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CABLE WIPER

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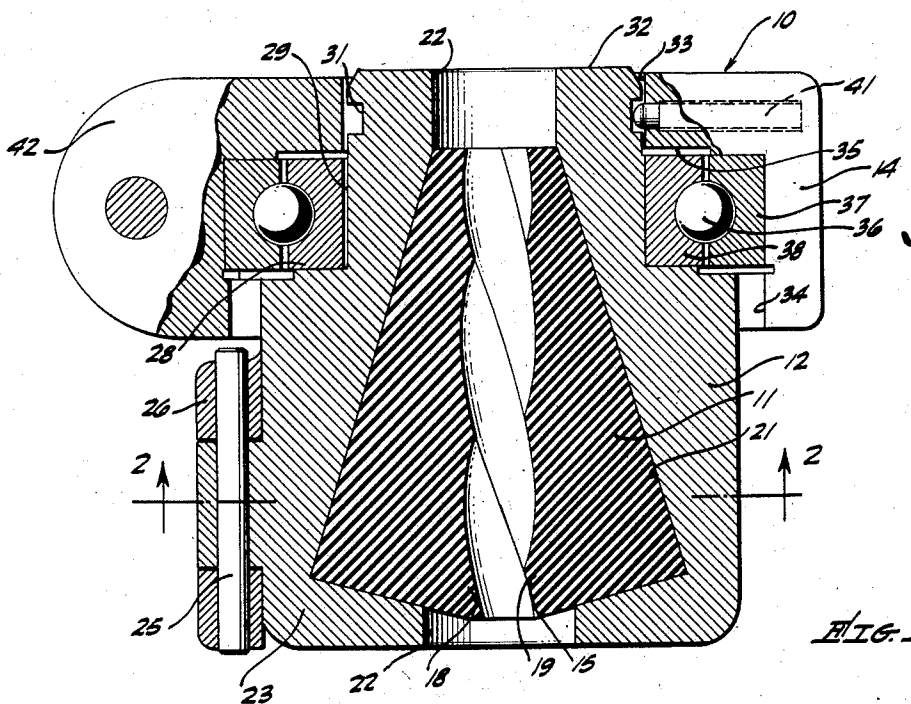


FIG. 1.

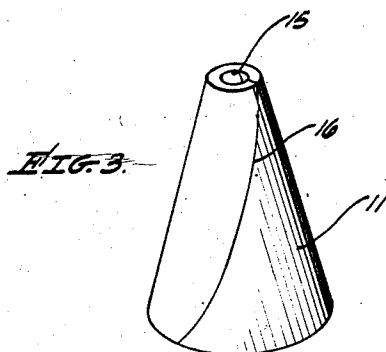


FIG. 3.

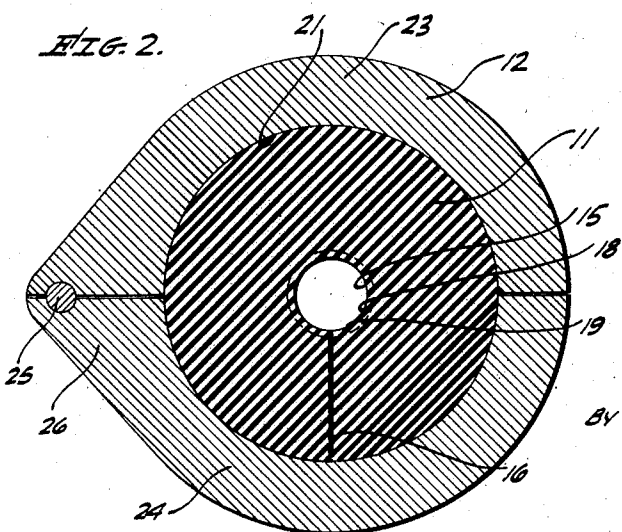


FIG. 2.

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CABLE WIPER

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2 Claims. (Cl. 15—210)

This invention relates to cable wiping or cleaning devices and more particularly to an improved cable wiping device for removing foreign material from the surface of a stranded or wound cable.

The use of cable wiping or cleaning devices for removing foreign material from the surface of stranded cables and wire rope has become quite general for use in connection with oil field practice and similar operations. The more common practice has been to pass the cable through a stationary elastomeric body having a hole smaller in diameter than the diameter of the cable in order that edge contact between the elastomeric body and the cable could be achieved. Complete wiping contact is difficult due to the non-circular and irregular circumference of the cable and the spiraling effect of the strands of the cable as it passes through the wiper. Various methods of obtaining clean wiping contact have been attempted in the prior art, the most common being that of applying compressive force to the elastomeric body to distort the body sufficiently to cause the flexible material to flow into the narrow spaces and irregularities between the adjacent strands to conform to the external surface of the cable. In devices of this type, however, wherein complete contact is attempted by distorting the flexible wiping body, high friction load between the surface of the elastomeric body and the cable passing through the body results. For example, in cleaning cable which is being removed from an oil well, a cable wiping device is positioned above the well and the cable is removed from the well through the opening in the cable wiping body. Since the cable to be cleaned may be of extensive length it is usually removed at high speed and the high friction forces which result when complete contact is attempted by methods of the prior art result in rapid wear and deterioration of the wiper body as it is distorted and burned by the cable passing through. Wear of the body quickly results in incomplete contact and sufficient cleaning action is no longer possible.

