A. B. CARLL.

RATCHET DRILL.

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1,138,276. Patented May 4, 1915.

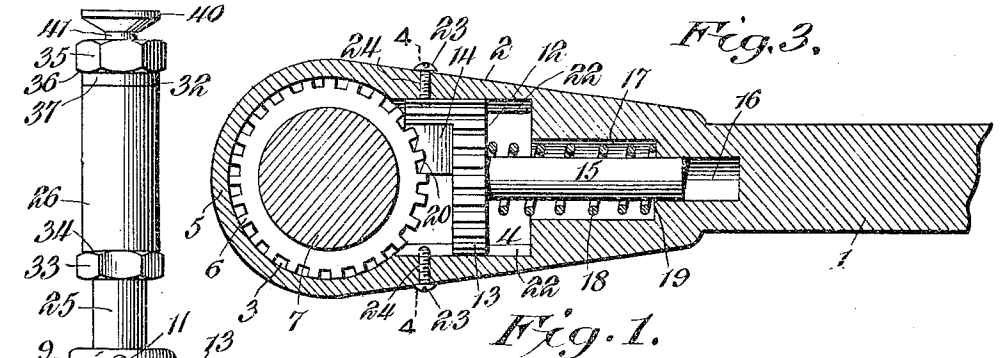


Fig. 3.

Fig. 1.

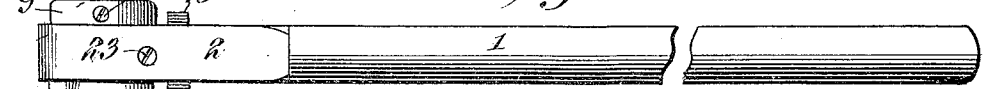




Fig. 4.

Fig. 2.

Fig. 7.

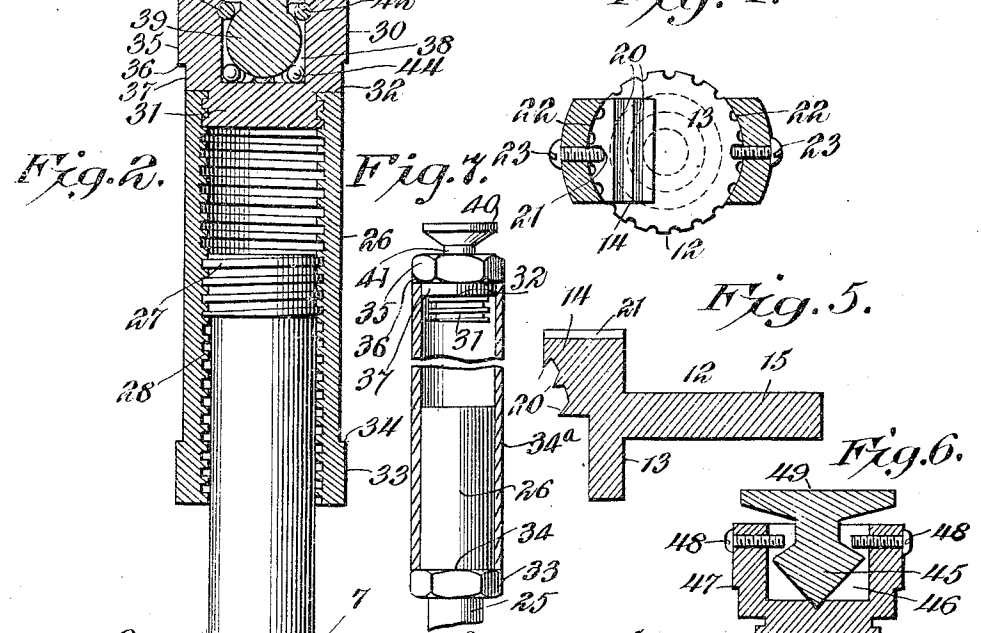


Fig. 5.

Fig. 6.

