

[54] **ROTARY MINING HEAD WITH FLUID CONNECTOR MEANS FOR NOZZLE**
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[58] **Field of Search**..... 299/81; 175/340, 175/393, 422; 239/600, 602; 85/82, 83; 285/40, 355

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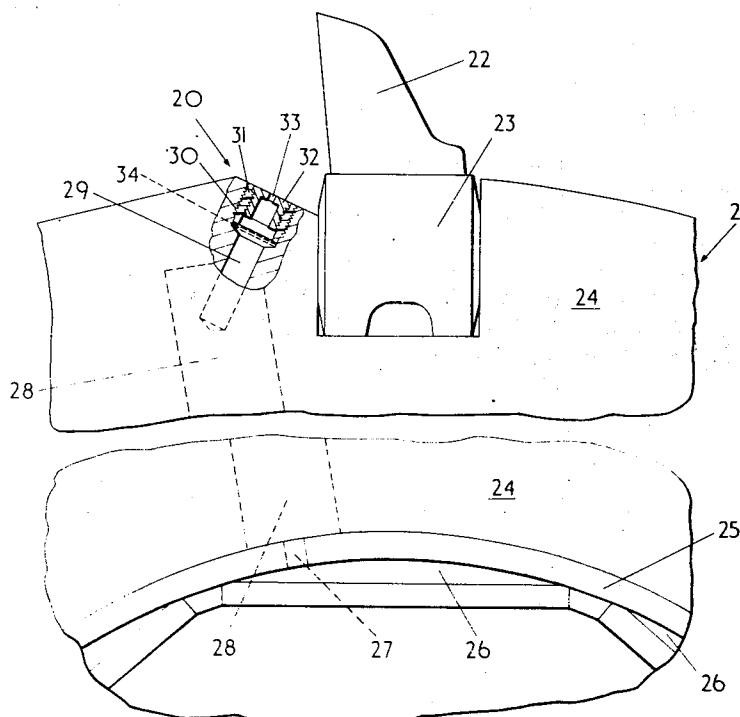
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[57] **ABSTRACT**

A cutter head for a mineral mining machine has connecting means for conveying dust suppression fluid to the cutting zone of the head. The connecting means comprises a tubular bush of synthetic plastics material which is inserted into a bore formed in the head. An apertured threaded member, conveniently a nozzle, is co-operable with the bush aperture such that when the member is screwed into the bush, the bush is expanded into the bore of the cutter head. In this way the member and the bush are releasably securable within the bore.

4 Claims, 2 Drawing Figures



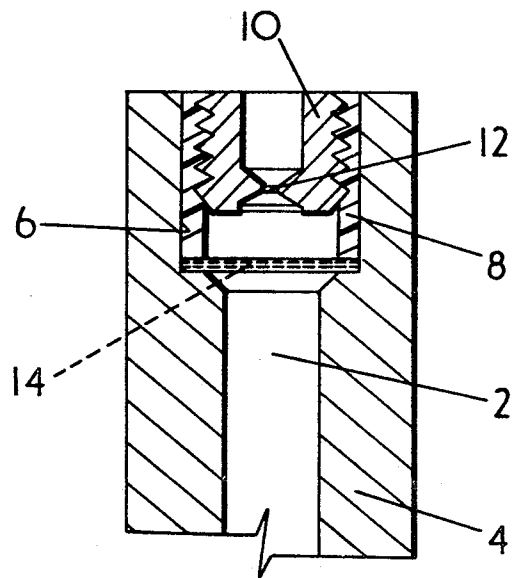


FIG. 1.

ROTARY MINING HEAD WITH FLUID CONNECTOR MEANS FOR NOZZLE

This invention relates to connecting means comprising one member having a bore and a threaded member engageable within the bore, and to a cutter head for a mineral mining machine incorporating such connecting means.

In particular, although not exclusively, the invention relates to connecting means for releasably securing fluid outlet assemblies to cutter heads of mineral mining machines, the heads being provided with systems for supplying fluid for suppressing dust evolved by cutter tools mounted on the heads.

It is known for a rotary cutter head mounted on a drive shaft of a mineral mining machine, to be provided with means for directing a jet of fluid e.g. water onto, or close to, the radially outer cutting zone of the head, the fluid being fed through an axial bore in the drive shaft and a distributor located within the head and along radial pipes or passages which lead to fluid outlet assemblies in the form of nozzles inserted in bores formed adjacent to the cutting zone of the head. One disadvantage of such a known head is that because the nozzles must be necessarily located adjacent to the cutter tools the nozzles and the bores become deformed by movement of the tools during cutting. Hence in use it becomes difficult to remove old nozzles and to refit new nozzles. In addition because of the wet dirty conditions associated with cutting mineral the nozzles tend to fast within the bores and again replacement of nozzles becomes difficult. The difficulty of replacing damaged or blocked nozzles is one of the major reasons why cutter heads having means for directing a jet of fluid have not been widely adopted. Another disadvantage of the known nozzles is that because they must be sealed within the bore and must, therefore, be of special design to accommodate the seal they are relatively expensive.

