C. S. WAHLSTROM.

DUST COLLECTOR FOR ROCK DRILLS.

APPLICATION FILED AUG. 29, 1910.

1,003,075. **Patented Sept. 12, 1911.**

2 SHEETS—SHEET 1.

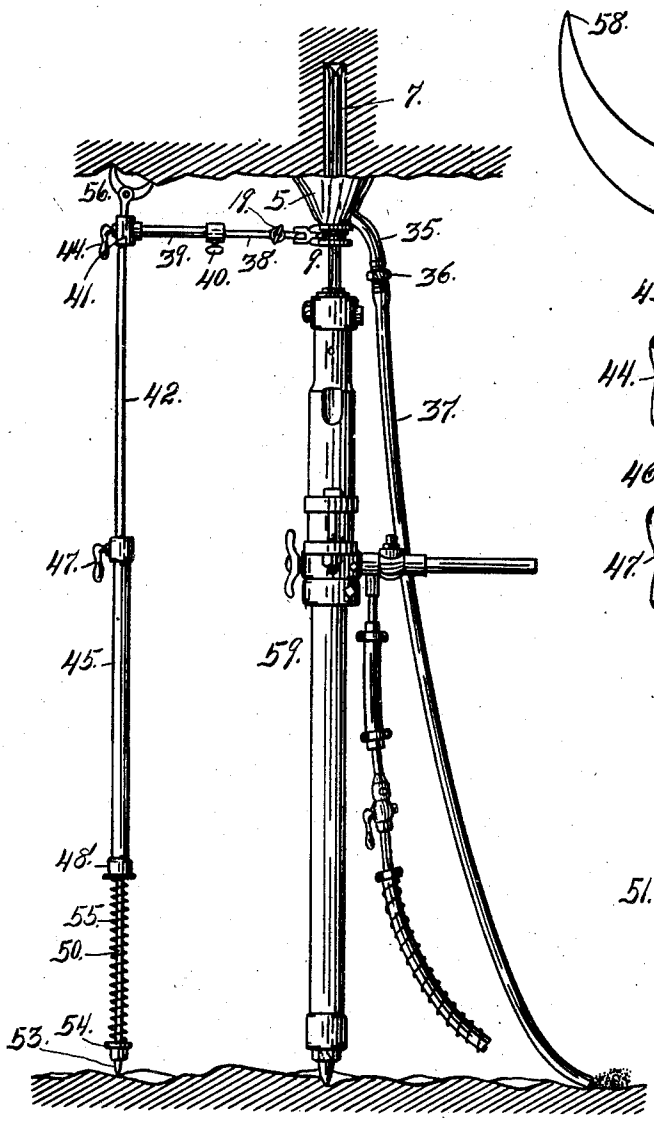

Fig. 1.

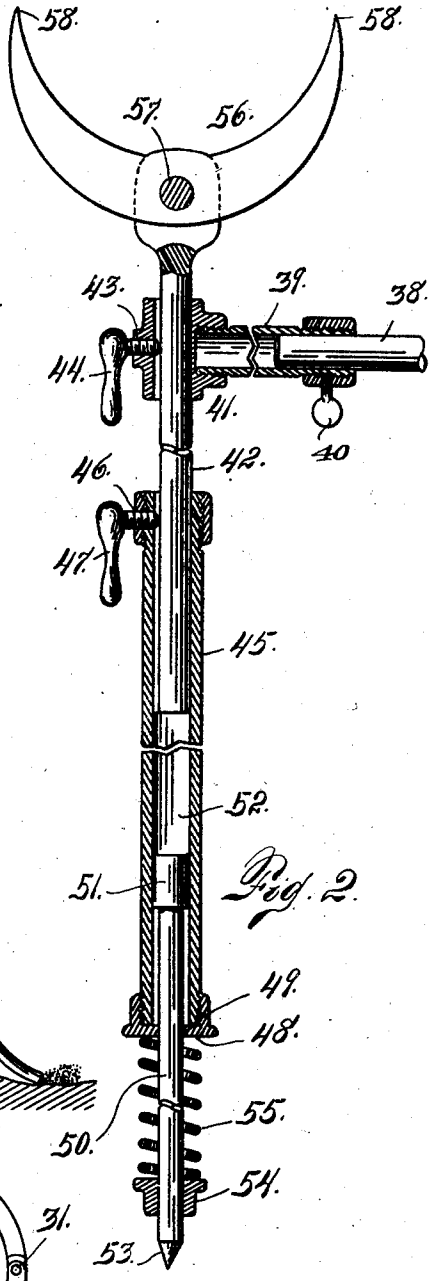

Fig. 2.

