding movement is imparted to the rotatable head.

The improved implement of my invention is adapted to be used in connection with a drill for forming holes in stone or rock, and it is common in the art to employ a drilling-tool such as shown by Fig. 6, which tool is provided at its working end with an expanded bit. It is to be understood that the stone-working tool has its lower end of a width exceeding the diameter of the shank, and this shank is polygonal in cross-section for the purpose of snugly fitting in the axial opening of the revoluble head. In the operation of the implement the drill is inserted point first through the revoluble head, so that the expanded point passes through the channels or openings 14, while the polygonal shank is snugly received in the corresponding opening of said head. The movement of the handle operates the dogs to rotate the head, which in turn rotates the tool, so as to produce the opening in the stone; but to feed the tool up to the work it is customary to hammer down on the head of the tool. In the course of time the head becomes battered or enlarged by hammering the end thereof, and it is difficult to withdraw the drill from the revoluble head, because the working end of the tool exceeds the diameter of the head, while the battered upper end of the tool prevents the latter from being drawn through the axial opening of said revoluble head. My construction obviates this objection, because the drilling-tool may be withdrawn from the revoluble head by slipping said tool endwise in an upward direction for the expanded working end thereof to pass through the channels 14 of the revoluble head.

Where the implement is to be used for drilling metal, a special boring-bit or drill-point 15 is provided, the same having its butt-end reduced to form a shoulder 16 and provide a shank 17, which is polygonal in form and of a cross-sectional shape corresponding to and adapted to fit within the opening 12 of the head 4, thus securing an interlocking fit between the head and boring-bit. In order to secure the bit 15 in place, the head is provided near its lower end with a thickened offset or lug 18, which is pierced by a binding-screw 19, the inner end of which impinges against the shank 17 and secures the bit in place. Within the opposite end of the head 4 is inserted the polygonal shank 20 of a screw-block or nut 21. The shank 20 corresponds in shape

to the opening 12, so that the block or nut 21 is caused to turn with the head 4. The block 21 is provided with an axial screw-threaded opening 22, extending therethrough to receive the feed-screw 23. The screw 23 is provided adjacent to its outer end with an enlarged collar 24, having a transverse opening 25 for the reception of a rod or handle wherewith to turn the screw for feeding the drill or bit toward the work. The extremity of the feed-screw 23 is provided with an annular groove 26, in which are received the inner ends of a pair of oppositely-arranged keys or pins 27, which pass through diametrical openings in the swivel-head 28, which is journaled to turn on the end portions of the feed-screw beyond the collar 24, the latter forming a seat for the swivel-head. The outer surface of the swivel-head is milled or roughened, as shown at 29, and is adapted to engage and rest against any fixed surface opposite that being drilled. In order to accommodate as long a feed-screw as possible and yet secure a compact arrangement, the shank 17 of the drill-point or bit is made hollow or recessed, as shown at 30, so that when the screw is turned inward its inner end will enter the recess 30 and allow the collar 24 to be brought close to the outer end of the screw-block 21.

In order to remove the rotatable head 4, one of the frame-plates 3 may be detached from the stock 1. One of the frame-plates is also provided with a clearance-slot 31, adapted to permit the passage of the lug 18 on the rotatable head above described.

It is to be understood that it sometimes becomes necessary to remove the revoluble head from the implement. The frame-plate which is not provided with the clearance-slot is made detachable from the handle, and to remove the revoluble head from the implement it is necessary to first detach the screw 19 from the lug 18, then turn the head until the lug 18 assumes a position opposite to or in line with the slot 31, and then withdraw the revoluble head from the frame-plate by slipping said revoluble head endwise in a direction for the lug 18 to pass through the slot 31. The parts may be replaced by reversing the order of adjustment of the head and the frame-plate, after which the binding-screw 19 should be replaced.

