May 24, 1932. G. M. NELL 1,859,748

ROCK DRILL MOUNTING

Filed March 13, 1929

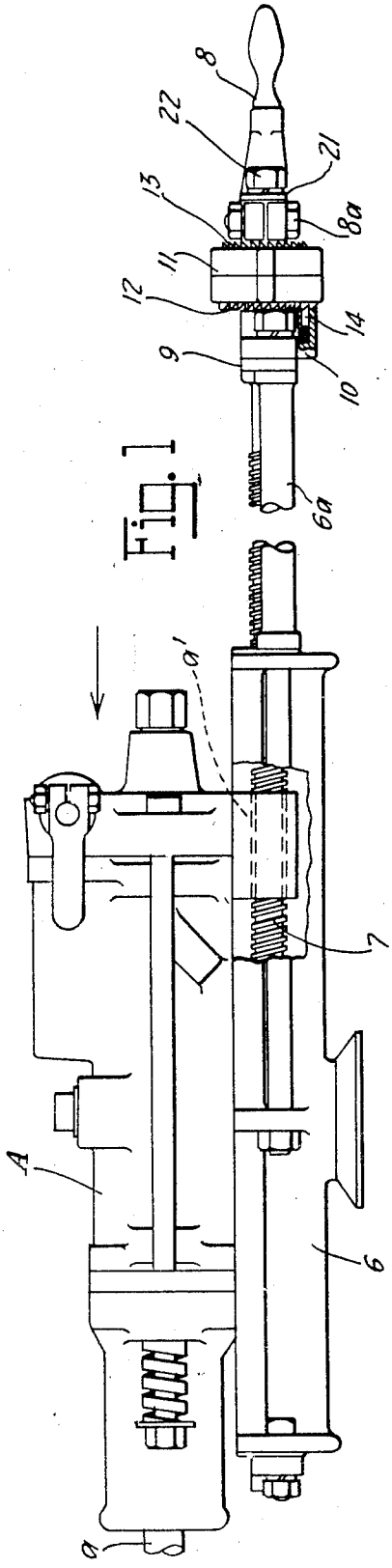


Fig. 1

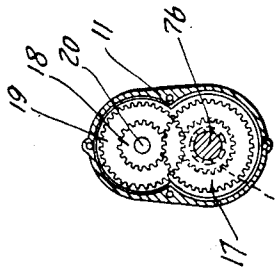


Fig. 3

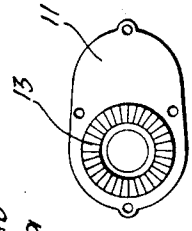


Fig. 5

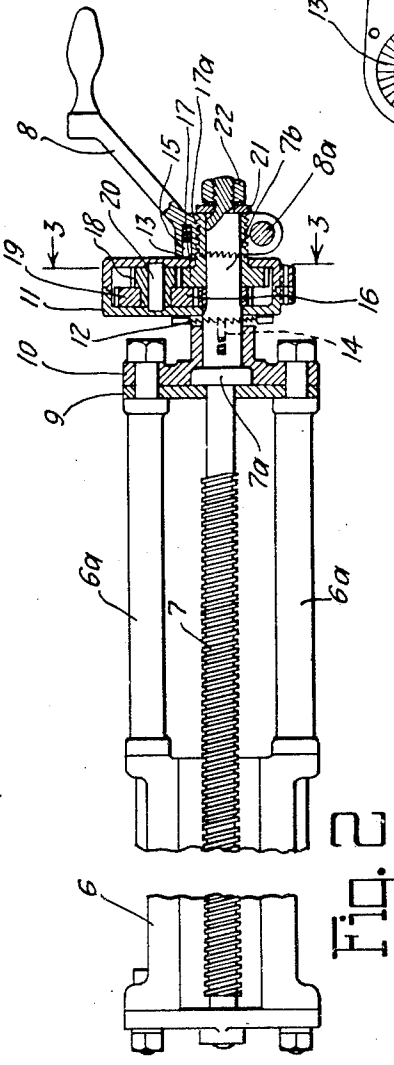


Fig. 2

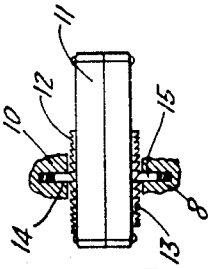


Fig. 4

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UNITED STATES PATENT OFFICE

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ROCK DRILL MOUNTING

Application filed March 13, 1929. Serial No. 346,532.

This invention relates to rock drilling apparatus and more particularly to the mountings or supports for drilling machines of the percussive type. It directly concerns the conventional guide shell mounting provided with a feed screw for advancing and retracting the drilling machine.