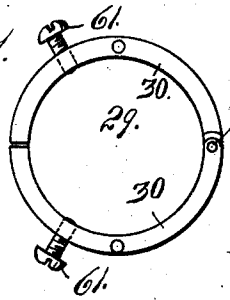

Fig. 6.

Witnesses
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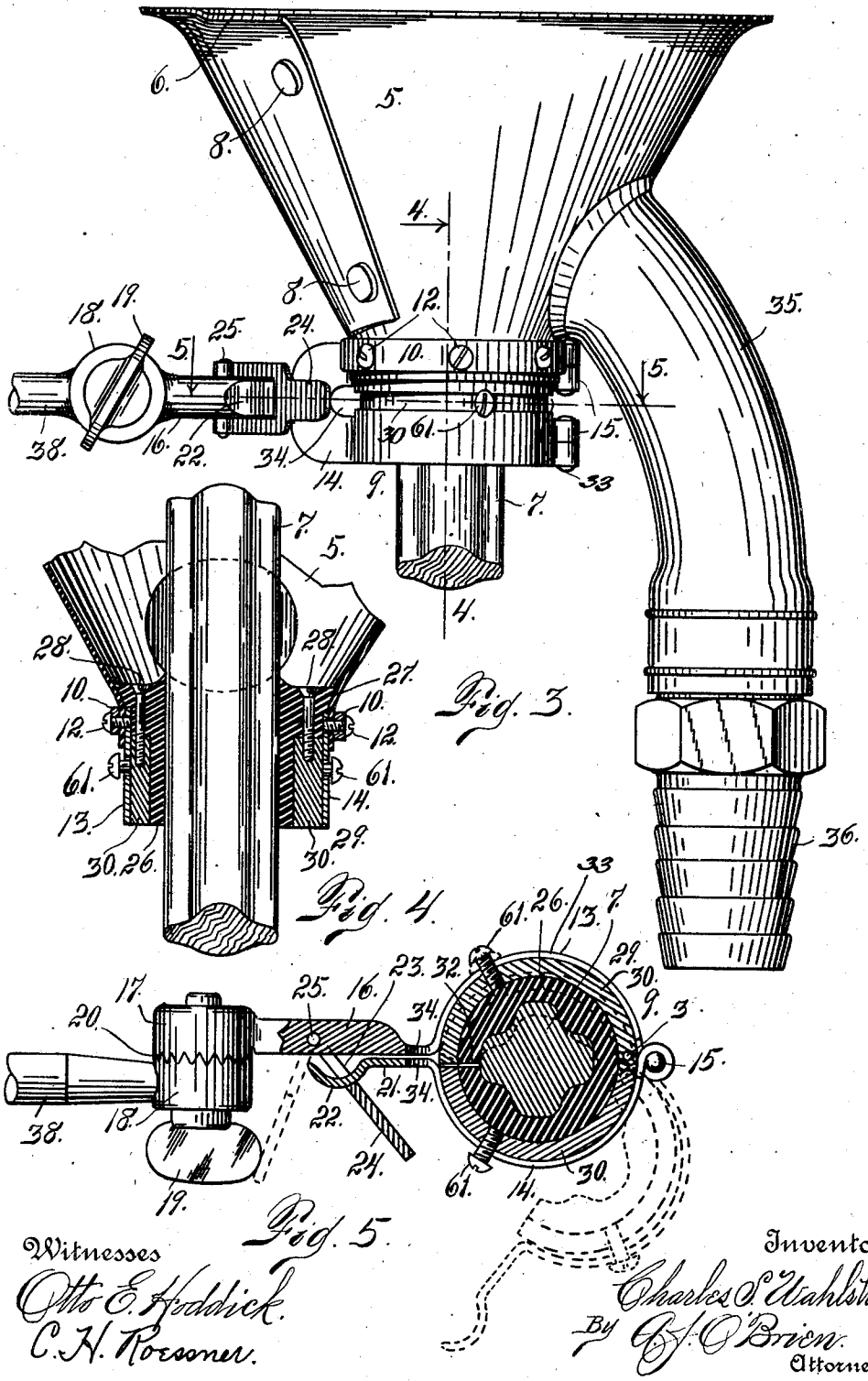

Fig. 3.

Fig. 4.

Fig. 5.

Witnesses

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UNITED STATES PATENT OFFICE.

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DUST-COLLECTOR FOR ROCK-DRILLS.

1,003,075. Specification of Letters Patent. Patented Sept. 12, 1911.

