

G. M. NELL.
TOOL RETAINING MEANS.
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1,430,102.

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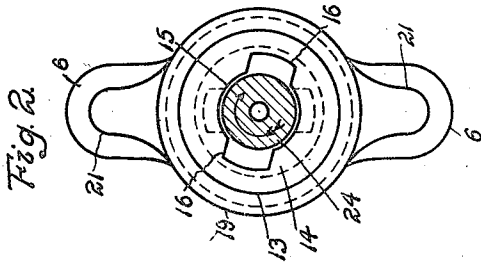


Fig. 4.

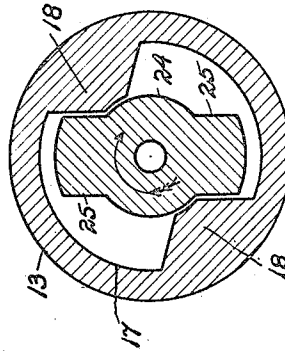


Fig. 1.

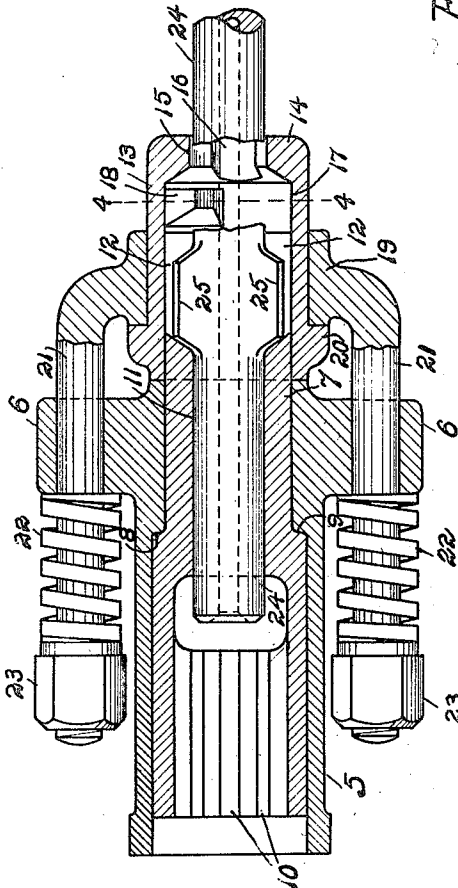
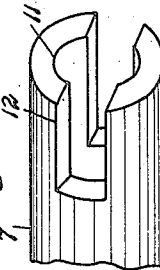


Fig. 3.



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GUSTAVE M. NELL, OF DENVER, COLORADO, ASSIGNOR TO THE DENVER ROCK DRILL MANUFACTURING COMPANY, OF DENVER, COLORADO, A CORPORATION OF DELAWARE.

TOOL-RETAINING MEANS.

Application filed February 14, 1920. Serial No. 358,643.

To all whom it may concern:

Be it known that I, GUSTAVE M. NELL, a citizen of the United States, residing at Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Tool-Retaining Means, of which the following is a specification.

The present invention relates to tool retaining means, and more particularly for holding in the chucks of rock drilling machines, steel having outstanding retaining lugs.

The object in the present invention is to provide a relatively simple structure that will effectively retain the steel in place, while permitting its necessary movement during drilling action, the retaining means being rotatable during the withdrawal of the steel from the drill hole, but being normally held against rotation during the drilling action, thereby avoiding excessive wear.

In the accompanying drawings:

Figure 1 is a longitudinal view through the front head and chuck of a drilling machine showing the drill steel in place therein.

Figure 2 is an end elevation of the same.

Figure 3 is a detail perspective view of the front end of the chuck.

Figure 4 is a sectional view on an enlarged scale, and taken substantially on the line 4-4 of Figure 1, with the steel in its forward position.