One object of the invention is to provide an improved form of guide shell mounting arranged to have a slow forward feeding movement and a relatively quick withdrawal. Another object is to effect the different rates of feed automatically without requiring any change in the operating speed of the actuating handle and without requiring the operator to move with the drilling machine. Another object is to provide a simple, compact and sturdy mechanism which is relatively cheap to manufacture and easy to assemble and repair. Still other objects will be apparent from the detailed description which follows.

I am aware that it has previously been proposed in Maxson Patent No. 1.614,038 to move a drilling machine along a guide shell at different speeds but the proposed mechanism has certain disadvantages from a practical standpoint. The speed changing mechanism therein shown is secured directly to the percussive machine where it is subjected to all the shocks and vibrations incident to the operation of the percussive motor and of the reaction of the work. The control handle being mounted on the drilling machine itself is in awkward position and makes it necessary for the operator to stand at one side of the mounting and to move with the machine. The present invention aims to avoid the defects of such prior apparatus and to produce a device having important practical advantages.

In order to illustrate the invention one concrete embodiment thereof is shown in the drawings, in which;

Fig. 1 is a side elevational view with a portion of the shell mounting partly cut away and showing a percussive drill mounted thereon;

Fig. 2 is a top plan view, partly broken away, of the shell mounting alone;

Fig. 3 is a transverse sectional view substantially on the line 3—3 of Fig. 2;

Fig. 4 is a plan view of the gear case with fragmentary sections of the adjacent parts to show the ratchet and pawl arrangement; and

Fig. 5 is a right end elevational view of the gear case with the handle removed.

Fig. 1 discloses a conventional rock drill A having a piston (not shown) which reciprocates to strike blows upon a drill steel *a*. Drilling machine A is provided with slides or flanges (not shown) which engage guide grooves in a guide shell 6 and has a feed nut *a'* in threaded engagement with a feed screw 7 rotatably supported in shell 6 so that the machine may be fed forwardly or rearwardly in the mounting by the manipulations of an operating handle 8. Abutments 9 and 10 supported in abutting relation on side rod extensions 6*a* of the shell mounting provide thrust seats for a shoulder 7*a* on the feed screw to take the shock of the vibratory reciprocations of the rock drill which are transmitted through the feed nut *a'* to feed screw 7.

The means providing for different relative speeds of rotation of feed screw 7 when operating handle 8 is turned at constant speed are associated wholly with the shell mounting and are confined to an extension 7*b* of feed screw 7 projecting from end abutment member 10. A gear case 11 comprising two or more casing parts suitably secured together is journalled on the projecting portion 7*b* of the feed screw, as shown, and has an annular series of ratchet teeth 12 and 13 on the opposite sides thereof. A spring-pressed pawl 14 slidably supported in abutment member 10 (Figs. 1, 2, and 4) engages ratchet teeth 12 and a similar spring-pressed pawl 15 supported in handle 8 engages ratchet teeth 13. Within the gear case a small gear 16 is splined or otherwise secured to feed screw extension 7*b* so as to rotate with the latter. A larger gear 17 in abutting relation with gear 16 is journalled on feed screw extension 7*b* for free rotative movement and has a sleeve extension 17*a* projecting beyond gear case 11 and to this gear sleeve extension operating handle 8 is securely fastened in

any suitable manner as by a clamping bolt 8*a*. A small gear 18 integral with or having a larger gear 19 fixedly secured thereto is journalled on a pin 20 mounted in gear case 11 in parallelism with screw extension 7*b* and is so arranged that gear 18 meshes with gear 17 and gear 19 meshes with gear 16. Suitable washers 21 and a nut 22 threaded upon the extreme end of screw extension 7*b* prevent gear case 11 and handle 8 assembled thereon from coming off the end of the feed screw.

The operation of the apparatus is as follows: Looking from the handle end of Fig. 1 toward drilling machine A rotation of handle 8 in a counter clock-wise direction causes pawl 15 to engage ratchet teeth 13 with the result that gear case 11 and the gears therewithin as a whole rotate with handle 8 in a counter clock-wise direction. Since there is no relative movement between the gears and inasmuch as gear 16 is keyed to the feed screw, the latter will also be caused to rotate in the same direction. In this direction of rotation, pawl 14 rides over ratchet teeth 12. Since the feed screw has a right hand thread, the drilling machine A will be fed forwardly or in the direction of the arrow shown in Fig. 1. When the rotation of handle 8 is reversed or changed to a clockwise direction, pawl 15 slips over ratchet teeth 13, but pawl 14 engages ratchet teeth 12 thereby holding gear case 11 stationary. Thereupon gear 17 to which handle 8 is secured will rotate clock-wise causing gears 18 and 19 to rotate counter clock-wise and causing gear 16 and feed screw 7 to rotate clock-wise. This makes rock drill 1 move toward the right or in the opposite direction to the arrow in Fig. 1. The ratio of rotation between operating handle 8 and feed screw 7 will depend upon the ratio of the gears 17, 18 and 19, 16. A preferred ratio is about 3 to 1 so that for one rotation of operating handle 8 in a clock-wise direction, feed screw 7 will rotate three times in the same direction. Thus in the form of the invention shown, the feed screw is turned slowly in a one to one ratio by operating handle 8 in feeding drill A to the work but rotates three times as fast as operating handle 8 when the drill is being retracted from the work.