Application filed August 29, 1910. Serial No. 579,528.

To all whom it may concern:

Be it known that I, CHARLES SOLOMON WAHLSTROM, a citizen of the United States, residing at Wallstreet, county of Boulder, 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.

During the regular drilling operation the material which is removed from the hole formed in the rock by the drill bit or tool, is formed into dust and if no provision is made for collecting and confining this dust, it fills the atmosphere in the vicinity of the breast of the rock where the drilling operation is carried on, to such an extent that it becomes almost unbearable for the workmen in charge of the machine. This dust also makes the handling of a drill very unhealthful work, so much so in fact that a person can endure it for a comparatively short time only.

The object of my improved construction is to overcome this difficulty and to practically collect all of the rock cuttings as they leave the drill hole, and deliver them to a conduit whence they may be carried or directed to a suitable location.

My improved construction consists of a funnel-shaped, flexible hood adapted to engage the breast of the rock surrounding the drill hole during the drilling operation, the arrangement being such that the rock cuttings all enter this hood with which a discharge conduit is connected in such a manner that the cuttings pass from the hood into the conduit. The hood is attached to the drill bit by means of a clamp surrounding a rubber bushing whose interior is the counterpart of the exterior of the drill bit, the bushing having grooves to fit the ribs of the bit, and ribs to enter the grooves of the latter whereby a dust-tight joint is formed between the bushing and the bit, thus preventing any dust or cuttings from passing through the hood. This bushing is mounted to rotate in the clamp, since the drill bit must rotate in order to properly perform its function. The rotary action of the drill bit may be either a rotary oscillating or a continuous rotary movement depending upon the style of drill mechanism employed. In either event the bushing directly engaging the drill bit and fitting within the clamp, may move freely with the bit. This clamp is connected with an arm which telescopes in a sleeve mounted upon a column, one extremity of which engages the roof or top wall of the tunnel, while the other extremity engages the bottom or floor of the same. This column has a rocking fork at its upper extremity whereby it is adapted to adjust itself to the surface of the rock whether the same is horizontal or more or less inclined. In other words, the unevenness of the rock surface presents no obstacle to the location of the supporting column upon which the dust collector is mounted. This column is composed of a sleeve and two members telescoping therein, the upper member carrying the fork and being secured to the sleeve in any desired position of adjustment; while the lower member telescopes freely in the sleeve and is provided with a stop near its lower extremity which engages one end of a coil spring surrounding the said member, the opposite extremity of the spring engaging the lower end of a sleeve. In this way the column is placed under tension. In other words, when it is desired to place the column in position, the operator pushes down upon the forked end causing the lower member to move upwardly into the sleeve in which it telescopes. Then by releasing the downward pressure, the recoil of the spring will force the forked upper end of the column against the roof of the tunnel, whereby the column is held securely in place.

Having briefly outlined my improved construction, I will proceed to describe the 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 tunnel or drift in the rock showing the rock drill in place and my improved dust collector connected in opera-

tive relation therewith. Fig. 2 is a view of the column partly in section and on a larger scale. Fig. 3 is a detail view showing the hood member of the dust collector and the parts directly connected therewith, on a larger scale than in Fig. 1. Fig. 4 is a sectional view taken through the drill bit clamp of the dust collector, the hood being shown partly broken away. This is a section taken on the line 4—4 Fig. 3. Fig. 5 is a section taken on the line 5—5 Fig. 3. Fig. 6 is a detail view of the rotatable hinged sleeve.

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

Let the numeral 5 designate a hood which may be composed of some suitable flexible material, for instance, rubber suitably reinforced by canvas or other fabric to give it the necessary durability. The inner surface of the hood should be smooth so that there will be no tendency for the dust or rock cuttings to adhere thereto. Rubber forms a sufficiently smooth surface for the purpose. This hood is funnel-shaped and is adapted to be opened on one side where the two edges of the hood overlap as shown at 6. After being applied to the drill bit 7, the opening at the side of the hood may be closed by the use of suitable devices 8. Separable glove buttons will answer every purpose. The smaller extremity of this hood is secured to a clamp 9 by means of a ring 10 and screws 12. The fabric of the hood is interposed between the members 13 and 14 of the clamp and the ring 10, the screws being threaded through the ring and the clamp members. The two clamp members 13 and 14 are hinged together as shown at 15. The opposite extremity of the member 13 merges into a laterally projecting arm 16 which terminates at its extremity remote from the clamp in a clutch member 17 coöperating with a similar clutch member 18, the two clutch members being connected by a bolt 19. The faces of these clutch members are serrated or toothed as shown at 20 and when they are connected in operative relation, the teeth intermesh in such a manner as to prevent any movement of their serrated faces upon each other. However, by loosening the bolt these faces may be moved to give the arms 16 any desired angle with the horizontal. The clamp member 14 terminates at its extremity remote from the hinge in a projection 21 curved at its outer end as shown at 22 to form a sort of cam which when the clamp members are held together in their clamping relation passes through an opening 23 formed in a locking hasp 24, hinged to the arm 16 as shown at 25.