An object of the present invention is to provide connecting means for releasably securing a fluid outlet assembly to a cutter head of a mineral mining machine which overcomes the above mentioned disadvantages.

According to one aspect of the present invention connecting means are provided which comprise a first component provided with a bore, a tubular bush of synthetic plastics material insertable into the bore, and a threaded second component which co-operates with the bush aperture so that when the second component is screwed into the inserted bush, the outer diameter of the bush increases and the bush and the second component are releasably secured within the bore.

The bore may be plain. Alternatively, the bore may be serrated and the serrations may be a thread formed along the inside of the bore.

According to another aspect of the present invention a cutter head is provided for a mineral mining machine, the cutter head having connecting means for conveying dust suppression fluid to the cutting zone of the head, the means including a fluid outlet assembly comprising a tubular bush of synthetic plastics material which is inserted into a bore in the head, and a threaded member which co-operates with the bush aperture so that when the member is screwed into the bush the outer diameter of the bush increases and the bush and the member are releasably secured within the bore, the member being provided with an outlet aperture for fluid.

Preferably the bush is nylon and the threaded member may have a tapered thread. Advantageously a filter is located adjacent the fluid outlet assembly.

In the case of a cutter head provided with a pipe leading from a distributor towards the cutting zone of the head, the pipe is made of synthetic plastics material and the outer end constitutes the bush.

By way of example only, two embodiments of the invention will be described with reference to the accompanying drawings in which:

FIG. 1 is a sectional view through a first embodiment of connecting means constructed in accordance with the invention and providing fluid outlet means;

FIG. 2 is a part sectional view of a second embodiment of connecting means providing fluid outlet means on a cutter head of a mineral mining machine.

The connecting means of FIG. 1 constitutes part of fluid outlet means provided on a rotary cutter head having means for conveying dust suppression fluid to the cutting zone of the head.

Examples of such cutter heads are described in our prior British Patent Specification NOS. 996962 and 1110763. However, the fluid outlet arrangements of the earlier cutter heads are replaced by the fluid outlet assembly comprising the present invention.

The rotary cutter head is mounted on a driven shaft of the mineral mining machine and dust suppression fluid e.g. water is fed along an axial bore in the drive shaft to a distributor located within the head. From the distributor the fluid is fed along radial pipes or passages towards the circumferential cutting zone of the head. The pipes may lead to the cutter tool holders. Alternatively the pipes may lead to the radially outer portions of cut mineral loading vanes extending helically around the hub of the head.

In the cutter head of FIG. 1 the pipe which is not shown in FIG. 1 leads to a passage 2 formed in the radially outer portion 4 of such a loading vane.

The end of the passage 2 is formed by a plain bore 6 of a diameter larger than the remainder of the passage. The fluid outlet assembly is inserted in the bore 6 and comprises a plain nylon bush 8 and a threaded member 10 which has an aperture 12 for the discharge of dust suppression fluid.

Typical dimensions for the bore 6 and for the thread of the member 10 are $\frac{3}{8}$ inch diameter and $\frac{1}{4}$ inch B.S.P. respectively, or $\frac{3}{8}$ inch diameter and $\frac{5}{16}$ inch B.S.P., respectively.

A filter 14 is clamped between the inner most end of the nylon bush 8 and the step formed at the junction of the passage 2 with the bore 6. Alternatively the filter may be clamped between the member 10 and the step.

The fluid outlet assembly is assembled by first inserting the filter 14 and then the nylon bush 8 into the bore 6, the outer diameter of the bush being such that it is a sliding fit within the bore 6. The threaded member 10 is then screwed into the bush 8, a female thread on the bush being formed as the member is screwed into the bush. The diameter of the member 10 is such that as it is screwed into the bush 8, the outer diameter of the bush is caused to expand and is thus sealed within the bore 6.

By the time the member 10 is fully in position within the bush 8 the bush is secured within the bore 6 which is thereby sealed except for the outlet aperture 12. The member 10 is also releasably secured in position within the nylon bush 8.

Upon an adjacent cutter tool moving when the cutter head starts to cut, the bore 6 is subjected to deformation as in the known cutter heads. However, the nylon bush 8 acts as a resilient cushion and protects the member 10 from becoming deformed, the bush absorbing all movements of the sides of the bore 6 due to deformation.

