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ATTACHMENT FOR STOPING DRILLS.

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1,359,935. **Patented Nov. 23, 1920.**

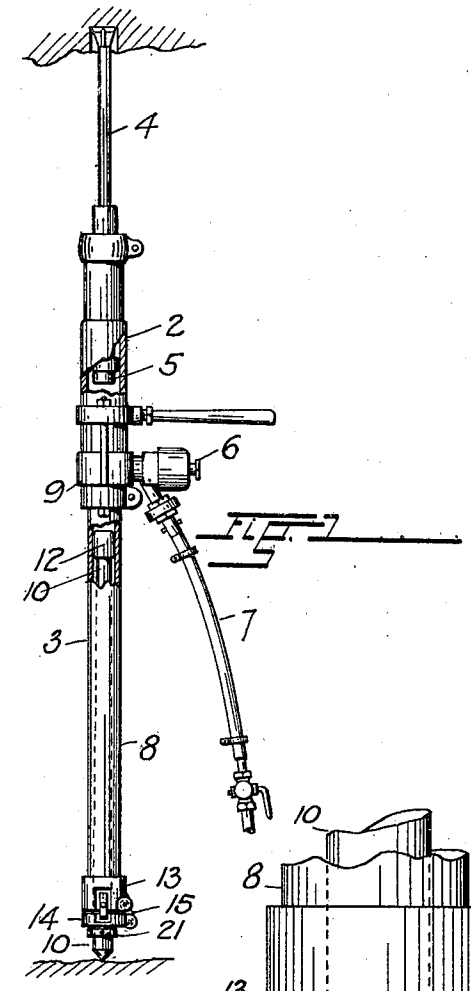


Fig. 1

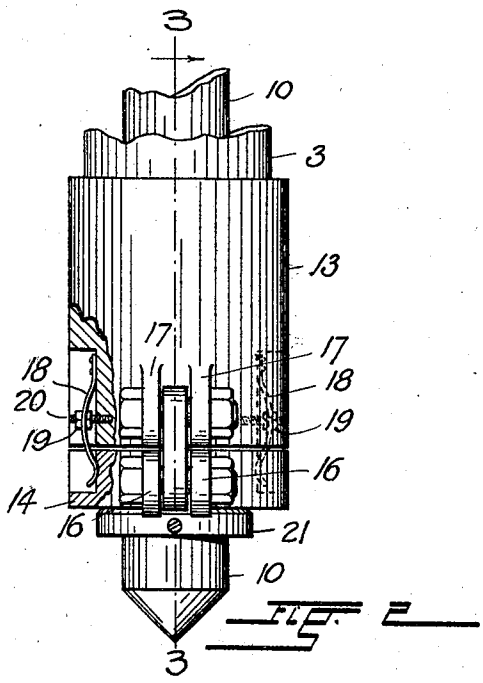


Fig. 2

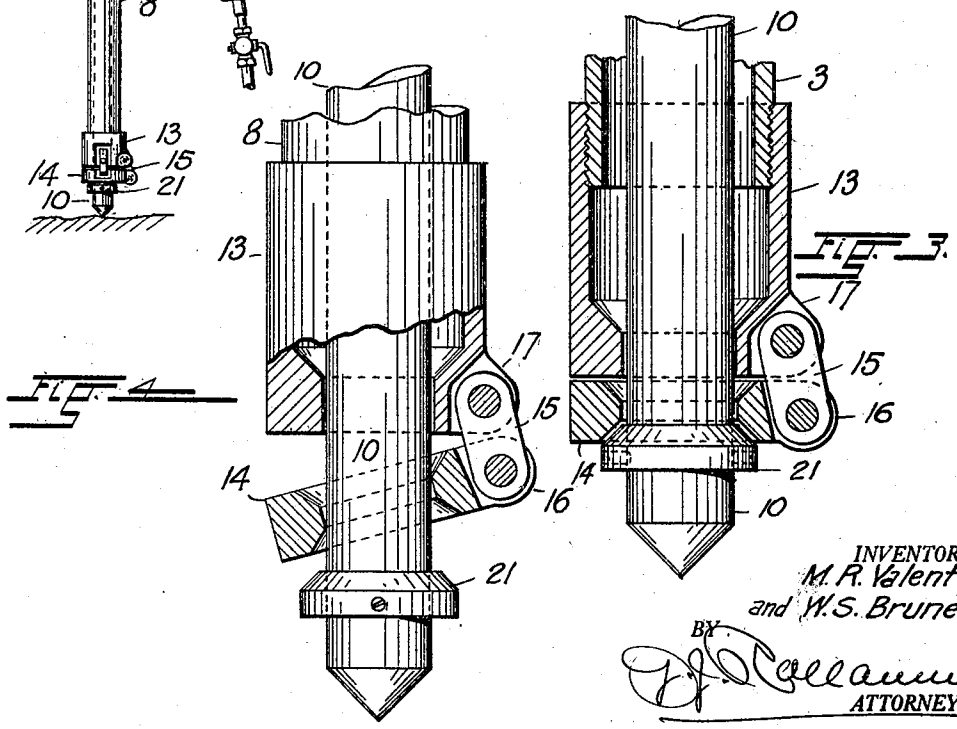


Fig. 4

Fig. 3

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ATTACHMENT FOR STOPING-DRILLS.

1,359,935. Specification of Letters Patent. Patented Nov. 23, 1920.

Application filed March 7, 1919. Serial No. 281,288.

To all whom it may concern:

Be it known that we, MALVERN R. VALENTINE and WILLIAM S. BRUNER, citizens of the United States, residing, respectively, at Victor and Cripple Creek, in the county of Teller and State of Colorado, have invented certain new and useful Improvements in Attachments for Stoping-Drills, of which the following is a specification.

This invention relates to improvements in stoping drills, and its primary object is to provide a brake which automatically arrests longitudinal movement of the air feed cylinder of a drilling machine of this character, by frictional contact with a stoping bar extending through an end thereof, when by breakage of a drill steel or other accidental cause, the cylinder is suddenly projected by expansion of the air which feeds it to the work.

Our invention is preferably embodied in an attachment which may be applied to the air-feed cylinders of drills already in use, without material change in the construction or arrangement of the same.

By the use of our invention violent displacement of air-feed drilling machine when by breakage of the drill or other causes the resistance to the pressure of the air which holds it to the work is suddenly removed, are effectively avoided, and the danger of accidents by contact of the forcibly projected parts is reduced to the minimum.

An embodiment of our invention is shown in the accompanying drawings in the various views of which like parts are similarly designated, and in which—

Figure 1 represents a stoping drill in its working position;

Fig. 2, a sectional elevation of the lower part of the extensible column of the machine drawn to an enlarged scale;

Fig. 3, a section taken on the line 3—3, Fig. 2, and

Fig. 4, a section similar to that of Fig. 3 partially in elevation, showing the position of the moving parts of the brake in its active condition.

