Title
A cable feeder

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A CABLE FEEDER

ABSTRACT

A cable feeder (1) including a body (2) having a passage (3) through which a cable (4) can pass. The cable feeder (1) also has a first roller (9) and a second roller (10). Both rollers (9, 10) being located adjacent said passage (3) to engage said cable (4) in use. The first roller (9) is supported by a first support member (15) and said second roller (10) is supported by a second support member (18). Each said support member (15, 18) is pivotally displaceable with respect to said passage (3). An actuator (12) drives at least one of said rollers (9, 10). A means (23) engages both support members (15, 18). The means (23) is configured to pivotally displace both support members (15, 18), and thereby both said rollers (9, 10), towards or away from each other such that the rollers (9, 10) provide sufficient contact with the cable (4) to drive cables of various diameters through said passage (3).
A CABLE FEEDER

Field of the Invention

The present invention relates to a cable feeder and in particular to a cable feeder for inserting cables of varying diameters into drill bore holes of a mine shaft to support the roof or walls of a mine.

Background of the Invention

In underground mining, such as coal mining, it is common to reinforce or support the roof and walls of the mine shaft or tunnel to prevent the roof and walls collapsing which can in certain circumstances cause significant loss of life and machinery.

Many types of reinforcement methods and apparatus have been developed in an attempt to secure a mine shaft roof and walls. One such method is by use of anchor bolts of various shapes and sizes which are inserted into respective bore holes. Cables, meshing and the like, are strung between the ends of those anchor bolts to support the roof or wall. Various methods of grouting or gluing the anchor bolts in the bore holes are also utilized to provide a more secure anchor. Another method is to insert a steel cable or the like into the bore hole rather than using a fixed rigid elongated anchor bolt. In this method, miners physically force the cable into the bore hole and when in position, insert grouting, bonding material or the like into the bore hole and around the cable to ensure the cable is securely fixed and anchored to the surrounding rock. Stiffening material, a drive head or the like can also be added to the front or first end of the cable to assist with driving the cable into the bore hole.

When installing a cable into a bore hole heavy manual handling is required by the miner to push the cable into the bore hole. The relative stiffness of the cable and the heavy weight of the cable means that manual handling is very difficult, time consuming and can easily lead to injuries to the miners. Also, the manual exertion involved in pushing a cable into a bore hole in some circumstances results in the cable not fully penetrating the bore hole which can lead to a less than satisfactory anchor in the mine roof or wall.
Accordingly, there is a need to provide an apparatus to provide mechanical assistance to a miner to reduce the physical handling of mine cables when being inserted into pre-drilled overhead anchor bore holes.

**Object of the Invention**

It is an object of the present invention to substantially overcome or at least ameliorate one or more of the disadvantages of the prior art, or to at least provide a useful alternative.

**Summary of the Invention**

An aspect of the present invention provides a cable feeder, including:

- a body having a passage through which a cable can pass;
- a first roller and a second roller, both said rollers located adjacent said passage to engage said cable in use, said first roller being supported by a first support member and said second roller being supported by a second support member, wherein each said support member is pivotally displaceable with respect to said passage;
- an actuator to drive at least one of said rollers; and
- a means engaging both said support members, said means configured to pivotally displace both support members, and thereby both said rollers, towards and away from each other such that said rollers provide sufficient contact with said cable to drive cables of various diameters through said passage.

Preferably, said means to move said rollers includes said support members. 

Preferably, said means to move said rollers includes an arm to engage said first and second support members. 

Preferably, said actuator of said driven roller is a rotary actuator.

Preferably, said means to move said rollers includes a linear actuator to drive said arm.

Preferably, in use, said linear actuator provides a constant force between said rollers and cable.

Preferably, in use, said arm moves said support members to provide sufficient contact between said rollers and said cable to drive said cable through said passage.
Preferably, each of said support members is adapted for angular movement about respective parallel longitudinal axes, said linear actuator rotating said support members about said respective axes.

Preferably, said cable is a mine anchor cable.

**Brief Description of the Drawings**

A preferred embodiment of the invention will now be described, by way of example only, with reference to the accompanying drawings, wherein:

Fig. 1 is a partially see through perspective view of a cable feeder of an embodiment of the present invention;

Fig. 2 is a front view of Fig. 1;

Fig. 3 is an exploded parts view of Fig. 1;

Fig. 4 is a further perspective view of Fig. 1;

Fig. 5 is a top view of Fig. 4;

Fig. 6 is a first side view of Fig. 4;

Fig. 7 is a front view of Fig. 4;

Fig. 8 is a second side view of Fig. 4;

Fig. 9 is a working top view of an embodiment of the present invention;

Fig. 10 is a working top view of an embodiment of the present invention; and

Fig. 11 is a working top view of an embodiment of the present invention.

