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[54] **DEVICE FOR COLLECTING DRILL DUST AND A SEALING MEMBER INTENDED FOR SAID DEVICE**

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[51] **Int. Cl.** **E21b 21/00,** E21c 7/02

[58] **Field of Search** ..... 145/116 A; 408/67; 83/168; 175/207, 209–211, 213, 214

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[57] **ABSTRACT**

A hood for collecting drill dust, especially in rock drilling, intended to rest with its lower edge surface against a rock surface or the like. The hood is provided with a connection means for a transport pipe and at its upper end with a sealed-off gland for a drill bit or drill rod. The hood comprises two shells, one of which is fitted over the other, which shells are provided at their upper ends with oppositely located apertures, that on the upper being smaller than the aperture on the lower shell. The shells are arranged to hold between them an elastic sealing member with an aperture to fit around a drill bit and intended to be located in line with the aforesaid apertures. The shell apertures are large enough for passage of a drill bit holder. Shells and sealing members have a lateral slot, that of the sealing member being only a cut slit, for lateral insertion of the drill.

9 Claims, 3 Drawing Figures

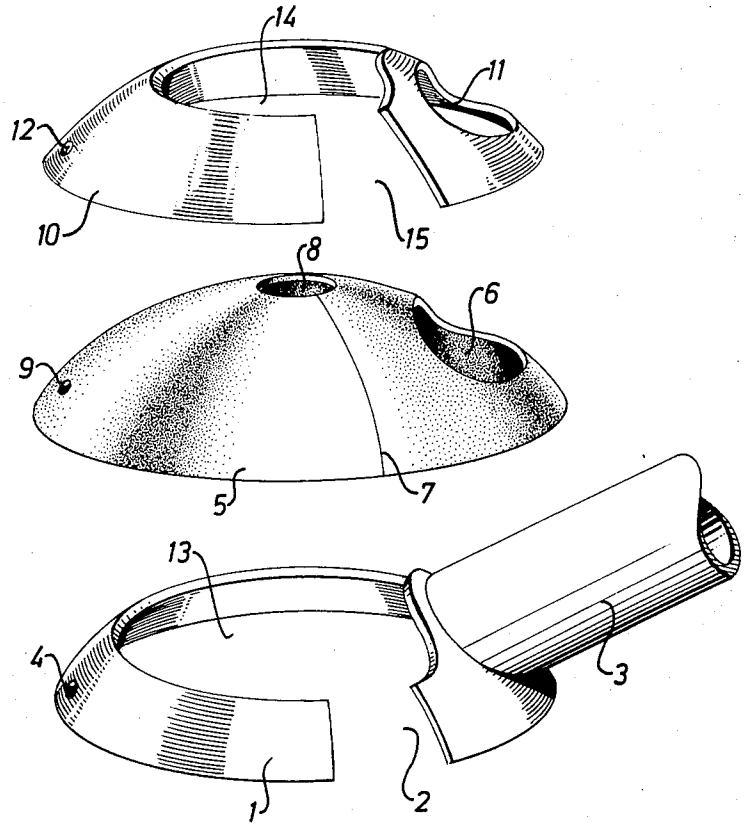


Fig.1

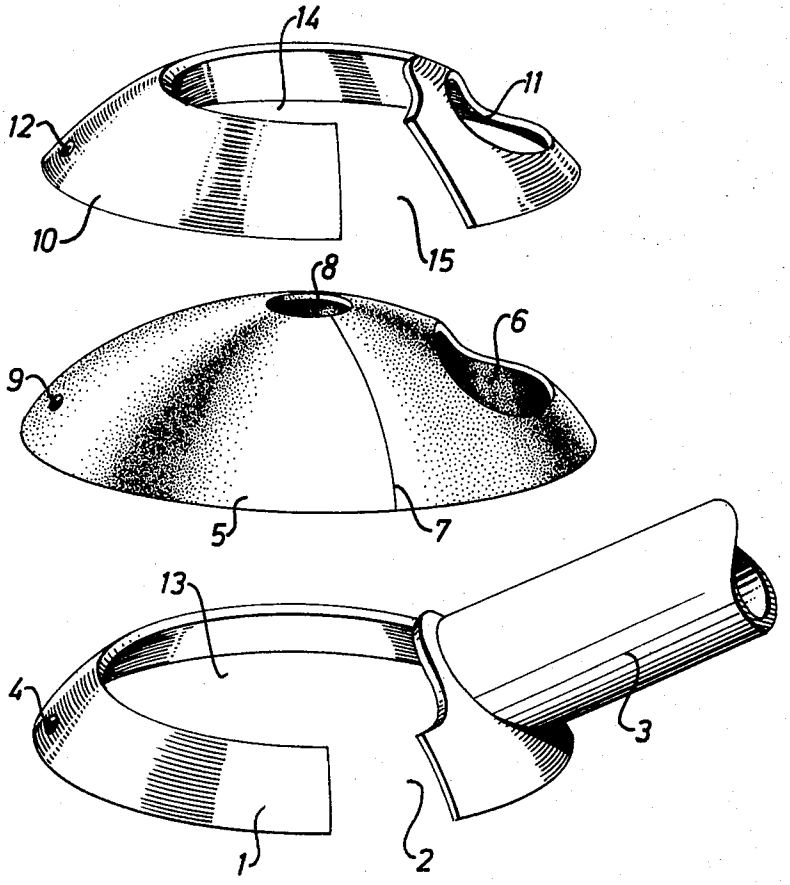


Fig. 2

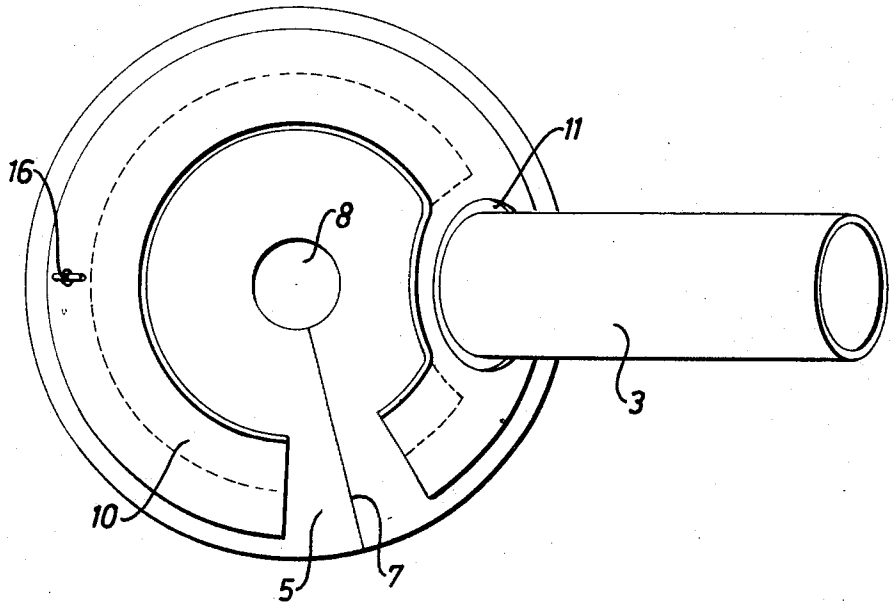
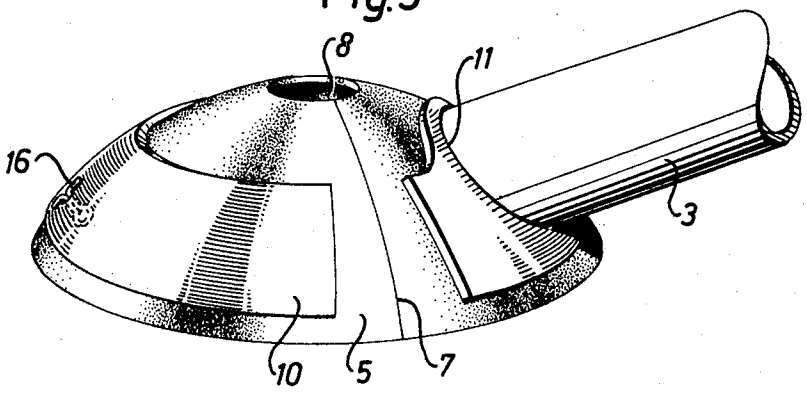


Fig. 3



DEVICE FOR COLLECTING DRILL DUST AND A SEALING MEMBER INTENDED FOR SAID DEVICE

This invention relates to a device for collecting drill dust, especially in rock drilling, which comprises a hood provided with a connection means for a transport pipe, which hood has at its upper end a sealed-off gland for a drill bit or drill rod.