Accordingly, it is an object of the present invention to provide an improved cleaning device for cables and wire rope which has a useful life in excess of those devices heretofore known to the art.

It is another object of the present invention to provide an improved cable cleaning device for removing foreign matter from the surface of stranded cables and wire ropes which is in wiping contact with the complete circumferential surface of the cable and thus has increased efficiency in cleaning and wiping operations.

It is a further object of the present invention to provide an improved cable cleaning device for removing foreign material from the surface of stranded cables and wire ropes in which the elastomeric body is not appreciably distorted and does not create an increased friction load on the cable during cleaning operations.

The cable wiping device of the present invention includes an elastomeric body having an opening extending longitudinally of the body through which the cable to be wiped is passed. The internal surface of the open-

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ing is mateable as a female element to the cable as a male element. The elastomeric wiping body is rotatably mounted to allow rotation of the body about the longitudinal axis of the opening as the relatively non-rotating cable passes through the opening and imparts relative rotation to the body.

The novel features which are believed to be characteristic of the invention, both as to its organization and method of operation, together with further objects and advantages thereof will be better understood from the following description considered in connection with the accompanying drawing, in which a presently preferred embodiment of the invention is illustrated by way of example. It is to be expressly understood, however, that the drawing is for the purpose of illustration and description only and is not intended as a definition of the limits of the invention.

Fig. 1 is a sectional view of a presently preferred embodiment of the cable wiping device of the present invention;

Fig. 2 is a view taken along line 2—2 of Fig. 1;

Fig. 3 is a view of the elastomeric body.

Referring to the figures, the cable wiper 10 of the present invention includes a wiper body 11, a body housing 12 and a mounting means 14. Although the external configuration of the wiper body is not critical, in this embodiment the body 11 is substantially frusto-conical but with a conically tapered bottom surface to allow ease of assembly. In addition, the conical configuration provides a tightening force on the cable as it passes upward, as will be seen from the following description. The wiper body 11 is formed of elastomeric material and defines an opening 15 which extends longitudinally through the body 11 symmetrically about the centerline of the body 11. The wiper body is split on one radius throughout its length such that the body 11 can be distorted and opened to allow placement of the body about the cable to be wiped. The split 16 may be positioned at an angle to the longitudinal axis as shown in Fig. 3 in order to prevent possible coincidence of the split 16 and the junction line of the housing sections described hereinafter.

The internal surface 18 of the body 11 is formed as a mateable female element with the cable or wire rope as the male element. For example, if the cable wiper of the present invention is to be used to wipe and clean a three-quarter inch diameter six strand wire rope the internal surface 18 of the body 11 will be a female mold image conforming to the configuration of the surface of the wire rope. Thus, the depressions in the wire rope between adjacent individual strands of the wire rope will appear as spiraling raised surfaces 19 on the internal surface 18. In the present embodiment the internal surface 18 is formed by utilizing a length of wire rope, similar to that which is to be wiped, as the core piece during the molding and formation of the wiper body 11. Thus, an elastomeric material which will not adhere to the wire rope is molded about a piece of wire rope which has been properly positioned and aligned in the mold. After the elastomeric material has hardened, or set, the wire rope is removed from the body 11 by turning it out of the body. An impression of the wire rope is then left on the surface 18 of the opening and the internal surface 18 is mateable with wire rope or cable of that size and type.

The wiper body 11 is positioned within the rigid housing 12 which is formed of metal or other suitable rigid material in the form of two sections which may be opened to insert or remove the wiper body. The housing 12 defines a cavity 21 having an internal configuration mateable with the external configuration of the wiper body 11 and positioned symmetrically about the

longitudinal centerline of the housing. The housing also defines a longitudinal opening 22 coextensive with opposed ends of the cavity 21. The opening 22 extending from the cavity 21 has a diameter substantially greater than the diameter of the opening 15 through the wiper body 11 and is symmetrical with respect to the centerline of the housing. The housing includes two similar sections 23 and 24 which are connected by a hinge pin 25 through mating bosses 26 affixed to the respective sections of the housing. The hinge pin 25 lies in a radial plane of the housing parallel to the centerline of the housing in order that the two sections 23, 24 may be swung open to remove and insert the wiper body 11 and wire rope to be cleaned. The external configuration of the housing 12 includes an annular bearing shoulder 28 and a cylindrical section 29 which is symmetrical with the centerline of the housing and extends axially from the inner diameter of the shoulder 28. An annular detent groove 31 is provided around the circumference of the cylindrical section 29 proximate the end 32 of the housing 12.