**Detailed Description of the Preferred Embodiments**

There is schematically depicted herein a cable feeder 1 including a body 2 having a passage 3 through which a cable 4 can pass. A pair of rollers 9, 10 are located adjacent the passage 3 to engage the cable in use. At least one of the rollers 9, 10 is a driven roller 9. An actuator 12 drives the driven roller 9. The rollers 9, 10 are movable towards or away from each other to provide sufficient contact with the cable 4 to drive cables of various diameters through
the passage 3. As best seen in Figures 1, 3, 4 and 5, the driven roller 9 is supported by a first support member 15. The first support member 15 being pivotally movable with respect to the passage 3 about an axis XX and pivot pin 16. The other roller 10 is supported by a second support member 18. The second support member 18 being pivotally movable about axis YY and pivot pin 20. The means to move the rollers 9, 10 includes the support members 15, 18. The means to move the rollers as best seen in Figures 3, 6 and 9 to 11 includes an arm 22 to engage the first and second support members 15, 18. The arm 22 is driven by a linear actuator 23 having a movable shaft 24 with a gripping portion at one end 25. The linear actuator 23 can also pivot about an axis WW and pin 19. The gripping portion 25 is rotatably connected to one end 26 of arm 22 to allow rotation about an axis ZZ. The end 26 and axis ZZ are aligned with an end 30 of first support member 15. The other end 32 of arm 22 is connected to one end 35 of the second member 18 about a pivot having an axis VV. As can be seen in Figures 9 to 11, the other end 32 of arm 22 and the end 35 of the second member 18 are able to move angularly while pivoting about the axis VV with respect to each other. The ends 30, 35 are connected to the arm 22 by way of pins 37.

In use, the arm 22 moves the support members 15, 18 to provide sufficient contact between the rollers 9, 10 and the cable 4 to drive the cable 4 through the passage 3. The support members 15, 18 are adapted for angular movement about the axes XX, YY. The axes XX, YY, VV, ZZ and WW are preferably all parallel longitudinal axes extending perpendicular to the body 2. The linear actuator 23 rotates the support members 15, 18 about the respective axes XX, YY. The actuator 12 of the driven roller 9 is in a preferred form a rotary actuator. However, it should be appreciated that other common forms of mechanical and electrical means of moving rollers 9, 10 could be utilized. In a preferred form, the linear actuator 23 provides a constant force between the rollers 9, 10 and the cable 4. It should however be appreciated that there could be a plurality of rollers and more than one roller could be driven. For example, there could be four rollers, two of those rollers being driven. The body 2 could also include side plates 40 or the like which can be secured to the body 2 by way of fastening means 42 or the like, various other fastening systems including nuts, bolts and securing plates 45 could be utilized to secure the body 2 together.

The cable feeder 1 therefore provides a rotary actuator 12 to roll a cable 4 into a pre-drilled bore hole in a mine roof. By use of a linear actuator 23, the arm 22 (which acts as a swinging mechanical linkage as best seen in Figures 9 to 11) causes the cable 4 to be engaged by the rollers 9, 10 no matter what diameter the cable 4 is due to the constant force provided by
the actuator 23. In one form, the rollers will "pinch" the cable 4. The passage 3 may also include an access way 51.

The present invention, at least in a preferred embodiment, would be best utilized in underground coal mining for primary support on continuous miners and secondary support on jumbo style units and for all rock strata securing systems that employ cables for anchoring. Advantageously, the present invention at least in a preferred form, provides a reduced manual handling of cables, increases the speed to complete the task of inserting cables into bore holes, could reduce the number of miners required to complete the anchoring of a roof or wall and provide additional safety to miners.

Although the invention has been described with reference to specific examples, it will be appreciated by those skilled in the art that the invention may be embodied in many other forms.
1. A cable feeder, including:
   a body having a passage through which a cable can pass;
   a first roller and a second roller, both said rollers located adjacent said passage to
   engage said cable in use, said first roller being supported by a first support member and said
   second roller being supported by a second support member, wherein each said support member is
   pivotally displaceable with respect to said passage;
   an actuator to drive at least one of said rollers; and
   a means engaging both said support members, said means configured to pivotally
   displace both support members, and thereby both said rollers, towards or away from each other
   such that said rollers provide sufficient contact with said cable to drive cables of various
   diameters through said passage.

2. The cable feeder of claim 1, wherein said means to move said rollers includes
   said support members.

3. The cable feeder of claim 1, wherein said means to move said rollers includes
   an arm to engage said first and second support members.

4. The cable feeder of claim 1, wherein said actuator of said driven roller is a
   rotary actuator.

5. The cable feeder of claim 3 or 4, wherein said means to move said rollers
   includes a linear actuator to drive said arm.

6. The cable feeder of claim 5, wherein, in use, said linear actuator provides a
   constant force between said rollers and cable.

7. The cable feeder of any one of claims 3 to 6, wherein, in use, said arm moves
   said support members to provide sufficient contact between said rollers and said cable to drive
   said cable through said passage.

8. The cable feeder of any one of claims 5 to 7, wherein each of said support
   members is adapted for angular movement about respective parallel longitudinal axes, said linear
   actuator rotating said support members about said respective axes.

9. The cable feeder of claim 1, wherein said cable is a mine anchor cable.
10. A cable feeder, substantially as herein described with reference to the accompanying drawings.

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