For collection of drill dust formed in for example rock drilling it is necessary in the first instance to have a cowl or hood of the above-mentioned kind which can be applied sealingly over the place where a hole is to be drilled and from which generated drill dust can be sucked out and transported to a suitable dust-collection unit.

Known collection hoods of this kind can be divided up into two main types. Belonging to the first main type are those hoods which are made in one piece of a sturdy sealing material, usually rubber. The greatest disadvantage of these is that they do not incorporate any special sealing member at the aperture in the hood intended for the drill bit, the said aperture being instead so dimensioned that the hood in itself seals against the drill bit or drill rod. This implies that when the aperture after the hood has been in use for a time, roughly a week, has become enlarged in consequence of wear, the entire hood has to be replaced, which makes the use of these hoods relatively expensive. A further major disadvantage is that, because the material in these hoods is relatively stiff, the drilling must be discontinued when the bit holder of the drilling machine strikes up against the upper end surface of the hood, whereupon consequently a length of each drill bit corresponding to the height of the hood cannot be utilized. This is a substantial disadvantage, particularly in the case of hand-held drilling machines, since when changing between standard drill bits of increasing length the drill must upon each change be lifted an extra distance corresponding to the height of the hood in order to be applied to the new, longer drill bit.

The second type comprises those hoods in which the actual hood is made of a stiff material and the relatively narrow drill bit gland is sealed by means of a detachable member. The problem with these hoods is, among other things, that it is a relatively complicated procedure to change sealing members, which cannot be done without tools. The hoods, furthermore, comprise a large number of parts, which makes production, assembly and service of the hoods more expensive. In order to afford an adequate seal against the rock face, the hoods in certain applications must also be provided with an extra, collar-like seal around their lower edge sections, which further increases their cost. Also this type of hood does not permit full utilization of the bit length owing to the fact that the downward movement of the bit holder is restricted by the upper limiting surface of the hood.

A main object of the present invention is to provide a collection hood of the kind mentioned in the introduction, which is simple and inexpensive to manufacture and which simplifies and cheapens utilization at the work site in that it, among other things, makes possible very simple replacement of a sealing member used to seal-off the bit gland. The hood will also enable practically the entire length of the drill bit to be utilized and can be fitted in and removed from its working position by a simple hand grip.

Another object is to provide a sealing member to be used in the collection hood.

The invention provides an improved device for collecting drill dust of the kind initially defined which is primarily characterized in that the hood comprises two shells, one of which is fitted over the other, and in that both shells are provided at their upper ends with oppositely located apertures, the shells being arranged to hold between them an elastic sealing member with an aperture intended to be located in line with the aforesaid apertures.

Further aspects of the invention will become apparent from the description below, wherein reference is made to a preferred embodiment shown in the accompanying drawings.

FIG. **1** is an exploded view in perspective showing the parts included in the hood.

FIG. **2** is a horizontal view of the assembled hood, showing the relative positions of the different parts.

FIG. **3** is a perspective view of the assembled hood according to FIG. **2.**

As is evident from the figures, the hood comprises only four parts. The innermost of these consists of an annular shell **1** of capshape, which is provided with a slot **2** and a pipe stub **3** intended to be connected to a pipe for removal of generated drill dust. The shell **1** is also provided with a small, through hole **4.** Arranged above this shell, which serves as a support, is a preferably cap-shaped sealing member **5,** which is passed over the pipe stub **3** which thereupon passes through an aperture **6** made in the sealing member. The sealing member, which is made of an elastic material, is provided with a slot **7,** located in line with the slot **2,** which slot **7** extends from a central aperture **8** and out to the periphery of the sealing member. In the sealing member **5** there is also a hole **9** in line with the hole **4** in the shell **1.**

For retaining and pressing the sealing member **5** against the inner shell **1** the hood incorporates an outer, annular shell **10** of cap-shape. The shell **10** is provided with a slot **15** and with an aperture **11** corresponding to the aperture **6** in the sealing element **5** and like the sealing member is fitted to the inner shell in that the pipe stub **3** is passed through the aperture **11.** In an alternative elaboration the aperture **11** can be replaced by a recess or slot emanating into the aperture **14** in the shell **10.** Reference numeral **12** designates a hole made in the shell **10** in line with the holes **9** and **4** in the sealing member **5** and the shell **1,** respectively.

