May 31, 1932. G. M. NELL 1,860,946

STOPING MACHINE

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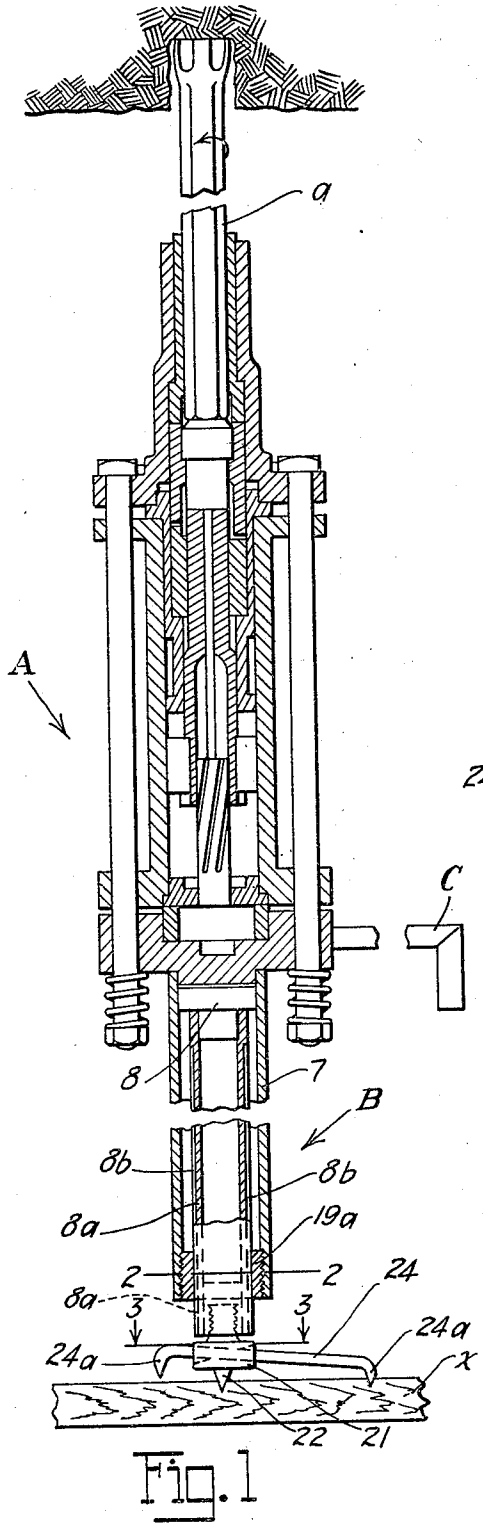


Fig. 1

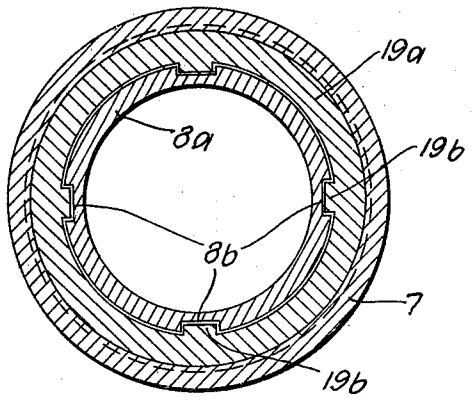


Fig. 2

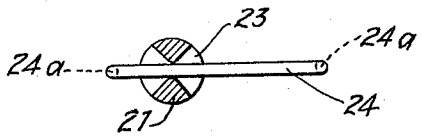


Fig. 3

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UNITED STATES PATENT OFFICE

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STOPING MACHINE

Original application filed April 6, 1929, Serial No. 353,209. Divided and this application filed June 12, 1930. Serial No. 460,622.

This invention relates to self rotated stoping machines operated by fluid pressure and more particularly to the feeding means for the percussive motor of such a machine. This application is a division of my copending application Serial No. 353,209, filed April 6, 1929, under the title "Stoping drills".

