E. F. GALLIGAN.

DUST COLLECTOR FOR ROCK DRILLS.

APPLICATION FILED MAY 19, 1913.

1,127,225.

Patented Feb. 2, 1915.

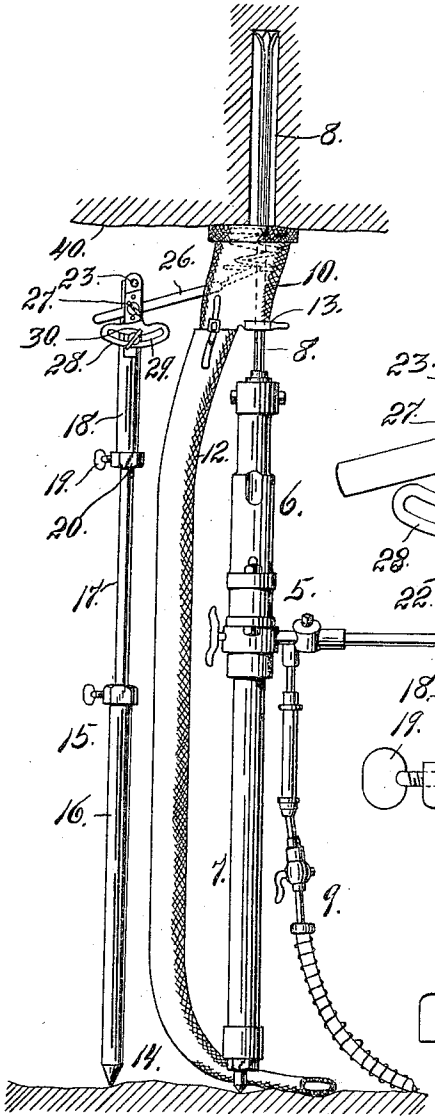


Fig. 1.

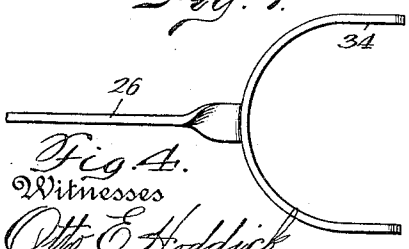


Fig. 4.

Fig. 2.

Fig. 3.

Witnesses

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DUST-COLLECTOR FOR ROCK-DRILLS.

1,127,225. Specification of Letters Patent. Patented Feb. 2, 1915.

Application filed May 19, 1913. Serial No. 768,408.

To all whom it may concern:

Be it known that I, EMMET F. GALLIGAN, a citizen of the United States, residing at Idaho Springs, county of Clear Creek, and State of Colorado, have invented certain new and useful Improvements in Dust-Collectors for Rock-Drills; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the characters of reference marked thereon, which form a part of this specification.

My invention relates to improvements in dust collectors for rock drills, my object being to provide a construction of this class which shall serve to efficiently support a hood around the drill hole at the breast of the rock, whereby the rock cuttings shall be received by the hood and from which they may pass to a suitable hose or conduit which is of such length as to reach the bottom of the drift or tunnel, the outer extremity of the conduit being open to allow the cuttings to quietly pass to the bottom of the drift, thus avoiding the making of dust which is exceedingly objectionable in work of this kind, owing to the unhealthful condition of the atmosphere for the workmen when the air is permeated with the resulting dirt.

The object of my present invention is the same as that of my previous applications, Serial Numbers 720,551 and 732,650, the said applications bearing date September 16 and November 21, 1912, respectively.

In my present invention I provide an independent support resting upon the bottom of the tunnel and with whose upper extremity is adjustably connected an arm which passes laterally through an opening in the hood of the dust-collector, the extremity of the said arm remote from the support being connected with one extremity of a spiral spring whose opposite extremity is connected with the portion of the hood which engages the breast of the rock. By properly adjusting the said arm, the spring may be placed under such tension as to press the hood against the breast of the rock with sufficient force to prevent the escape of any cuttings from the drill hole. The spring is pivotally adjustable on the inner extremity of the arm, the latter being bifurcated and the two arms being separately pivotally connected with the spring, whereby the latter is free to adjust itself to conform to the requirements of the peculiar formation of the breast of the rock surrounding the drill hole. The arm which carries the spring is adjustable both longitudinally and rotatably. The supporting column is also vertically extensible and it includes two telescoping members.

Having briefly outlined my improved construction, I will proceed to describe same in detail, reference being made to the accompanying drawing in which is illustrated an embodiment thereof.

In this drawing Figure 1 is a section taken through a drift or tunnel, showing a rock drill in place, the same being equipped with my improved dust-collecting apparatus. Fig. 2 is a fragmentary sectional view cutting the hood, the parts being shown on a much larger scale. Fig. 3 is a detail view of the tubular telescoping member mounted on the upper portion of the dust-collector column and carrying the adjustable arm, the latter being sectionized. This view is a section taken on the line 3—3, Fig. 2, viewed in the direction of the arrow, with the said sleeve removed.