Located within the clamp 9 and directly engaging the outer surface of the drill bit 7 when the device is in use, is a bushing 26 composed of rubber or other suitable material. This bushing is cored out to fit the drill bit 7, the exterior surface of the latter being composed of alternate ribs and grooves in the well known manner. The portion of the bushing 26 adjacent the hood constitutes a head 27 through which screws 28 are passed and threaded into a sleeve 29 which is composed of two members 30 hinged together as shown at 31 to harmonize with the hinge 15 of the clamp 9. This hinged sleeve 29 is supported between the clamp members 13 and 14 by means of screws 61. The rubber bushing 26 is divided as indicated at 32, in line with the division between the sleeve members 30 and the clamp members 13 and 14, so that when it is desired to apply the hood to the drill, the inner clamping structure may be opened on one side to receive the drill bit. By virtue of this construction the device may be applied to the drill bit when the cutting extremity of the latter is close against the rock or concealed within the drill hole.

It is evident that I am not limited to the specific construction of clamp and bushing disclosed in the drawing and heretofore described, though it is necessary that the member of the clamping mechanism in direct engagement with the drill steel should form a tight joint therewith and also be so carried as to rotate either continuously or back and forth with the drill steel, as may be desired. It is also evident that the clamp 9 must be relatively stationary. Hence both members of this clamp are slotted as shown at 33, the slot extending entirely around the curved members 13 and 14 and extending into the members 16 and 21 as shown at 34, in order to allow the screws 61 which are connected with the sleeve members 30 and protrude therefrom, to move freely in the slot formed in the members of the clamp 9, during the rotary action of the drill bit. These screws 61 are simply threaded into the sleeve members 30 and constitute retaining guides for the bushing through which the drill steel passes, whereby the hood and bushing are retained securely in place when the dust collector is in use.

Communicating with the hood through an opening on one side thereof is a conduit member 35 which terminates in a serrated nipple 36 adapted to be connected with a hose pipe 37 for carrying off the dust or rock cuttings which enter the hood during the drilling operation.

Rigidly connected with the clutch member 18 is a rod 38 which telescopes into a sleeve 39, the said rod being held in the desired position of adjustment by a set screw 40. The sleeve 39 is threaded into a fitting 41 which is longitudinally adjustable upon a rod 42 extending at right angles to the sleeve 39, the fitting 41 being held in the desired position of adjustment upon the rod

42 by means of a set screw 43 threaded in the fitting and equipped at its outer extremity with a handle 44 to facilitate the adjustment of the screw. The rod 42 telescopes in a hollow bar 45, being adjustable therein and locked in the desired position of adjustment by a set screw 46 having a handle 47. This hollow bar is equipped at its lower extremity with a cap 48 provided with an opening 49 through which passes a rod 50, the inner extremity of the rod being formed into a piston 51 fitting closely within the opening 52 of the hollow bar 45. The rod 50 protrudes below the hollow bar, its lower extremity being pointed as shown at 53 to facilitate its engagement with the rock floor of the tunnel or drift. Above the lower extremity of this rod is located a stop collar 54 which is engaged by one extremity of a coil spring 55 whose upper extremity engages the cap 48 of the hollow bar.

Upon the upper extremity of the rod 42 above the fitting 41 is a crescent-shaped member 56 pivotally connected with the rod as shown at 57, whereby the said member is adapted to rock so that its points or horns 58 may engage the rock wall at the top or roof of the tunnel, the said device automatically adapting itself to the surface whether the same is horizontal or irregular.

Attention is called to the fact that the members 42, 45 and 50 constitute a column for supporting the dust collector in operative relation with the drill steel.

It is evident that my improved device is specially adapted for use with hammer drills of the stoping type or those adapted for drilling up-holes where the holes are run either in a vertical direction or in a direction inclined to the vertical. In down-holes or even in holes driven in a horizontal direction or only slightly inclined from the horizontal, the rock cuttings may be removed by the use of water. However, in the case of up-holes or holes either vertical or considerably inclined, it is impracticable to employ water for obvious reasons, one of which is that the rock cuttings mixed with water would form a dirty liquid which would descend upon those in charge of the machine. Hence it is with this class of holes that my improved dust collector may be most advantageously employed, and in these cases the arrangement is such that the cuttings will move freely by gravity out of the hole, pass into the hood and thence out of the latter through the conduit connected therewith, the cuttings being carried to the desired location.