With such a fluid outlet assembly it has been found in operation that there is little or no tendency for member 10 to unscrew from the nylon bush 8 during cutting. Also, upon extended use the member 10 does not tend to become fast in the bore 6 due to corrosion.

In operation dust suppression fluid is passed along the passage 2 through the filter 14 which prevents any solid particles large enough to block the aperture 12 from reaching the aperture.

The fluid is discharged from the aperture 12 into the cutting zone of the cutter head.

As no part of the fluid outlet assembly projects beyond the portion 4 of the loading vane there is little tendency for the assembly to become damaged by the cut mineral flowing during cutting.

FIG. 2 shows a fluid outlet assembly 20 secured to a cutter head 21 of a mining machine (not shown) by means of a second embodiment of connecting means. The assembly 20 is mounted on a cutter head 21 adjacent to the front face of a cutter tool 22 which is releasably mounted in a cutter tool holder 23, the holder 23 being welded in a recess formed in the loading vane 24 of the cutter head 21. In FIG. 2 the head 21 has a central barrel 25 around which the loading vane 24 extends in a helical path and along the inner face of which are formed cross passage 26 for dust suppression fluid. The barrel is provided with a central bush (not shown) for mounting a driven shaft of the mining machine (not shown).

Dust suppression fluid is fed along the shaft, through a distributor (not shown) and along the cross passage 26 from where it is fed along radial passages 27, 28 formed in the barrel 25 and loading vane 24, respectively. An inclined passage 29 having an enlarged outer bore 30 is provided in the loading vane 24 adjacent to the front face of the cutter tool 22 and connecting with the passage 28. The inner face of the enlarged bore 30 is serrated by means of a female thread formed around the face. The fluid outlet assembly which is similar to that described with reference to FIG. 1 is inserted into the enlarged bore 30 and comprises a plain nylon bush 31 and a threaded member 32 which has an aperture 33 for the discharge of dust suppression fluid.

A filter 34 is clamped between the inner most end of the nylon bush 31 and the step formed at the junction of the passage 29 with the bore 30.

The fluid outlet assembly shown in FIG. 2 is assembled in similar manner to that described with reference to FIG. 1. The outer diameter of the nylon bush 31 is such that it is a sliding fit within the innermost portions of the thread. When the threaded member 32 is screwed into the nylon bush 31 a female thread is formed on the inner face of the bush by the member 32 and as the outer diameter of the bush 31 increases as

the member 32 is screwed further into the bush, the outer portions of the nylon bush flow into the grooves formed by the female thread in the bore 30 and thereby form a male thread around the bush.

Thus with the second embodiment of connecting means the nylon bush 31 is held in the bore 30 by means of abutments on the bush engaging abutments on the bore.

In alternative arrangements of the invention the fluid outlet assembly is mounted within a cutter tool holder.

In further alternative arrangements the member 10 has a tapered thread.

In still further alternative arrangements of the invention the bore 6 is serrated not by means of a thread but for example by having the inner face of the bore knurled.

In alternative embodiments of the invention the nylon bush 8 is constituted by the end of the pipe which feeds fluid from the distributor towards the cutting zone of the cutter head. The pipe may extend from the distributor or from passages leading from the distributor.

I claim:

1. A cutter head for a mineral mining machine, including means for conveying dust suppression fluid to the cutting zone of the head, the means including a fluid discharge assembly comprising a first component having a male threaded portion, a synthetic plastic bush into which the male threaded portion of the first component is received, and a second component adapted to accommodate the bush, the threaded portion co-operating within the bush such that when screwed into the accommodated bush the outer diameter of the bush increase and the bush and the first component are thereby releasably secured to the second component, one of the components comprising fluid discharge means.

2. A cutter head as claimed in claim 1, in which the second component has serrations arranged to contact the accommodated bush.

3. A cutter head as claimed in claim 2, in which the serrations are provided by a female threaded portion of the second component.

4. A cutter head for a mineral mining machine, including means for conveying dust suppression fluid to the cutting zone of the head, the means comprising a distributor and a synthetic plastic pipe leading from the distributor towards the cutting zone, and further comprising a fluid discharge assembly comprising a first component having a male threaded portion for engagement in the end of the pipe remote from the distributor, and a second component adapted to accommodate the pipe, the threaded portion co-operating within the said end of the pipe such that when screwed into the accommodated pipe the outer diameter of the said end of the pipe increases and the pipe together with the first component are thereby releasably secured to the second component, one of the components comprising fluid discharge means.

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