The same reference characters indicate the same parts in all the views.

Let the numeral 5 designate a rock drill, considered in its entirety, and consisting of a hammer cylinder 6, a feed-bar-casing 7, and a drill-steel 8, provision being made, as shown at 9, for delivering motive fluid to the cylinder for reciprocating the hammer (not shown) therein. It is evident that the special rock-drill construction is immaterial and that my improved dust-collector may be applied to drills of all constructions where devices of this character are needed. It should be stated that dust-collectors are only employed and are only practicable in connection with machines for drilling upholes or holes of such inclination that the

rock cuttings will automatically pass out of the hole during the operation. Without the employment of dust-collectors when drilling holes of the aforesaid character, it is evident that these rock cuttings would fall from the hole and permeate the atmosphere with dust to such an extent as to make it practically unbreathable, at least without great danger to the health of the workmen. My invention, as aforesaid, is intended to overcome this difficulty.

An important feature in every dust-collector is a hood which surrounds the mouth of the drill-hole and through which the drill steel passes. In my present invention this hood is designated by the numeral 10, and is equipped at the bottom and to one side of a conduit 12, with a bushing 13, in which the drill-steel fits so closely as to prevent the escape of the rock cuttings around the steel during the operation of the drill. The conduit 12 is in communication with the hood at one side of the drill steel and leads downwardly to the bottom 14 of the drift, its lower open extremity terminating in any desired locality that may be practicable for disposing of the rock cuttings in such a manner as to avoid the making of dust.

Arranged at one side of the drill, and extending preferably parallel or approximately parallel therewith, is a dust-collector support, composed of a column 15, the said column consisting of a body part 16 having a reduced upper part 17 with which is telescopically connected a sleeve 18, vertically adjustable on the part 17 by means of a set-screw 19, passing through the reinforced lower extremity 20 of the sleeve. The upper extremity of this sleeve is reinforced on one side, as shown at 21, to form a flat face 22 to the upper extremity of which is pivotally connected, as shown at 23, a bracket 24, having an opening 25 through which passes an arm 26, the arm being held in any desired position of longitudinal adjustment by means of a set-screw 27. The lower part 28 of this bracket is lengthened laterally and provided with a curved slot 29, through which passes a set-bolt 30, the latter having a shoulder 31 which overlaps the part 28 on opposite sides of the slot. The inner extremity of this set-bolt is reduced, as shown at 32, and threaded into the reinforcement 21 of the sleeve. By loosening this set-screw, the bracket may be swung upon its pivot 23 to give the arm 26 any desired position or so that it shall form any desired angle with the axis of the column 15.

The arm 26 passes through an opening 33 formed in the head 10, its inner extremity merging into a bifurcated part 34 which straddles the drill steel 8 and is pivotally connected on opposite sides thereof, as shown at 35, with the lower convolution 36 of a relatively large spiral spring 37, which surrounds the drill steel and is located within the hood. The uppermost convolution 38 of this spring is secured to the top of the hood, the latter being reinforced by a relatively heavy ring or band 39, preferably composed of felt or some other suitable relatively soft material adapted to closely engage the breast of the rock 40 around the drill hole, when the spring 37 is placed under proper tension by the adjustment of the arm 26.

In order to cause the upper extremity of the hood to remain open or properly expanded for drill hole surrounding purposes, a metal ring 41 is inserted therein, and secured thereto, this ring being attached to the downwardly bent portion 42 of the hood, being the portion which extends downwardly after passing over the uppermost convolution 38 of the spiral spring. It is the intention that the felt band 39 shall project slightly beyond the expanding ring 41 of the hood so that the said band shall be forced tightly against the breast of the rock while the ring 41, as well as the upper extremity of the hood proper is slightly removed from the rock.

By virtue of the pivotal connection between the bifurcated extremity 34 of the arm 26 and the spring 37, the latter is free to adjust itself automatically to conform to the surface of the breast of the rock. Furthermore, by loosening the set-bolt 30, the bracket 24 may be swung in either direction to the limit permitted by the length of the slot 29. This movement changes the relative position of the arm 26 to the axis of the supporting column. This adjustment, taken in connection with the automatic adjustment permitted by the aforesaid connection between the spring and the bifurcated extremity 34 of the arm 26, makes it practicable to provide for all possible contingencies so far as the proper adjustment of a device of this character is concerned.