It will now be clear that my invention comprehends a metal-drill constructed and arranged in a novel manner in order that when its parts are disassociated the bit-holder may be used for the ordinary stone-drilling bit, which, as is well known, comprises an expanded cutting-head designed to be located below the bit-stock and with a comparatively-long polygonal shank extending above the stock and designed to be struck with a sledge. It is in order to permit this dual adaptation of the holder or head that its opening is of uniform transverse contour throughout its length, as this peculiarity is necessary in order to accommodate ordinary forms of rock-



drill bits. This necessary structural arrangement or design of the head necessitates a novel agroupment of parts in order to accommodate the holder for use as a component  
 5 part of a metal-drill, and that novelty resides in the provision of a screw-block and bit each provided with a shank conforming to the contour of the opening in the head and seated in the opposite ends thereof. A proper  
 10 bearing for the feed-screw is thus provided, and the head is rendered as effective for use in connection with a metal-drill as it is for use in connection with the ordinary rock-drill bit. There is still another consideration, how-  
 15 ever, which must receive attention in constructing a device of this character and that is that for rock-drilling a comparatively-short head must be utilized, as it frequently happens that the rock-fissures in which the  
 20 drill is located—as, for instance, in sinking “charge-holes”—are frequently narrow and necessitate the employment of a very short bit in order to give sufficient room between  
 25 the end of the bit and the adjacent wall of the fissure to permit the manipulation of the sledge or hammer. It is for this reason that in constructing my metal-drill I use a comparatively-short head and hollow out the  
 30 shank or tang of the bit for the reception of the feed-screw, as such employment of the short head adapted for use as a rock-drill holder necessitates special provision for obtaining a proper length of feed when the  
 35 holder is used as a head for a metal-drill, and this provision is made, as indicated, by telescoping the screw with the shank. Obviously the shank could not be telescoped with the screw in this form of metal-drill, because,  
 40 unlike metal-drills of ordinary construction, this device comprehends the employment of a head or holder of uniform internal contour throughout, and this necessitates the employment of a drill-bit whose shank conforms to the interior of the head or holder, and as the  
 45 feed-screw must be carried by the screw-block, likewise fitting within the head or holder, it must of necessity be of less diameter than the diameter of the shank and must necessarily telescope therewith as contradistinguished from the telescoping of the feed-screw  
 50 by the bit-shank.

For the purpose of reducing the friction between the collar 24, which is fast with the upper part of the feed-screw, I have provided  
 55 a beveled upper surface 24' on said collar, thereby reducing the area of frictional contact between the swiveled head and the collar.

The upper extremity of the feed-screw is of conical form, as at 23' in Figs. 1 and 2. This conical extremity of the screw extends 60 through the swiveled head and beyond the milled upper surface thereof, whereby the conical end of the screw is adapted to be countersunk in soft material, such as wood, while the swiveled head bears firmly against 65 the surface in which the conical-ended screw is seated. This reduces the friction between the screw and the surface against which its conical end bears.

From the foregoing it is thought that the construction, operation, and many advantages of the herein-described invention will be apparent to those skilled in the art without further description, and it will be understood that various changes in the size, shape, 75 proportion, and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

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

1. In a ratchet-drill, the combination with a head provided with drill-channels in its interior walls, of a handle the hub of which surrounds the head, and pawls attached to the handle, whereby the device may be employed as a holder for rock-drills. 85

2. In a metal-drill, the combination with a head provided with an opening of the same cross-sectional contour throughout, whereby said head may be employed as a rock-drill holder, of a drill-bit and screw-block having shanks fitted in the opposite ends of the head, and a feed-screw passing axially through the screw-block and telescoping with the shank of the bit. 90 95

3. In a metal-drill, the combination with a head provided with an opening of the same cross-sectional contour throughout and having bit-channels, whereby said head may be employed as a rock-drill holder, of a drill-bit and screw-block having shanks fitted in the opposite ends of the head, and a feed-screw passing axially through the screw-block and telescoping with the shank of the bit. 100 105

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

DANIEL S. WILLIAMS.

Witnesses:

JAMES W. DE WEESE,  
ALBERT LAUB.