E. F. GALLIGAN.

DUST COLLECTOR FOR ROCK DRILLS.

APPLICATION FILED JUNE 7, 1913.

1,128,674.

Patented Feb. 16, 1915.

2 SHEETS—SHEET 1.

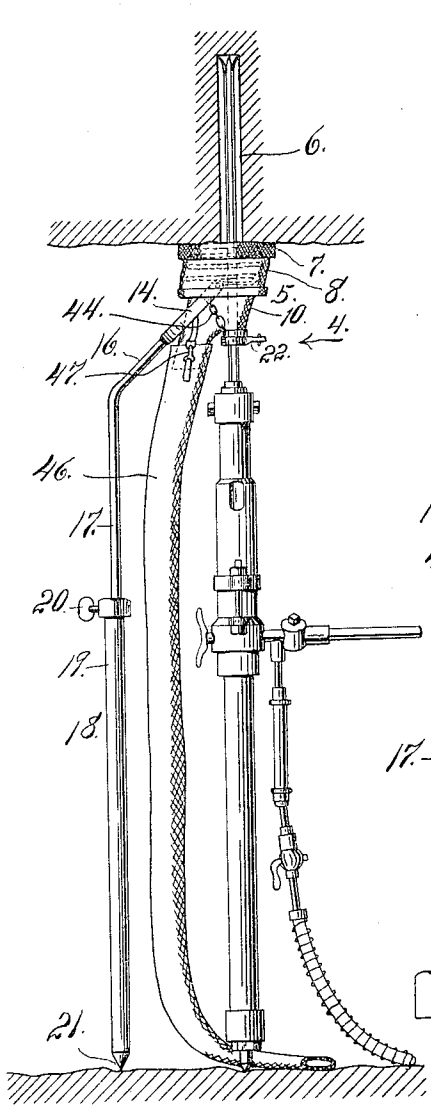


Fig. 1.

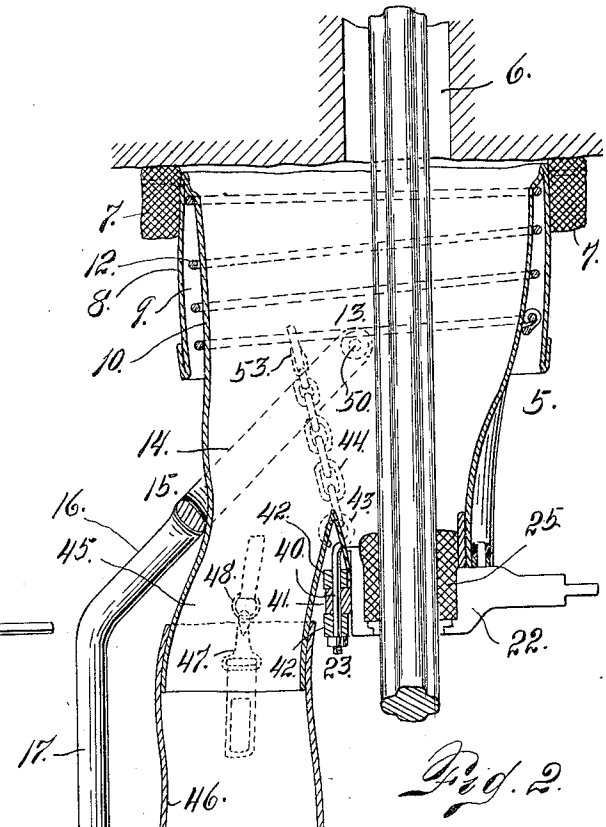


Fig. 2.

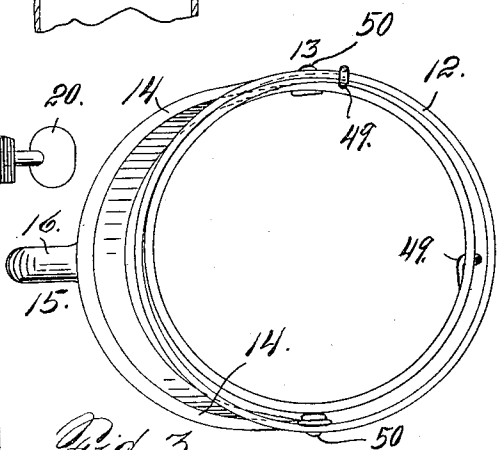


Fig. 3.