While it is preferred that the mouth of the hood should be in direct engagement with the breast of the rock, it is not absolutely necessary that this should be the case, since in actual practice the rock cuttings will follow the grooves of the drill steel for several inches before they begin to spread and impregnate the atmosphere with dust. These cuttings whether the hood is in exact engagement with the breast of the rock or not, will enter the hood and be discharged through the conduit connected therewith as heretofore explained.

In Fig. 1 of the drawing it is assumed that the dust collector supporting column occupies a vertical position parallel with the drill 59 carrying the drill steel 7 with which the dust collector is connected in operative relation.

Having thus described my invention, what I claim is:

1. A dust collector for rock drills, comprising a hood, a clamp to which the hood is secured, a bushing rotatably mounted in the clamp and adapted to fit the drill steel, and means independent of the drill connected with the clamp for supporting the hood in operative relation with the drill mechanism.

2. A dust collector comprising a hood, a clamp to which the hood is attached, and a bushing rotatably mounted in the clamp and grooved to fit the drill steel and form a dust-tight joint, but allowing the steel to move longitudinally therein, the bushing being split to open with the clamp and consisting of a yielding member and a metal reinforcing member to which the yielding member is secured.

3. A dust collector comprising a hood, a clamp to which the hood is attached, and a bushing rotatably mounted in the clamp and grooved to fit the drill steel to form a dust-tight joint, the bushing consisting of a yielding member and a metal reinforcing member to which the yielding member is secured, the yielding member being divided and the metal member hinged to open with the hood clamp, substantially as described.

4. The combination of a hood, a clamp to which the hood is secured, and a yielding bushing member grooved to fit the drill steel, the clamp being slotted and the bushing member provided with retaining guides which protrude through the slot of the clamp and allow the bushing member to rotate in the clamp and with the drill steel, substantially as described.

5. The combination of a hood, a circular support to which the hood is secured, a yielding bushing member grooved to fit the drill steel, the circular support being slotted and the bushing member provided with retaining guides which protrude through the slot of the support to allow the bushing member to rotate with the clamp and with the drill steel, and means independent of the drill mechanism, connected with the circular support for maintaining the hood in operative relation with the drill mechanism, substantially as described.

6. The combination of a hood, a collar to which the hood is secured, the collar being slotted, a bushing member grooved to fit the drill steel and mounted to rotate in the collar, the bushing having retaining devices protruding through the slot of the collar, and hood-supporting means connected with the collar for maintaining the hood in operative relation with the drill mechanism, substantially as described.

7. The combination of a hood, a collar to which the hood is secured, the collar being slotted, a yielding bushing member grooved to fit the drill steel and provided with retaining devices which protrude through the slot of the collar, and means independent of the drill mechanism for supporting the hood in operative relation with the drill, said means comprising a laterally projecting arm and a column upon which the arm is mounted, the said arm being jointed whereby the member connected with the collar is adjustable to allow the hood to change its position as the inclination of the drill steel is changed, substantially as described.

8. A dust collector comprising a funnel-shaped hood, a collar to which the smaller extremity of the hood is secured, a bushing rotatably mounted in the collar and adapted to fit the drill steel to form a dust-tight joint, and hood-supporting means comprising a column and a member extending at right angles to the column, the last named member being composed of two parts, each part having a clutch member, the two clutch members coöperating to allow the position of the hood to conform to that of the drill steel.

9. A dust collector comprising a hood, a clamp to which the hood is secured, a bushing member rotatably mounted in the clamp and shaped to fit the drill steel to form a dust-tight joint and rotate with the latter, the said bushing protruding into the smaller extremity of the hood, and means independent of the drill mechanism and connected with the clamp for supporting the hood in operative relation with the drill steel.

10. The combination of a funnel-shaped hood composed of flexible material and adapted to open on one side, a dust discharge conduit communicating with the hood, a collar to which the hood is secured, the said collar being shaped interiorly to fit the drill steel, the part directly engaging the steel being composed of yielding material, and means connected with the collar for supporting the hood in operative relation with the drill steel, substantially as described.

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

CHARLES SOLOMON WAHLSTROM.

Witnesses:
GUSTAF T. JOHNSON,
EDWARD STENSON.