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

The head of a well known type of drilling machine is illustrated and is designated 5, said head being provided at its front end with outstanding integral ears 6. A chuck 7 is rotatably mounted in the head and is provided with an annular shoulder 8 bearing against an internal shoulder 9 in the bore of the head to prevent longitudinal forward movement of the said chuck. This chuck is provided at its rear end with longitudinal ribs 10 adapted to interlock with the corresponding ribs on the extension of the hammer piston, as will be readily understood by those skilled in the art. The front portion of the chuck 7 has a longitudinal axial bore 11 for the reception of the rear end of the steel or tool, which end is adapted to be struck by the hammer piston. The front end of the chuck 7 is furthermore pro-

vided with longitudinal diametrically opposite slots 12.

As shown in Figure 1, the front end of the chuck 7 projects beyond the head 5 and journaled on said projecting end is the rear end of a retaining member in the form of a sleeve 13 having an inset head or flange 14 at its front end, provided with a bore 15 aligned with the bore 11 and also provided with oppositely disposed slots 16. The portion of the sleeve 13 in rear of the said sleeve or flange 14 has an internal chamber 17, the rear end of which receives the projecting end of the chuck 7. The said chuck, however, terminates short of the head or flange 14, and in the space are located inwardly extending lugs 18 formed integral with the sleeve 13.

The sleeve 13 is held in place by a yoke or collar 19 surrounding the same, and bearing against an external annular flange 20 formed upon the rear end of the sleeve 13. The yoke or collar 19 is provided with rearwardly extending arms or stems 21 that slidably pass through the ears 6 of the head 5, and have coiled springs 22 on their rear portions. These springs bear against the rear side of the ear 6, and also bear against suitable nuts 23 threaded upon the rear ends of the arms or stems 21.

A portion of a well known form of drill steel or tool is illustrated at 24, the shank thereof being provided between its ends with opposite outstanding lugs 25. The shank of the tool is adapted to pass freely into the openings 15 and 11, as shown in Figure 1, and the lugs 25 can pass through the slots 16 of the sleeve 13 and engage in the slots 12 of the chuck 7. The sleeve 13 is rotatable and when its slots 16 are out of line with the slots 12 of the head 7, it will be obvious that the tool will be locked against detachment, but is permitted to have a limited longitudinal movement in the chuck. The arrangement of the lugs is such that when the tool is drawn forward or the machine is drawn rearwardly, and the lugs 25 bear against the lugs 18, the said lugs 25 will be out of alignment with the slots 16. It will also be noted that the yoke or collar 19 by reason of the action of the springs 22 will serve to clamp the rear end of the sleeve 13 frictionally against the front end of the head 5. The said sleeve 13 will be held against rotation when the lugs 25 of the

drill steel are in the slots 12, and out of engagement with the lugs 18.

The action of the device is substantially as follows. During the ordinary drilling operation the chuck 7 is rotated in a manner well understood, and as the machine is pressed forwardly to maintain the drill steel against its work, the lugs 25 will be engaged solely in the slots 12 and the tool will be rotated. The retaining member 13 is however, held against rotation by reason of the friction clamping action above described.

In withdrawing the steel from the drill hole the rearward movement of the machine will cause the lugs 25 to be partially removed from the slots 12 and the front edges of said lugs 25 will engage the inner face of the head or flange 14 of the sleeve 13. The chuck still being rotated the lugs 25 will strike the lugs 18 and will therefore rotate the sleeve 13, but the lugs 25 being abutted against the flange 14 will prevent the withdrawal of the tool since the slots 16 are out of alignment with said lugs. To detach the tool it is only necessary to turn the sleeve 13 in the reverse direction or until the slots 16 are aligned with the lugs 25, whereupon the said lugs will pass freely through the slots 16, as will be evident. The same result can be accomplished when the tool is in its rearward position, by turning said tool in its normal rotative direction as indicated by the arrow until the slots 12 and 16 are brought into alinement whereupon the tool can be removed without rotating the sleeve 13.

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, 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 fully described my invention, what I claim as new, and desire to secure by Letters Patent, is:—

1. In tool retaining means, the combination with a head, of a chuck member rotatably mounted thereon and having a tool receiving socket and a recessed seat for the usual tool lug, and a retaining member located in front of the chuck member and having a tool receiving opening, and a slot for the passage of the lug thereof, said retaining member having an internal chamber provided with a stop adapted to be engaged by the lug of the tool when in said chamber and out of line with the slot.