Witnesses

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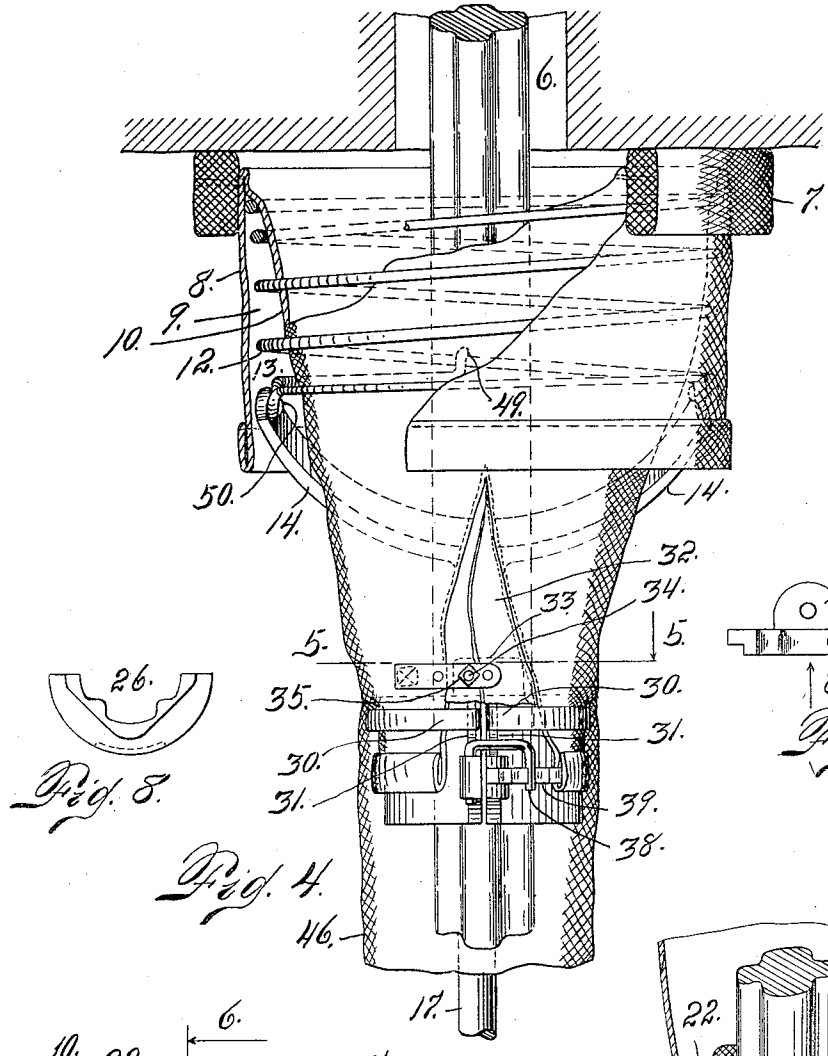


Fig. 4.




Fig. 8.




Fig. 7.

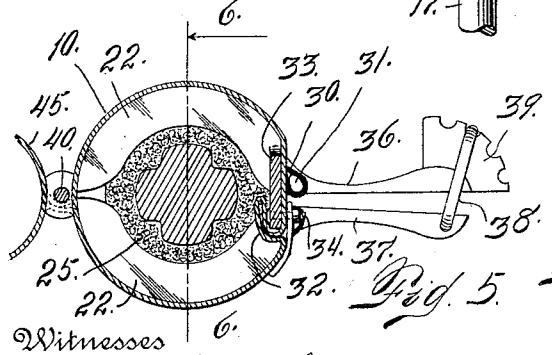


Fig. 5.

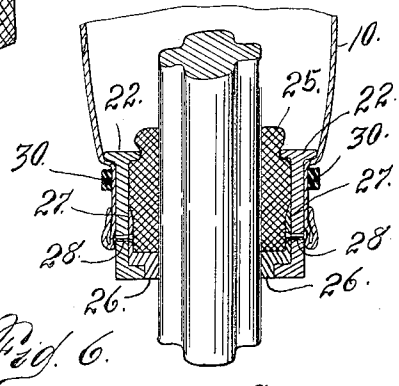


Fig. 6.

Witnesses

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# UNITED STATES PATENT OFFICE.

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## DUST-COLLECTOR FOR ROCK-DRILLS.

1,128,674. Specification of Letters Patent. Patented Feb. 16, 1915.

Application filed June 7, 1913. Serial No. 772,298.

*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 letters and figures 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 device of this character which shall be exceedingly efficient in use and which shall at the same time be of simple and economical construction.

The simplicity of the device is an important feature, since it will not readily get out of repair and its use requires no special skill on the part of the person in charge.