From the foregoing description, the use and operation of my improved construction will be readily understood. Assuming that the drill is installed in the drift or tunnel and that the drill-steel is passed through the hood in the manner illustrated in the drawing, the sleeve 18 is adjusted vertically on the part 17 of the supuporting column, to maintain the arm 26 at the proper elevation relatively to the position of the hood 10. It is assumed that before the hood is put in place, the spring 37, together with the expanding ring 41, is applied thereto, the arm 26 being also connected with the spring, as heretofore explained. This arm will be passed through the opening 33 in the hood and at the same time inserted in the opening 25 of the bracket 24 and properly adjusted, after which the set-screw 27 will be adjusted to lock the arm against accidental longitu-

dinal movement. By swinging the bracket 24 upon its pivot 23, any desired tension may be placed upon this spring 37, for the purpose of properly maintaining the felt band 39 of the hood against the breast of the rock to prevent the escape of rock cuttings, as heretofore explained. Assuming that the dust-collector is properly arranged and adjusted, as the drilling operation proceeds the rock cuttings will move downwardly out of the drill hole as fast as they are formed, enter the hood 10 and escape therefrom into the conduit 12, through the medium of which they may be carried downwardly and deposited in any desired location to prevent the formation of dust in the mine.

Certain subjects-matter disclosed but not broadly claimed herein, are broadly claimed in my copending application Serial No. 772,298, filed June 7, 1913. These subjects-matter comprise the following two combinations: First. A hood having a bottom opening through which a drill steel passes, means for closing the opening in the hood around the drill steel to form a substantially dust tight joint, the said closing means being independent of the hood-supporting means, a circular member engaging the hood forward of said joint and having its axis substantially coincident with the axis of the hood, and a standard independent of the drill for supporting the circular member and coöperating with the latter to maintain the hood in place around the drill hole. Second. A hood, a spiral spring engaging the hood, and a standard independent of the drill for supporting the spring and coöperating with the latter for supporting the hood in place around the drill hole, the axis of the spring being substantially coincident with that of the hood.

I claim—

1. In a dust-collector for rock drills, the combination of a flexible hood, having an opening, a spring within the hood, an arm passing through the opening in the hood and connected with the spring and a column upon which the arm is adjustably supported.

2. In combination, a hood having an opening, a column, an arm adjustably mounted on the column and passing laterally through the opening in the hood, and a spring located within the hood and interposed between the mouth of the latter and the arm and connected with both.

3. In combination, a hood having an opening, a spiral spring therein, one extremity of the spring being secured to the hood, an arm passing through the opening in one side of the hood and pivotally connected with the spring, a column and an adjustable connection between the column and the said arm outside of the hood.

4. In a dust collector for rock drills, the combination of a hood having a bottom opening through which the drill steel passes, means for closing the opening in the hood around the drill steel to form a substantially dust tight joint, said closing means being independent of the hood-supporting means, a column arranged at one side of the hood, an adjustable arm connected with the column, and a circular connection between the arm and the hood and engaging the latter forward of said joint to maintain the hood in close contact with the rock around the drill hole, the axis of said connection being substantially coincident with that of the hood.

5. The combination of a hood provided with an opening and having an expansion ring at its mouth and a surrounding band of soft material extending beyond the ring in the direction of the rock, a spring attached to the mouth of the hood at one extremity, an arm to which the opposite extremity of the spring is secured, the said arm passing through the opening in the side of the hood, and a column with which the outer extremity of the arm is adjustably connected.

6. In combination, a hood, a supporting column, a bracket pivotally mounted on the column, the axis of the pivot being at right angles to the longitudinal axis of the column, means for adjusting the bracket on the column, an arm connected with the bracket beyond the latter's pivot, and an operative connection between the arm and the hood whereby the engagement of the latter with the rock around the drill hole may be controlled by the adjustment of the bracket.

7. In combination, a hood, a supporting column, a bracket pivotally mounted on the column, the axis of the pivot extending at right angles to the longitudinal axis of the column, an arm slidably adjustable on the bracket and located beyond the pivotal point of the latter, a yieldable connection between the arm and the hood, the bracket being adjustable on its pivot to regulate the pressure of the hood against the rock around the drill hole.

8. In combination, a longitudinally extensible column, a bracket pivotally adjustable thereon, the axis of the pivot extending at right angles to the longitudinal axis of the column, an arm mounted on the bracket, a hood, and a yieldable connection between the hood and the arm, and means for adjusting the bracket whereby the pressure of the hood against the rock around the drill hole is controlled through the medium of the said arm.

9. In combination, a column, a bracket adjustably connected with the column, an arm adjustably connected with the bracket, a hood, the arm extending through an opening in the hood, a spiral spring within the hood, a pivotal connection between the arm and the lower extremity of the spring, an expansion ring at the mouth of the hood, the

opposite extremity of the spring being connected with the hood around the said ring and a surrounding band of soft material applied to the hood and projecting beyond the expansion ring in the direction of the rock, substantially as described.

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

EMMET F. GALLIGAN.

Witnesses:
W. H. GALLIGAN,
RENE J. COPPARD.

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