WITNESSES

H. D. Orr.

H. T. Riley

A. B. Carll, INVENTOR,

BY

C. L. Siggers.

ATTORNEY

THE NORRIS PETERS CO. PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ADDISON BURTIS CARLL, OF BOOTHWYN, PENNSYLVANIA.

RATCHET-DRILL.

1,138,276. Specification of Letters Patent. Patented May 4, 1915.

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To all whom it may concern:

Be it known that I, ADDISON B. CARLL, a citizen of the United States, residing at Boothwyn, in the county of Delaware and State of Pennsylvania, have invented a new and useful Ratchet-Drill, of which the following is a specification.

The invention relates to improvements in ratchet drills.

The object of the present invention is to improve the construction of ratchet drills, and to provide a simple, practical and efficient ratchet drill equipped with a stock having feeding means, and adapted to be increased in length when desired and also provided with a swiveled head for bearing or resting against a stop or support.

With these and other objects in view, the invention consists in the construction and novel combination of parts hereinafter fully described, illustrated in the accompanying drawing, and pointed out in the claims hereto appended; it being understood that various changes in the form, proportion, size and minor details of construction, within the scope of the claims, may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawing:—Figure 1 is a side elevation of a ratchet drill, constructed in accordance with this invention. Fig. 2 is a longitudinal sectional view of the same. Fig. 3 is a sectional view on the line 3—3 of Fig. 2. Fig. 4 is a transverse sectional view on the line 4—4 of Fig. 3. Fig. 5 is a detail sectional view of the reversible pawl. Fig. 6 is a detail sectional view, illustrating another form of swiveled head. Fig. 7 is a sectional view showing an extension tube or pipe applied to the feeding means, the latter being shown in elevation.

Like numerals of reference designate corresponding parts in all the figures of the drawing.

In the accompanying drawing in which is illustrated the preferred embodiment of the invention, 1 designates a handle having an enlarged terminal portion 2 provided with an aperture composed of a substantially circular or segmental outer portion 3 and an approximately rectangular inner portion 4. The outer portion 3 of the opening is greater than a semicircle to provide a curved outer wall 5 for embracing and forming a bearing for a ratchet wheel 6, preferably formed by cutting teeth in a drill stock 7, but the ratchet wheel may be applied to the drill stock in any other preferred manner. The drill stock 7 is provided at one side or face of the enlarged portion of the handle with a projecting head 8, adapted to receive a drill bit. The stock is retained in the outer portion of the aperture of the handle by a set collar 9, detachably secured on a reduced portion 10 of the stock by a set screw 11. The handle 1 of the wrench is oscillated in the usual manner in the operation of the tool, and the enlarged end 2 is arranged between the flat faces of the head 8 and the set collar 9.

The ratchet wheel 6 is engaged by a reversible pawl 12 consisting of a circular head or disk 13, having an engaging portion 14 and a central longitudinal stem or pivot 15, extending into a longitudinal opening 16 of the handle and slidable therein to carry the engaging portion of the pawl into and out of engagement with the ratchet wheel, and capable also of rotary movement to reverse the pawl for arranging the engaging portion thereof at either side of the enlarged terminal of the handle. The longitudinal opening of the handle has a counterbore 17, which receives a coiled spring 18 bearing at its outer end against the disk or head of the pawl and having its inner end seated against the shoulder 19 formed by the counterbore 17. The engaging portion 14 consists of an extension located at one side of the center of the circular head or disk 13 and having straight parallel side faces and a straight inner edge or face, the outer face of the enlargement being curved and forming a continuation of the adjacent portion of the periphery of the head 13 of the pawl. The enlargement is provided at the inner side with an inclined or angularly disposed series of teeth 20 extending entirely across the enlargement and having their points arranged in an arc corresponding with the periphery of the ratchet wheel and adapted to engage in the grooves or spaces between the teeth thereof, as clearly illustrated in Fig. 3 of the drawing. The angularly disposed series or set of teeth form a tapered engaging portion, and the tendency of the ratchet wheel is to draw the pawl around with it, whereby the strain or pressure on the pawl incident to the operation of the tool in the forward movement thereof serves to wedge the pawl between

the ratchet wheel and the adjacent side of the handle. This action of the parts maintains the pawl securely in engagement with the ratchet wheel and effectually prevents the pawl from accidentally springing out of such engagement.