Generally speaking, the object of the device is the same as that sought to be accomplished by my previous applications for patent, serially numbered 720,551, 732,650 and 768,408, and filed September 16, 1912, November 21, 1912, and May 19, 1913, respectively, said first two applications having been renewed May 7, 1914, and bearing Serial Numbers 837,071 and 837,070, respectively.

My present application, however, has some features of novelty not disclosed in the aforesaid applications and the object of this present application is to protect those features.

The construction, briefly described, consists of a hood adapted to engage the breast of the rock around the drill hole and held in place by a standard to the upper angular extremity of which is pivotally attached a spiral spring which surrounds the hood and is arranged to be compressed by the vertical adjustment of the upper member of the standard, which is telescopically connected with the lower member thereof. The angular construction of the upper extremity of the upper member of the standard is due to the off-set necessary and due to the arrangement of the hood-supporting standard at one side of the location of the rock-drilling machine.

The lower part of the hood is provided with an opening through which the drill steel passes, the said steel being continued through the hood when the machine is in operation. At the opening in the bottom of the hood is located a pair of pivoted jaws which are hollowed out to receive a bushing of felt or other suitable soft material, which, when the jaws are closed, tightly engages the drill steel, thus preventing the escape of dust therearound. Leading downwardly from the hood, which is composed of canvas or other suitable flexible material, is a conduit, also preferably composed of canvas, which is of sufficient length to reach the bottom of the tunnel or drift, and through which the rock cuttings, which otherwise would be formed into dust permeating the atmosphere, escape.

One important object of a device of this character is to prevent the rock cuttings from filling the atmosphere with dust to such an extent that it is unbreathable by the men in charge of the work, except at great risk. In fact, where some provision is not made to allay the dust resulting from the drilling of up-holes in mines, it is impossible for the workmen to endure labor of this kind for more than a few years and then they have to give it up, owing to the fact that they are afflicted with what is known as "miner's tuberculosis", an incurable malady.

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 an elevation of a rock drill in position for use, my improved dust-collecting apparatus being connected in operative relation therewith. Fig. 2 is a view partly in section and shown on a much larger scale, illustrating the dust-collecting mechanism, the rock-drilling apparatus, with the exception of the drill steel, being omitted. Fig. 3 is a top plan view of the supporting standard of my improved construction, showing the spiral spring applied thereto, the dust-collecting hood being omitted. Fig. 4 is a front view of the dust-

collecting apparatus, looking in the direction of arrow 4, Fig. 1, the parts being shown on a larger scale and the hood partly broken away. Fig. 5 is a cross section taken on the line 5—5, Fig. 4. Fig. 6 is a vertical section taken on the line 6—6, Fig. 5, a portion of the drill steel being shown in elevation. Fig. 7 is a view of one of the wearing parts with which the clamping jaws are equipped. Fig. 8 is a view of the same, looking in the direction of arrow 8, Fig. 7.

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

Let the numeral 5 designate a canvas hood of sufficient size to surround a drill hole 6, leaving a reasonable amount of space between the hole and the circumference of the hood. To this hood is secured a relatively heavy band 7 of felt or other suitable material adapted to closely engage the breast of the rock, preferably slightly in advance of the outer extremity of the body of the hood. The hood, as illustrated in the drawing, has a downwardly turned housing part 8, which extends below the band 7 and forms a sort of pocket 9, between the body 10 of the hood and the housing in which a spiral spring 12 is located; the lower convolution of the spring being pivotally connected, as shown at 13, with the arms 14 of a yoke 15, mounted on the upper extremity 16 of the upper member 17 of a standard 18, the lower member 19 of the standard being tubular to receive the member 17, which telescopes therein, the member 17 being retained in any desired position of vertical adjustment by means of a set screw 20. The lower member 19 of the standard is preferably cone-shaped, as shown at 21, whereby it is sufficiently sharp to indent the rock floor of the tunnel, whereby the standard, when properly adjusted, is securely held in place.

Suitably attached to the lower part of the body of the hood at one side is a pair of jaws 22, the said jaws being pivotally connected, as shown at 23. These jaws are suitably secured to the hood, being inserted in an opening therein, the jaws being secured to the hood in such a manner that they may be opened and closed, the two jaws being shaped to form a cavity in which a bushing 25 is located, preferably composed of felt or other suitable similar material, the arrangement being such that when the jaws are closed the bushing therein will make a dust-proof joint around the drill steel and thus prevent the possible escape of dust during the operation of the machine. Each jaw 22 is provided at its bottom or lower extremity with a wearing part 26, through which the drill steel passes, the said parts when the jaws are closed conforming approximately to the exterior shape of the drill steel and forming a guide for the latter. Each of these wearing parts has an upwardly projecting lug 27, which is secured to its respective jaw by means of a rivet 28, or other suitable fastening device.