Referring to the drawings by numerical reference characters 2 designates the barrel of an air-driven stoping drill which is mounted upon the longitudinally extensible column 3.

A drill-steel 4 held in a chuck at the end of the barrel is driven by a reciprocating piston-hammer 5 and a valve 6 between the drill proper and the extensible column admits air supplied through a hose-connection 7, for the operation of the piston-hammer and for feeding the machine by gradual extension of the column.

The construction of the valve and other parts of the operating mechanism of the drill is too well known to require further description or detailed illustration, it being understood that our invention is applicable to any drilling machine which by the expansion of a body of air under pressure is moved longitudinally with relation to a relatively stationary stoping bar.

The extensible column hereinbefore referred to consists of a cylinder 8 which is connected with the drill barrel through the intermediary of a head 9 in which the valve 6 is fitted and to which the air-hose is attached.

A stoping bar 10 projecting through the lower end of the cylinder has a piston head 12 which fits slidingly within the same and a nut 13 attached to the cylinder at its lower end provides a guiding passage for the bar.

The parts of our invention are completely assembled on the above-mentioned nut so that for its application to a drilling machine already in use, it is only required to remove the nut, plug or bushing which closes the feed-cylinder, and attach the nut which carries the automatic brake, by means of an external screw thread on the end of the cylinder.

On cylinders originally closed by a nut the same screw-thread may be used for securing the attachment, but on those which are closed by a threaded bushing or plug, a new screw-thread must be cut upon the exterior of the cylinder to attach the nut which carries the brake.

A ring 14, interiorly of tapering section, normally occupies a position coaxial with the feed-cylinder and contiguous to the nut at the lower end thereof as best shown in Fig. 3 of the drawings.

A link 15 pivotally secured between ears 16 on the ring and corresponding ears 17 on the nut B, provides a hinge connection by which the ring is attached to the nut for downward motion to clampingly engage the stoping bar which when the ring is in its normal inactive position, has a free sliding movement therein.