In the elaboration shown, the inner aperture **13** in the shell **1** is larger than the aperture **14** in the shell **10.** The apertures **13** and **14** can however be made essentially the same size and both are preferably made, as will be explained below, larger than the aperture **8** adapted for the drill bit in the sealing member **5.**

In assembling the hood as above, wherein the sealing member and the outer shell are passed over the pipe stub **3,** the outer and inner shell as well as the sealing member are fixed to each other in that a locking means **16,** e.g., a cotter pin, is fitted in the holes **4, 9** and **12.** The pipe stub **3** together with the locking means **16** brings about an exact steering of the included parts, which are thus fixed in predetermined positions in relation to each other, so that the slots **2, 7** and **15** will be located in line with each other.

In using the hood it is connected to a suitable dust collection unit and placed over the site where a hole is to be drilled, whereupon the drill bit is passed down through the apertures **14, 8** and **13.** The hole **8** is then so adapted that the sealing member **5** will seal against the drill bit in order to prevent dust leakage. To afford an effective seal also against the rock face, etc., the sealing member **5** is appropriately made somewhat larger than the annular shells **1** and **10,** so that it will protrude from the lower edge sections of the shells and seal against the underlying surface.

To permit utilization of the entire length of the drill bit the apertures **14** and **13** are so dimensioned that they allow the bit holder of the drilling machine to be passed through them. The bit holder will then, when it reaches down to the sealing member **5,** press the latter in front of it towards the rock surface. To facilitate this, the aperture **13** is appropriately made larger than the aperture **14.** Since the entire length of the drill bit can be utilized, the inconvenience is avoided that the drilling machine needs to be lifted when changing drill bits an extra distance corresponding to the height of the hood when the machine is to be applied to a new and longer bit inserted in the hole.

The slots **2, 7** and **15** enable the hood to be easily removed from its working position, in which it surrounds a drill bit, by being withdrawn towards the side so that the drill bit passes through the said slots. It can thereafter in the same simple manner be reinserted in its working position. On account of the shape of the sealing member **5** no extra means are required in order to get this to close tightly at the slot **7.**

A very great advantage of the shown hood is its simple assembly, utilizing the pipe stub **3** as an assembling and fixing means which allows quick and simple replacement of sealing members. The sealing members **5** do not need to have the shape shown in FIG. **1** but can for example be flat, in which case they can possibly be cut out from a larger sheet directly at the work site. When drilling is to be carried out on very uneven and broken rock, the sealing member is appropriately dimensioned so that it will protrude a longer distance beyond the lower edges of the shells **1** and **10.** In certain other cases it is not at all necessary for the sealing member to protrude beyond the said edges and these themselves afford sufficient seal against the underlying surface. The sealing member will have a long service life since, among other things, the design allows large apertures in the annular shells, which prevents the sealing members from being ruined by squeezing between the drill bit and the said shells. As is evident, one and the same sealing member serves three important purposes, namely sealing-off of the drill bit gland, sealing over the slots of the shells and sealing against the rock surface.

The shape of the shown hood causes it to rest very firmly against the underlying surface, its heaviness being decided largely by the material in the shells. It is important for the hood not to be too light, since it would then be lifted up by the flushing air which flows up through the drill hole. The annular shells can appropriately be made of siluminum and the sealing member of rubber or a similar material. The shape of the shells and the assembled hood can be varied within wide limits from purely cylindrical to conical, but is appropriately made in the form of a cap.

The shown hood is designed especially for hand-held drilling machines and bench feeders but can naturally also be utilized with other drilling equipments. For bench feeders it is essential for the hood to be low so that there is room for it under the bit holder of the bench feeder. The hood, moreover, should not have too large an inner volume, since this makes extraction of coarser particles more difficult. These then accumulate around the drill hole and drop down into it when the drill bit is lifted up.

