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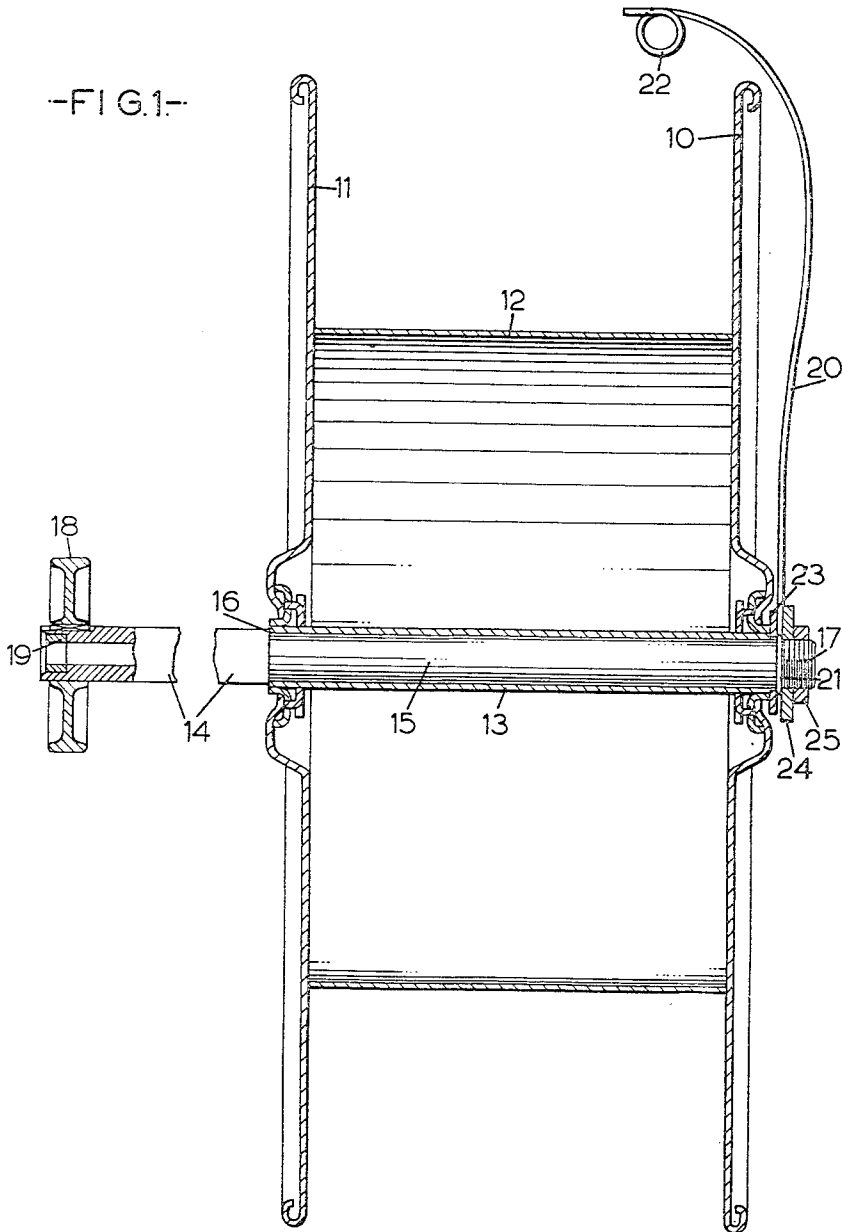
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3,484,054