The ring is yieldingly held in its normal position by means of two spring-latches 18 which are attached at one of their ends in recesses at opposite sides of the nut and which at their other ends lie in shallow indentations in correspondingly formed recesses of the ring.

Nuts 19 screwed on studs 20 which extend through openings in the springs serve to regulate the pressure with which they engage the ring for holding it in its inactive position.

A detachable collar 21 on the stope bar returns the brake ring to its normal position in locked engagement with the spring latches, when the drilling machine is moved downwardly on the stoping bar to resume its operation.

The collar also prevents displacement of the brake ring while the machine is being moved about.

In the operation of the drill, air is constantly admitted to the piston head of the stoping bar for the purpose of feeding the drilling machine to the work engaged by the head of its steel, by a relatively longitudinal movement of the feed cylinder upon which the machine is mounted.

When by breakage of the drill steel or other cause, the resistance to the expansion of the body of compressed air working upon the piston head is suddenly eliminated, the violent impulse imparted to the feed cylinder causes the latches to release the ring which in consequence drops to an oblique position around the stoping bar, as shown in Fig. 4 of the drawings, and by clamping engagement therewith, arrests the outward motion of the cylinder.

The link connection causes the ring to engage the bar simultaneously at diametrically opposite sides of its interior ridge and any increase in the pressure by which the cylinder is propelled will intensify the braking action.

Having thus described our invention what we claim and desire to secure by Letters-Patent is:

1. In a stoping-drill, the combination with an air-feed cylinder and a stoping bar having a piston therein, of a ring hingedly connected with the cylinder and adapted to arrest a longitudinal movement of the same by clampingly engaging the bar, in an oblique position, and means to loosely hold the ring in a coaxial position on the cylinder.

2. In a stoping-drill, the combination with an air-feed cylinder and a stoping bar having a piston therein, of a ring hingedly connected with the cylinder and adapted to arrest a longitudinal movement of the same by clampingly engaging the bar, in an oblique position, and a spring-latch to loosely hold the ring in a coaxial position on the cylinder.

3. In a stoping-drill, the combination with an air-feed cylinder and a stoping bar having a piston therein, of a ring normally coaxial with the cylinder at an end thereof, and a link hingedly connecting the ring to the cylinder so as to permit of its movement to an oblique position by which to clampingly engage the bar.

4. In a stoping-drill, the combination with an air-feed cylinder and a stoping bar having a piston therein, of a ring of interiorly tapering section, hingedly connected with the cylinder and adapted to arrest a longitudinal movement of the same by clampingly engaging the bar, in an oblique position, and means to loosely hold the ring on the cylinder in spaced relation to the bar.

5. An attachment for stoping-drills, comprising a nut adapted for connection at the end of the air-feed cylinder thereof, a ring normally coaxial at an end of the nut, a hinge-connection between the ring and the nut, and a latch yieldingly holding the ring in its normal position.

6. An attachment for stoping-drills, comprising a nut adapted for connection at the end of the air-feed cylinder thereof, a ring normally coaxial at an end of the nut, a link hingedly connecting the ring to the nut, and a latch yieldingly holding the ring in its normal position.

7. An attachment for stoping-drills, comprising a nut adapted for connection at the end of the air-feed cylinder thereof, a ring of interiorly tapering section, normally coaxial at an end of the nut, a hinge-connection between the ring and the nut, and a latch yieldingly holding the ring in its normal position.

8. In a stoping drill, the combination with an air-feed-cylinder and a stoping-bar having a piston therein, of a ring hingedly connected with the cylinder and adapted to arrest a longitudinal movement of the same by clampingly engaging the bar, in an oblique position, a latch to lock the ring in a coaxial position on the cylinder, and a collar on the stoping bar, which engages the ring in its locked position.

9. In a drilling machine, in combination, a feed cylinder, a stoping bar movable with relation thereto, a brake on the cylinder, adapted to arrest the relative movement of the stoping bar, and means for holding the brake in an inoperative position, adapted to

release the same by sudden movement of the cylinder.

10. In a drilling machine, in combination a feed cylinder, a stoping bar movable with relation thereto, a brake on the cylinder adapted to move into frictional contact with the stoping bar, and means adapted to loosely hold the brake on the cylinder, in spaced relation to the bar and to release the same by sudden movement of the cylinder.

In testimony whereof we have affixed our signatures.

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