One object of the invention is to provide a feeding device for self-rotated stopers arranged to prevent the entire machine from rotating when the drill steel becomes stuck. Another object is to enable the machine to be rotated manually through a sufficient arc to aid in loosening a stuck drill steel. Other objects will be apparent from the detailed description which follows.

In order to illustrate the invention one concrete embodiment thereof is shown in the accompanying drawings in which:

Fig. 1 is a vertical sectional view illustrating a stoping drill in position for operation;

Fig. 2 is a transverse sectional view on an enlarged scale substantially on the line 2—2 of Fig. 1; and

Fig. 3 is a detail sectional view substantially on the line 3—3 of Fig. 1.

The stoping drill disclosed in Fig. 1 comprises a percussive motor A adapted to impart blows and to rotate a drill steel *a* supported in the forward end thereof and a feeding device or motor B for advancing the percussive motor and the steel to the work. While the percussive motor may have independent means for rotating the drill steel, it is shown as provided with the well known rifle bar rotation mechanism. Since the percussive motor may be of any suitable or desired type, further description thereof is omitted.

A handle C projects from the machine to be grasped by the operator in directing the machine to the work and in controlling its operation. Handle C is also used to free the machine when the drill steel *a* becomes stuck in the formation which is being drilled. Since motor A is of the self-rotating type, sticking of the steel tends to cause the entire machine to rotate unless suitable means are provided to prevent it.

The feeding device shown is of the fluid pressure type and consists of telescoping members 7 and 8, one of which is secured to the drill and the other engages or is engaged by a support. Member 7 is a feed leg cylinder secured to motor A, and member 8 a piston slidable within cylinder 7 and having a stem 8*a*, the end of which projects at all times beyond cylinder 7. The feeding device is arranged to prevent rotation of the motor A when the steel *a* becomes stuck and to permit a limited amount of rotative movement relative to the support so that the operator may utilize handle C to assist in freeing the steel.

The telescoping parts comprising feeding device B, namely cylinder 7 and piston 8, are arranged for relative axial movement but are maintained against relative rotative movement. To this end a splined connection is used which involves a nut 19*a* secured in the outer end of cylinder 7, as by a threaded engagement, having inwardly directed splines or ribs 19*b* slidably received in longitudinal slots 8*b* in the exterior of piston stem 8*a*. Piston stem 8*a* is provided with an extension 21 threaded thereinto or otherwise fixedly secured to the same, which extension may have a spur 22 for engaging a supporting surface *x*. An enlarged portion of extension 21 has a bore 23 therethrough transverse to the axis of the machine. This bore is flared or fan shaped divergently from its centre as shown in Fig. 3. Through bore 23 extends a foot piece 24 in the form of a rod having bent ends 24*a* sharpened to provide spurs which engage the support *x* at spaced points. Foot piece or rod 24 accordingly has a limited lateral pivotal connection with piston extension 21 since the fanning or flaring of the bore 23 permits a restricted amount of rotative movement of the entire machine on foot piece 24. This enables the operator to rock the machine on its axis to release a stuck steel.

While the invention has been herein described 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 combination, a rock drill having a percussive motor, and a feeding device for advancing the motor to the work comprising an extensible member, an end member on said extensible member arranged to engage a supporting surface in a manner to resist rotative movement, and a connection between said members positively preventing relative movement in a direction axially of said drill but permitting limited relative rotative movement.

2. In combination, a rock drill having a percussive motor, and a feeding device for advancing the motor to the work comprising an extensible member, a foot piece on said member for engagement with a supporting surface at a plurality of points, and means connecting said foot piece to said member and providing for limited rotative movement of the latter relative to said foot piece.

3. In combination, a rock drill having a percussive motor, and a pressure feeding device therefor comprising telescoping members having a keyed connection with each other permitting relative movement in an axial direction but not in a rotative sense, and means on one of said members for engaging a supporting surface and for resisting rotative movement thereon but permitting limited rotative movement of said last named member relative to said means.