The housing 12 is rotatably mateable with a stationary collar 14 when the two sections of the housing are closed. The collar 14 has a first longitudinal opening 33 therethrough having a diameter substantially equal to but greater than the diameter of the cylindrical section 29 of the housing 12. A second opening 34 longitudinally coextensive with the first longitudinally opening 33 has a diameter substantially greater than the first opening 33 and greater than the outside diameter of the housing 12, thus forming a shoulder 35 perpendicular to the longitudinal axis of the collar.

A set of bearings 36 is mounted in the collar with the outer race 37 positioned adjacent the surface of the second opening 34 and shoulder 35. The housing 12 is mateable with the collar such that when the cylindrical section 29 is inserted through the first opening 33 the shoulder 28 of the housing is in contact with the inner race 38 of the bearings 36 which is also in contact with the surface of the cylindrical section 29 of the housing. The housing is thus in contact only with the inner race of the bearings when positioned within the collar and is, therefore, rotatably mounted with respect to the collar. A plurality of spring loaded detents 41, one of which is shown, are mounted in the collar at the position of the annular groove 31 when the housing is inserted into the collar. Thus, in the assembled position of the cable wiper the detents extend into the detent groove of the housing and retain the housing in the proper longitudinal position with respect to the collar. Means for mounting the collar in a stationary location are provided. In the present embodiment a plurality of bosses 42, one of which is shown, are affixed to the collar and adapted for mounting by bolts or similar means to a stationary platform or object. Although a stationary collar of the type described has been utilized in the present embodiment, the means for rotatably mounting the wiping body 11 may take various forms depending upon the application and conditions of use.

In the operation of the cable wiper to wipe and clean a wire rope in drilling operations, the collar 14 is positioned surrounding the wire rope while an end of the wire rope is available, and the collar is then stationarily mounted. When it is necessary to wipe the wire rope, for example, when removing it from a wet hole, the wiper body 11 having a longitudinal opening mateable with the size and type of wire rope to be wiped, is opened along the split 16 and positioned upon the wire rope beneath the collar. The wiper body is rotated or moved slightly to bring the wiper body and wire rope into mating engagement. The housing 12 is opened and positioned about the wire rope and wiper body and closed to encompass the wiper body within the cavity 21 of the housing. The housing and wiper body are then raised,

along the wire rope and into the collar by rotating the housing to move it upward to the position where the detents 41 in the collar engage the detent groove 31 in the housing. The cable wiper is thus assembled as shown in Fig. 1.

The wire rope is drawn upward through the cable wiper and is cleaned and wiped by the passage through the wiper body. As the wire rope passes through the opening it imparts a rotary motion to the wiper body and housing which rotate freely with respect to the collar. By imparting rotation to the wiper by movement of the wire rope, little or no frictional force between the wire rope and wiper body results and superior cleaning action is achieved by the complete contact between the wire rope and wiper.

Thus, the present invention provides a cable wiper having complete circumferential contact with the cable or wire rope to be wiped without distortion of the wiping means. The present cable wiper allows removal of foreign material from the surface of wound or stranded cables and wire ropes without creating high friction forces and with a resulting longer life of the wiper device than has heretofore been possible by means known to the prior art.

It is to be understood that the foregoing disclosure relates to only a preferred embodiment of the invention and that numerous modifications or alterations may be made therein without departing from the spirit and scope of the invention as set forth in the claims.

I claim:

1. A cable wiping device for wiping and cleaning stranded cable comprising: an elastomeric wiper body, said body defining a longitudinal opening therethrough, said opening having an internal configuration substantially equal to the external configuration of said stranded cable, said body being split throughout its length, whereby said body may be placed upon said cable; a rigid housing for said body, said housing comprising two radially hinged sections, said housing defining a longitudinal cavity having an internal configuration substantially equal to the external configuration of said body, said housing defining a longitudinal opening therethrough coextensive with said cavity, said opening having a diameter substantially greater than the diameter of said cable; a collar stationarily mounted surrounding said cable and means for rotatably mounting said housing in said collar.

2. A cable wiping device for wiping and cleaning stranded cable comprising: an elastomeric wiper body, said body defining a longitudinal opening therethrough, said opening having an internal configuration substantially equal to the external configuration of said stranded cable, said body having a substantially frusto-conical external configuration, said body being split throughout its length whereby said body may be placed upon said cable; a rigid housing surrounding said body, said housing comprising two radially hinged sections, said housing defining a longitudinal cavity substantially frusto-conical in configuration and substantially mateable with said body, said housing defining a longitudinal opening therethrough coextensive with said cavity, said opening having a diameter substantially greater than the diameter of said cable; a stationary collar mounted surrounding said cable, said housing rotatably mounted in said collar whereby said body and housing are rotated in said collar as said cable is pulled through said body.

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