While the invention has been herein disclosed in what is now considered to be a preferred form, it is to be understood that the invention is not limited to the specific details thereof but covers all changes, modifications, and adaptations within the scope of the appended claims.

I claim as my invention:

1. In a guide shell mounting for drilling machines having a feed screw, a gear case journalled on said screw, gearing within said case, a crank handle for actuating said screw through said gearing, and means for effecting a connection between said case and said screw whereby they rotate together or a connection between said case and said mounting whereby said case remains stationary relative to said screw and handle.

2. In a guide shell mounting for drilling machines having a feed screw, a gear case journalled on said screw, a gear within said case journalled on said screw and having an extension projecting beyond said case, a crank handle secured to said extension, and means operable automatically either to cause said casing to rotate with said handle or to restrain the same against rotation.

3. In a guide shell mounting for drilling machines having a feed screw, a gear case journalled on said screw, a gear within said case journalled on said screw and having an extension projecting beyond said case, a crank handle secured to said extension, and interengaging means on said handle and on said case for causing the latter to rotate with said handle when the latter is rotated in one direction.

4. In a guide shell mounting for drilling machines having a feed screw, a gear case journalled on said screw, a train of gears within said case, one of which gears is keyed to said screw and another journalled thereon, an operating handle secured to said last named gear, and means operating automatically through said gear train to rotate said screw at different speeds in opposite directions when said handle is rotated in opposite directions without variation in speed, said gear case rotating with said feed screw in one operative arrangement.

5. In a guide shell mounting for drilling machines having a feed screw, a gear case journalled on said screw, a train of gears within said case, one of which gears is keyed to said screw and another journalled thereon, an operating handle secured to said last named gear, and means operating automatically through said gear train to rotate said screw at different speeds in opposite directions when said handle is rotated in opposite directions without variation in speed, including alternately operating clutch means between said case and said mounting and between said case and said handle respectively.

6. In a guide shell mounting for drilling machines having a feed screw, a gear case journalled on said screw, a train of gears within said case, one of which gears is keyed to said screw and another journalled thereon, an operating handle secured to said last-named gear, and means operating automatically through said gear train to rotate said screw at different speeds in opposite directions when said handle is rotated in opposite directions without variation in speed, including ratchet and pawl mechanism for engagement alternatively between said case on the

one hand and said mounting and said handle respectively on the other.

7. In a guide shell mounting for drilling machines having a feed screw, a gear case journalled on said screw, a train of gears within said case, one of which gears is keyed to said screw and another journalled thereon, an operating handle secured to said last named gear, and means operating automatically through said gear train to rotate said screw at different speeds in opposite directions when said handle is rotated in opposite directions without variation in speed, including ratchet teeth on opposite sides of said case, and pawl members on said mounting and on said handle respectively for engaging said teeth.

8. In a guide shell mounting having a feed screw journalled therein and an end abutment providing a bearing for said screw, said screw having a part extending beyond said abutment, a gear case journalled on said screw extension, a gear train within said case including a gear journalled on said extension and having a projecting sleeve portion, a crank handle secured to said portion of said gear, means securing said gear case and handle upon said screw extension, clutch means between said case and said abutment, and clutch means between said case and said handle, said clutch means being operable alternately depending upon the direction of rotation of said handle.

9. In a guide shell mounting having a feed screw journalled therein and an end abutment providing a bearing for said screw, said screw having a part extending beyond said abutment, a gear case journalled on said screw extension, a gear train within said case including a gear journalled on said extension and having a projecting sleeve portion, a crank handle secured to said portion of said gear, means for securing said gear case and handle upon said screw extension, an annular series of ratchet teeth on opposite sides of said gear case, and pawls on said abutment and in said handle respectively for engaging said teeth.

Signed by me at Detroit, in the county of Wayne and State of Michigan, this 9th day of March, 1929.

GUSTAVE M. NELL.