4. In combination, a rock drill having a percussive motor, and a pressure feeding device therefor comprising a cylinder secured to said motor, a piston slidable within said cylinder and having a stem projecting therefrom, cooperating means on said cylinder and on said stem maintaining the same against relative rotation, and means on said stem for engaging a supporting surface at two spaced points and providing for limited rotative movement of said stem in the plane which includes said stem and said points.

5. In combination, a rock drill having a percussive motor, and a pressure feeding device therefor comprising a cylinder secured to said motor, a piston slidable within said cylinder and having a stem projecting therefrom, a member secured in the end of said cylinder establishing a keyed connection with said stem, and means on said stem for engaging a supporting surface at two spaced points and providing for limited rotative movement of said stem in the plane which includes said stem and said points.

6. In combination, a rock drill having a percussive motor, and a pressure feeding device comprising telescoping members having a splined connection permitting relative axial movement, means for engaging a supporting surface in a fixed position, and means interposed between said first named means and one of said members providing for a limited amount of relative rotative movement.

7. In combination, a rock drill having a percussive motor, and a pressure feeding device comprising telescoping members having a splined connection permitting relative axial movement, one of said members being secured to said drill, an extension on the other of said members, a support engaging member on said extension, and means permitting relative rotative movement between said support engaging member and said extension.

8. In combination, a rock drill having a percussive motor, and a pressure feeding device comprising telescoping members having a splined connection permitting relative axial movement, one of said members being secured to said drill, an extension on the other of said members having a spur for engaging a supporting surface, and means extending laterally from said extension to engage the supporting surface and having a loose connection with said extension.

9. In combination, a rock drill having a percussive motor, and a pressure feeding device comprising telescoping members having a splined connection permitting relative axial movement, one of said members being secured to said drill, an extension on the other of said members having a spur for engaging a supporting surface, and a foot piece extending laterally from said extension and having a spur to engage the supporting surface, said foot piece providing for limited movement of said extension relative thereto.

10. In combination, a rock drill having a percussive motor, and a pressure feeding device comprising telescoping members having a splined connection permitting relative axial movement, one of said members being secured to said drill, a spur on the end of the other member for engagement with a supporting surface, and a foot piece extending laterally from said other member having a spur to engage the supporting surface in spaced relation to said first spur, said foot piece providing for limited rotative movement of said other member relative thereto.

11. In combination, a rock drill having a percussive motor, and a pressure feeding device comprising telescoping members having a splined connection permitting relative axial movement, one of said members being secured to said drill, an extension on the other of said members having a spur for engaging a supporting surface, said extension having a bore therethrough with flared or fan shaped openings, and a foot piece extending through said bore and having means for engaging the supporting surface in spaced relation to said spur.

12. A pressure feeding device for a percussive drill comprising telescoping members having means maintaining the same against relative rotative movement, one of said members being adapted to be secured to the drill, and means on the end of the other member

for engaging a supporting surface including a foot piece mounted on said member for limited pivotal movement relative to the latter.

13. A pressure feeding device for a percussive motor comprising telescoping members having a splined connection permitting relative axial movement, one of said members being adapted to be secured to the motor, and means on the end of the other member for engaging a supporting surface including a bore therethrough and a foot piece extending loosely through said bore and having means to engage a supporting surface at a point in spaced relation to the axis of said device.

14. A pressure feeding device for a rock drill comprising telescoping members having means maintaining the same against relative rotative movement, one of said members being secured to said drill, an extension on the other of said members having a spur for engaging a supporting surface, said extension having a bore therethrough flared or fan shaped divergently from its center, and a foot piece extending through said bore and having spurs at its ends either of which may engage the supporting surface in spaced relation to said extension spur.

Signed by me at Detroit, in the county of Wayne and State of Michigan, this 4th day of June, 1930.

GUSTAVE M. NELL.