2. In tool retaining means, the combination with a head, of a chuck sleeve rotatably mounted therein, a rotatable retaining sleeve at the front end of the chuck sleeve, said

sleeves having aligned bores for the reception of the tool and having slots for the lugs of such tool, said retaining sleeve having an internal chamber to receive the lugs, and shoulders therein against which said lugs are adapted to bear when out of line with the slots of the said retaining sleeve.

3. In tool retaining means, the combination with a head, of a chuck sleeve rotatably mounted therein and having slots to completely receive the lugs of a tool placed thereon, and a rotatable retaining sleeve at the front end of the chuck having slots for the passage of the lugs of the tool, said retaining sleeve having a chamber in its inner portion through which the lugs are adapted to pass and said chamber having inwardly extending lugs against which the tool lugs are adapted to abut when out of line with the slots of said retaining sleeve.

4. In tool retaining means, the combination with a head, of relatively rotatable chuck and tool retaining members having sockets for the reception of a tool and passageways and seats for the lugs thereof, and means for normally holding the retaining member against rotation during the rotation of the chuck member with the tool engaged thereon.

5. In tool retaining means, the combination with a head, of relatively rotatable chuck and tool retaining members having sockets for the reception of a tool and passageways and seats for the lugs thereof, means for normally holding the retaining member against rotation during the rotation of the chuck member with the tool engaged therein, and means for permitting the interlocking of the tool with both the chuck and retaining members to cause their simultaneous rotation.

6. In tool retaining means, the combination with a head, of relatively rotatable chuck and tool retaining members having sockets for the reception of a tool and passageways and seats for the lugs thereof, means for normally holding the retaining member against rotation during the rotation of the chuck member with the tool engaged therein, and means for permitting the interlocking of the tool with both the chuck and retaining members and with the lugs of said tool out of line with the lug receiving slots of the retaining member.

7. In tool retaining means, the combination with a head, of relatively rotatable chuck and tool retaining members having overlapping portions and provided with sockets for the reception of a tool and passageways and seats for the lugs thereof, and means for normally holding the retaining member against rotation during the rotation of the chuck member with the tool engaged therein.

8. In tool retaining means, the combina-

tion with a head, of a chuck sleeve rotatable therein and projecting therefrom, a retaining sleeve journaled on the projecting portion of the chuck sleeve and having portions adapted to be engaged by the lugs of a tool placed therein, said sleeves having tool lug receiving slots movable into and out of alinement, and means for yieldingly holding the retaining sleeve in frictional engagement with the head to normally hold it against rotation but permitting rotation when engaged by the lugs of the tool.

9. In tool retaining means, the combination with a head having oppositely disposed ears, of a chuck rotatably mounted in the head, a retaining sleeve on the front end of the head, said chuck and retaining sleeve having alined sockets for the reception of a tool and slots for the reception of the lugs of such tool, a yoke surrounding the retaining sleeve and having rearwardly extending arms slidable in the ears, and springs on the arms bearing against the rear sides of the ears.

10. In tool retaining means, the combination with a head having oppositely dis-

posed ears, of a chuck rotatably mounted in the head and projecting therefrom, a retaining sleeve having a rear chamber that rotatably receives the projecting portion of the chuck and having a flanged rear end bearing against the head, a yoke rotatably receiving the retaining sleeve and bearing against the flange thereof, said yoke having arms slidable in the ears, springs on the arms bearing against the ears and causing the yoke to frictionally hold the retaining sleeve against the head and movably against rotation with the chuck, said chuck and retaining sleeve having alined sockets for the tool and slots for the reception of the tool lugs, and the chamber of the retaining sleeve having internal bearing shoulders for the tool lugs when out of line with the slots of the said retaining sleeve.

In testimony whereof, I affix my signature in the presence of two witnesses.

GUSTAVE M. NELL.

Witnesses:

SAMUEL V. JOHNSON,
B. F. WITT.