As illustrated in the drawing, the fabric of the hood around the opening therein engages the jaws exteriorly and is secured thereto in any suitable manner. As shown in the drawing, the canvas parts of the hood are connected with the jaws by means of loops 30 formed thereon and which are slipped over upwardly projecting lugs 31 formed on the respective jaws. The hood is further provided with a gore or gusset 32, which is inserted therein to make the lower part of the hood sufficiently full to permit the opening of the jaws the necessary distance. One of the jaws is further provided with an upwardly projecting and overlapping part 33, which carries a screw 34 adapted to pass through the canvas and through a metal strap 35, which is attached to the canvas on one side and overlaps the jaw part 33, the canvas being interposed between the said strap and said jaw part. Each jaw is provided with an arm, the two arms being designated by the numerals 36 and 37, respectively. One jaw is equipped with a pivoted keeper 38, while the other is provided with a notched quadrant 39, which the keeper engages when the jaws are locked in the closed position.

As illustrated in the drawing, the jaws are connected by a hinge pin 40, which passes through registering perforations formed in lugs 41 and 42, with which the jaws are respectively provided. The upper extremity of this hinge pin consists of an eye 43, with which is connected the lower extremity of a short chain 44, the upper extremity of the chain being connected preferably by means of a snap hook 43 with the lower convolution of the spiral spring 12. The object of this chain is to overcome the tendency of the lower part of the hood where the jaws are located to work downwardly on the drill steel when the drill is in operation.

It will be understood that the clamping jaws through which the drill steel passes are composed of metal and while these jaws are preferably formed of aluminum and therefore of minimum weight, there is a considerable tendency of the lower part of the hood to work downwardly as the drill steel is driven upwardly into the rock. It should also be understood that where a dust-collector of this character is employed it is always in connection with drills arranged for the forming of up-holes, it being necessary that the angle of inclination be sufficient to cause the rock-cuttings to pass out of the hole by gravity. Hence the drill steel, when the drill is in operation, is always working up through the jaws of the hood and the upward movement under the influence of the powerful and rapid blows of

the hammer, of the drill continues through the jaws, even though the latter are adjusted to cause the bushing to tightly grip the drill steel to form a dust-tight joint. Hence, it is found in actual practice that there is no tendency on the part of the hood to which the jaws are attached to move upwardly with the drill steel, the fact being that the opposite result exists, as heretofore explained, and in the absence of a support such as the chain 44 or its equivalent, this downward pull upon the lower part of the canvas would soon result in separating this portion of the canvas to which the jaws are attached, from the upper portion, particularly under the influence of the twisting strain to which the hood is subjected as the result of imparting partial rotations in reverse directions to the drill steel during the drilling operation.

The bottom of the hood at one side of the opening in which the clamping jaws are inserted, is provided with a distinct opening 45 for the escape of the rock cuttings and to the part of the hood where the opening 45 is located is attached a downwardly extending conduit 46 preferably composed of canvas and of sufficient length to reach the bottom of the drift or tunnel where the drill is located. This conduit 46 is preferably connected with the hood in such a manner that it is readily detachable.

As illustrated in the drawing, the conduit is provided with a hook 47 which engages a ring 48, attached to the lower part of the hood. Preferably, there is a hook 47 and a ring 48 on each side of the device.

As illustrated in the drawing, the extremities of the spiral spring are secured, as shown at 49, to the adjacent convolutions of the spring. This may be done by forming the extremity of the spring into an eye and clamping it tightly to the adjacent spring part. In order to pivotally connect the lower convolution of the spring with the arms 14 of the yoke, the said arms are provided with inwardly projecting pins 50, around which the spring is bent on opposite sides, the spring parts being thus formed into eyes which loosely engage the pins of the yoke, the said pins having their free extremities up-set sufficiently to maintain an operative connection between the said elements. It is evident, however, that this connection may be made in any approved or suitable manner.