The circular head of the pawl operates in the inner approximately rectangular portion 4 of the aperture of the handle, and it extends entirely across the same, and it is provided in its periphery with a groove 21 extending longitudinally of the handle and also along the curved outer face of the engaging portion 14. The inner faces 22 of the enlarged terminal portion of the handle at the rectangular portion 4 of the aperture are curved and present smooth surfaces to the head of the pawl. When the handle is oscillated in the forward movement of the tool, it is locked rigid with the stock by the action of the pawl, and when it is swung in the opposite direction, the pawl releases the ratchet wheel and permits the handle to turn independently of the stock. The pawl has a slight reciprocation in engaging and releasing the ratchet wheel, and it is guided in such reciprocation and held against rotary movement by one of a pair of screws 23, mounted in threaded perforations 24 of the sides of the enlarged portion of the handle and adapted to engage the grooves 21 of the pawl at the engaging portion 14 thereof. The screws are located at the outer end of the rectangular portion 4 of the aperture, and the pawl is adapted to be moved inwardly beyond the transverse plane of the screws to disengage it from one screw partially rotated and slidably interlocking it with the other screw to reverse the wrench. The teeth of the ratchet wheel are substantially similar to ordinary spur teeth and the pawl is adapted to operate in either position to form either a right or left hand tool. The outer circular portion 3 of the aperture of the enlarged terminal portion of the handle is of greater diameter than the inner rectangular portion 4 of the said aperture, and when the handle is separated from the stock, the pawl may be readily moved into the said outer portion 3 of the said aperture and thereby detached from the handle. This construction will enable the parts to be readily separated and assembled.

The drill stock 7 is provided with a smooth shank 25, fitting snugly the interior of a sleeve 26 and provided at its upper or outer end with exterior screw threads 27 of greater diameter than the smooth portion of the shank and engaging interior screw threads 28 of the adjustable sleeve 26. The interiorly threaded sleeve 26 and the shank constitute means for feeding the drill and the shank and sleeve operate automatically in the usual manner in the forward movement of the tool. The sleeve or extensible member of the feeding means is a two-part structure embracing a sleeve proper and an upper or outer socket piece 30, having a reduced inner portion 31, provided with exterior screw threads and screwing into the upper or outer end of the sleeve, the shoulder 32 formed by reducing the inner end of the socket piece fitting against the outer end of the sleeve, as clearly illustrated in Fig. 2 of the drawing. The sleeve is provided at its inner end with an exterior polygonal enlargement 33, preferably of hexagonal form and providing an upper or outer shoulder or seat 34, adapted to receive a tubular extension piece (not shown) for increasing the length of the tool. When it is desired to increase the length of the sleeve, the socket piece is removed and a piece of ordinary pipe 34ª of proper diameter is slipped on the sleeve 26 with its inner or lower end resting upon the shoulder 34. The socket piece may or may not be employed when such extension pipe or tube is used, and it is provided with an exterior polygonal portion 35 corresponding to the polygonal portion 33 and forming a shoulder 36, adapted to rest upon the upper or outer end of the extension tube or pipe. The socket piece has a smooth cylindrical portion 37 between the reduced threaded portion 31 and the polygonal enlargement 32 to fit the interior of the said extension pipe or tube. The smooth portion 37 is of the same diameter as the exterior of the sleeve, which is also smooth, and by this construction the ratchet drill may be temporarily extended to any desired length to meet any requirement incident to its use.

The exterior screw threads 27 of the shank are arranged only at the upper end thereof, and the shank presents a smooth exterior from the said threads to the set collar 9. The sleeve proper 26 is interiorly threaded throughout its entire length, and it engages the screw threads 27 of the shank and is guided by the smooth exterior portion of the same. Also, by this construction the screw threads of the sleeve and the shank are never exposed and are protected and kept clean and free from dust and dirt. Furthermore, the threaded portion of the shank forms a guide or gage for the operator, and when the sleeve has run out to the full extent and the threads of the shank begin to be exposed, the operator knows that he has reached the limit of the extension or adjustment of the device. The relatively small threaded upper or outer portion of the shank lessens the labor of cutting the threads thereon, and reduces the cost of construction, without impairing the efficiency of the tool.