What we claim is:

1. A device for collecting drill dust, especially in rock drilling, which comprises a hood provided with a connection means for a transport pipe, which hood is intended to rest with its lower edge surface against a rock face or the like and has at its upper end a sealed-off gland for a drill bit or drill rod, wherein the hood comprises two shells (**1,10**), one of which is fitted over the other, which shells are provided at their upper ends with oppositely located apertures (**13,14**), said shells each being also provided with a slot (**2,15**) made in the same direction between the respective aperture (**13,14**) and outer edge, and further being arranged to hold between them an elastic sealing member (**5**) with an aperture (**8**) intended to be located in line with the aforesaid apertures.

2. A device according to claim **1,** wherein said transport pipe connection means comprises an outwardly directed pipe stub (**3**) provided on the inner shell (**1**) and an aperture (**11**) or slot corresponding to the pipe stub, provided on the outer shell (**10**).

3. A device according to claim **1,** wherein the two shells (**1, 10**) are provided with holes (**4, 12**) located in line with each other for fitting of a locking means (**16**).

4. A device for collecting drill dust, especially in rock drilling, which comprises a hood provided with a connection means for a transport pipe, which hood is intended to rest with its lower edge surface against a rock face or the like and has at its upper end a sealed-off gland for a drill bit or drill rod, wherein the hood comprises two shells (**1,10**), one of which is fitted over the other, which shells are provided at their upper ends with oppositely located apertures (**13,14**), the aperture (**13**) in the inner shell (**1**) being larger than the aperture (**14**) in the outer shell (**10**), both apertures (**13,14**) being of sufficient size for passage of a drill bit holder, said shells being further arranged to hold between them an elastic sealing member (**5**) with an aperture (**8**) intended to be located in line with the aforesaid apertures.

5. A device for collecting drill dust, especially in rock drilling, which comprises a hood provided with a connection means for a transport pipe, which hood is intended to rest with its lower edge surface against a rock face or the like and has at its upper end a sealed-off gland for a drill bit or a drill rod, wherein the hood comprises two shells (**1,10**), one of which is fitted over the other and a sealing member fitted between the shells,

said shells being provided at their upper ends with oppositely located apertures (**13,14**), each being also provided with a slot (**2,15**) made in the same direction between the respective apertures (**13,14**) and the outer edge of the shell,

said sealing member being a cap-like body (**5**) of an elastic material provided at its upper end with a

central aperture (**8**) smaller than said apertures (**13,14**) of said shells and in line with said apertures and provided also with a cut on a line (**7**) aligned along the middle of said slots of said shells and extending from said aperture (**8**) in said cap-like body to the outer edge of said cap-like body.

6. A device according to claim **5,** wherein said transport pipe connection means comprises an outwardly directed pipe stub (**3**) provided in the inner shell (**1**) passing through a second aperture (**6**) in said sealing member and through a second aperture (**11**) or slot in said outer shell (**10**).

7. A device according to claim **5,** wherein the two shells (**1,10**) and the sealing member are respectively provided with holes (**4,12,9**) located in line with each other and a locking means (**16**) is fitted therethrough.

8. A device according to claim **5,** in which said sealing member is so dimensioned that it protrudes beyond the lower edges of said shells (**1,10**).

9. A device for collecting drill dust, especially in rock drilling, which comprises a hood provided with a connection means for a transport pipe, which hood is intended to rest with its lower edge surface against a rock face or the like and has at its upper end a sealed-off gland for a drill bit or drill rod, wherein the hood comprises two shells (**1,10**), one of which is fitted over the other, and a sealing member fitted between them,

said shells and said sealing member being provided at their upper ends with apertures (**13,14,8**) coaxially disposed, the aperture (**8**) in said sealing member being the smallest for sealing a drill bit or drill rod and the aperture (**13**) in the inner shell (**1**) being larger than the aperture (**14**) in the outer shell (**10**), both apertures (**13,14**) in the respective shells (**1,10**) being of sufficient size for passage of a drill bit holder.

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