From the foregoing description, the use of my improved dust collector will be readily understood. In applying the hood to the drill steel, it is only necessary to pass the steel through the hood so that it shall engage the bushing 25 of the clamping jaws. These jaws are then closed and locked by causing the keeper 38 to engage one of the notches of the quadrant 39. Before inserting the drill steel, however, the spiral spring 12 should be applied to the hood, which may be drawn down through the spring or attached in such a manner that the upper or outer portion of the spring shall engage the exterior pocket 9 of the hood. The conduit 46 may then be attached. Before beginning the drilling operation, the vertically adjustable part 17 of the standard should be elevated sufficiently to place the spring under considerable tension in order that the pressure of the spring upon the outer extremity of the hood shall be sufficient to maintain a dust-tight joint between the band 4 and the breast of the rock around the drill hole, in order to prevent the escape of any dust or rock cuttings. An important advantage results by reason of applying the spiral spring to the hood exteriorly, since by so doing the supporting member of the standard does not pass through the hood and consequently there is no opening for the escape of dust. Furthermore, by applying the spring exteriorly to the hood instead of interiorly, the entire space within the hood around the drill steel is open to permit the free and unobstructed downward movement of the rock cuttings as fast as they leave the drill hole. Furthermore, by forming the exterior pocket 9 in the hood, the spring is more easily connected with the hood than is the case where the spring is located inside of the hood, since by locating the spring in the pocket no other means of attachment to the hood is necessary and the hood may be quickly removed from the spring by detaching the conduit 46 and pulling the hood outwardly through the spring.

The subject-matter of claim 8 is disclosed in my copending application, Serial No. 837,071, originally filed September 16, 1912; and the subject-matter of claims 1, 2, 3 and 16 is disclosed in my copending application Serial No. 768,408, filed May 19, 1913.

I claim—

1. 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 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.

2. The combination of a hood adapted to engage the breast of the rock around the drill hole, a supporting standard, a spiral spring mounted on the standard, and directly engaging the hood to maintain the latter in place, the axis of the said spring

being substantially coincident with the axis of the hood.

3. The combination of a flexible hood adapted to engage the breast of the rock around the drill hole, a vertically adjustable support or standard, a spiral spring pivotally mounted on the standard independently of the drill, and engaging the hood for holding the latter in place.

4. In a dust-collector for rock drills, the combination of a flexible hood adapted to engage the breast of the rock around the drill hole, a spiral spring surrounding the hood and connected in operative relation with the outer extremity thereof, and means independent of the drill and connected with the spring in operative relation to maintain the hood in place.

5. In a dust-collector for rock drills, the combination of a flexible hood having an exterior pocket, a spiral spring located in said pocket, and a supporting standard whose upper extremity is connected with the spring, the part of the standard engaging the spring being adapted to compress the latter to maintain the hood in place.

6. The combination of a flexible hood having an exterior pocket, an adjustable supporting standard and a spring connected with the standard and located in the pocket of the hood, for the purpose set forth.

7. The combination of a hood having an exterior pocket surrounding its outer portion, a spiral spring surrounding the hood and whose outer portion enters the said pocket, and a supporting standard upon which the spring is mounted.

8. The combination of a hood, a spiral spring engaging the hood, and means independent of the drill for supporting the spring and acting through the agency thereof for supporting the hood in place around the drill hole, the axis of the said spring being substantially coincident with the axis of the hood.

9. The combination of a flexible hood having an opening in its bottom to receive the drill steel, which also passes through the chamber inclosed by the hood, a spiral spring surrounding and directly engaging the hood, and a standard supporting the spring independently of the drill, the standard being adjustable to hold the hood in place through the medium of the spring.

10. The combination of a flexible hood, a spiral spring engaging an exterior pocket formed in the hood, and means connected with the spring and supporting the latter independently of the drill for maintaining the hood in place.

11. The combination of a flexible hood having a pocket surrounding its outer extremity, a spiral spring engaging said pocket and a supporting standard having a yoke at its upper extremity connected with the spring on opposite sides.

12. The combination of a flexible hood having a pocket surrounding its outer extremity, a spiral spring engaging said pocket and a supporting standard having a yoke at its upper extremity pivotally connected with the spring on opposite sides.

13. The combination of a flexible hood having an exterior pocket at its outer extremity, a relatively heavy band of soft material surrounding the outer extremity of the hood beyond the pocket and a spiral spring engaging the pocket for holding the hood in place, and means for supporting the spring independent of the drill.

14. The combination of a flexible hood, having an exterior pocket at its outer extremity, a relatively heavy band of soft material surrounding the outer extremity of the hood beyond the pocket, a spiral spring whose outer extremity enters the pocket, a yoke pivotally connected with the spring on opposite sides and a supporting standard with whose upper extremity the yoke is connected.

15. The combination of a flexible hood having an exterior pocket, a spiral spring surrounding the hood and whose outer extremity enters the pocket, a standard having a longitudinally adjustable upper portion terminating in a yoke with which the lower extremity of the spring is pivotally connected on opposite sides.

16. The combination of 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.

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

EMMET F. GALLIGAN.

Witnesses:
W. H. GALLIGAN,
THOS. COPPARD.