The socket piece 30 is provided with a cylindrical bearing recess 38, adapted to receive a ball 39 of a swiveled head 40. The

head 40, which is preferably of circular form, is connected with the ball by an integral neck 41, and it is detachably retained in the bearing recess of the socket piece by a split resilient ring 42, which is sprung into engagement with the interior annular groove 43 of the socket piece. The groove is formed in the walls of the recess adjacent to the upper or outer end of the socket piece, and an annular series of antifriction balls 44 are preferably placed in the bottom of the recess to support the relatively large ball 35 of the swiveled head. The swiveled head has a limited tilting and a free frictional relative rotary movement.

Instead of employing the ball and the retaining spring of the swiveled head illustrated in Fig. 2 of the drawing, the cone-shaped bearing portion 45 may be provided, as illustrated in Fig. 6. The cone-shaped bearing portion, which has its apex fitting against the bottom of the recess 46 of the socket piece 47, is retained in the latter by screws 48, piercing the walls of the socket piece and having inwardly projecting terminals extending over the conical bearing portion of the swiveled head 49. With the conical swivel, balls are unnecessary but they may be employed if desired.

What is claimed is:—

1. A drill of the class described including a rotary stock provided with a shank having threads, and an interiorly threaded sleeve arranged on the shank and engaging the threads thereof to feed the drill, said sleeve consisting of a separable two-part structure, one part being provided with an exterior shoulder forming a seat and adapted to permit a piece of pipe or tube to be fitted on the sleeve to increase the length of the drill, and the other part carrying a head and having a shoulder for engaging the upper end of the pipe or tube.

2. A drill of the class described including a rotary stock provided with a shank having threads, and an interiorly threaded extensible member engaging the threads of the shank and consisting of a separable two-part structure, each part having portions to receive an extension pipe or tube and provided with shoulders or seats for engaging the same.

3. A drill of the class described including a rotary stock provided with a shank having threads, and an interiorly threaded sleeve arranged on and engaging the threads of the shank and provided at its inner portion with an exterior shoulder or seat, a socket piece having a threaded portion screwed into the outer end of the sleeve, said socket piece being provided with an exterior shoulder and being separable to permit a piece of pipe or tube to be placed on the sleeve to increase the length of the tool, and a swiveled head carried by the socket piece.

4. A drill of the class described comprising a rotary stock, feeding means including a socket piece provided with a bearing recess, a swiveled head having an inner bearing portion arranged in the recess of the socket piece, and detachable means projecting from the walls of the recess and engaging the bearing portion of the swiveled head to secure the same to the socket piece.

5. A drill of the class described comprising a rotary stock, feeding means including a socket piece provided with a bearing recess, a swiveled head having a ball arranged in the bearing recess, antifriction balls also located within the recess and supporting the said ball, and retaining means projecting from the walls of the recess and engaging the ball at the outer portion thereof.

6. A drill of the class described including a rotary stock provided with a shank having a threaded outer or upper end and presenting a smooth exterior below the threads, and a threaded sleeve adapted to slip over the shank and be extended therefrom, said sleeve consisting of a two-part structure, one of the parts being interiorly threaded throughout its entire length and adapted to engage the threads of the shank and be guided by the smooth portion of the same, and the other part being exteriorly threaded to engage the interior threads of the first mentioned part and provided with a shoulder or abutment for the same.

7. A drill of the class described comprising a rotary stock, feeding means including a socket piece provided with a bearing recess, a swiveled head having a ball arranged in the bearing recess, antifriction balls also located within the recess and supporting the said ball, and means for retaining the ball in the bearing recess.

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

ADDISON BURTIS CARLL.

Witnesses:

GEORGE H. OLIVER,

PHILIP T. NICKERSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."