METHOD AND MEANS FOR DISPENSING WIRE FROM A REEL

Filed March 20, 1967

4 Sheets-Sheet 1



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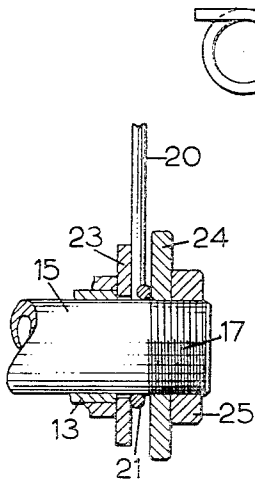
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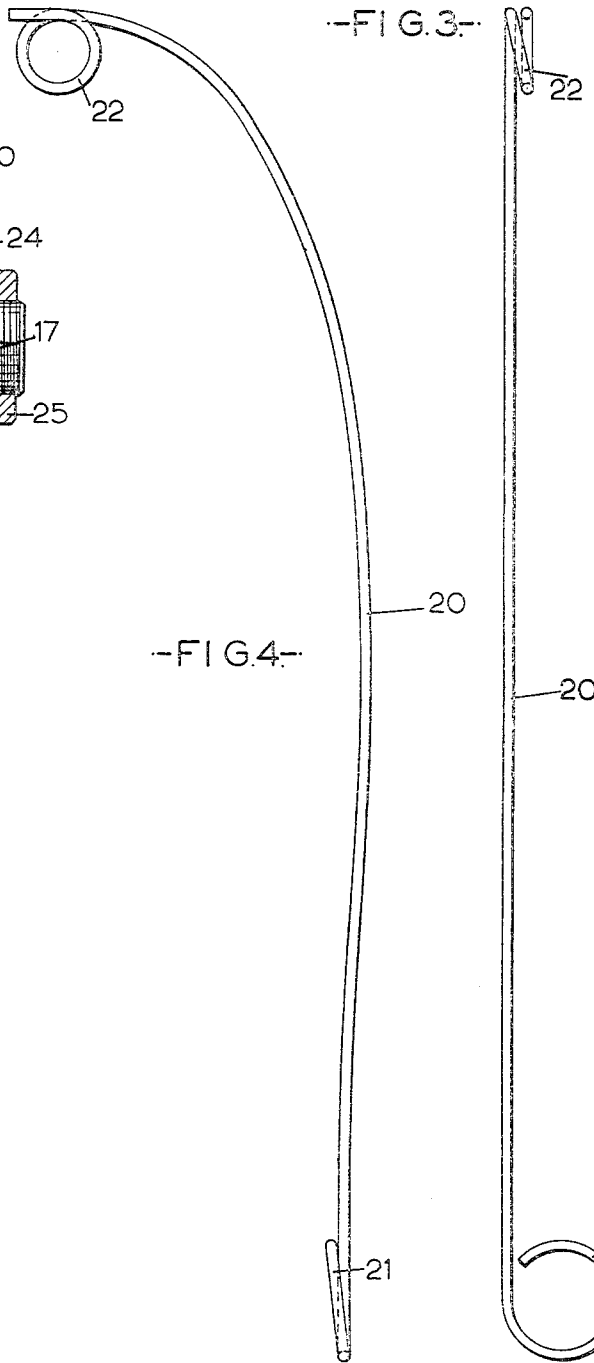
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-FIG. 2-



-FIG. 4-

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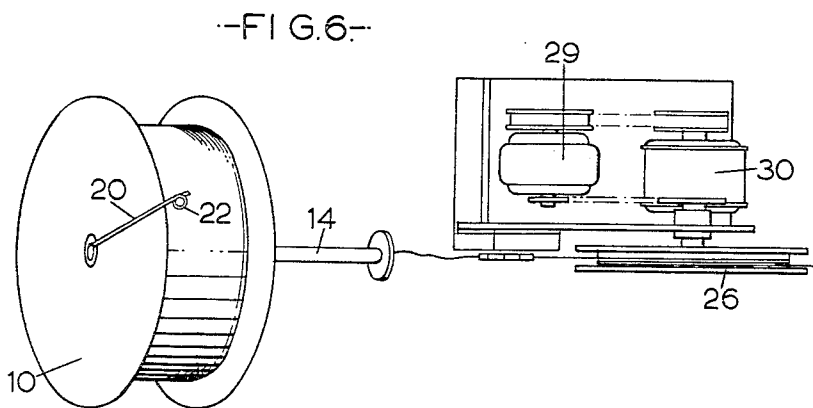
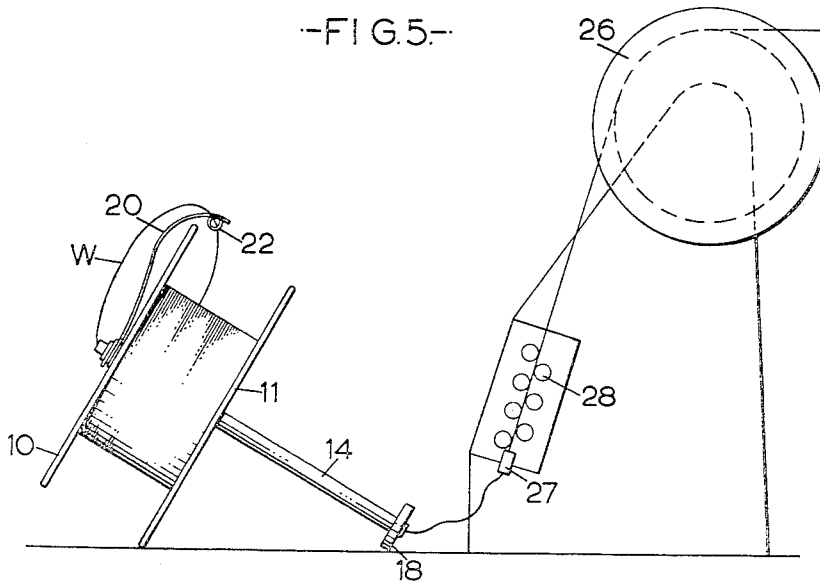
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METHOD AND MEANS FOR DISPENSING WIRE FROM A REEL

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4 Sheets-Sheet 3



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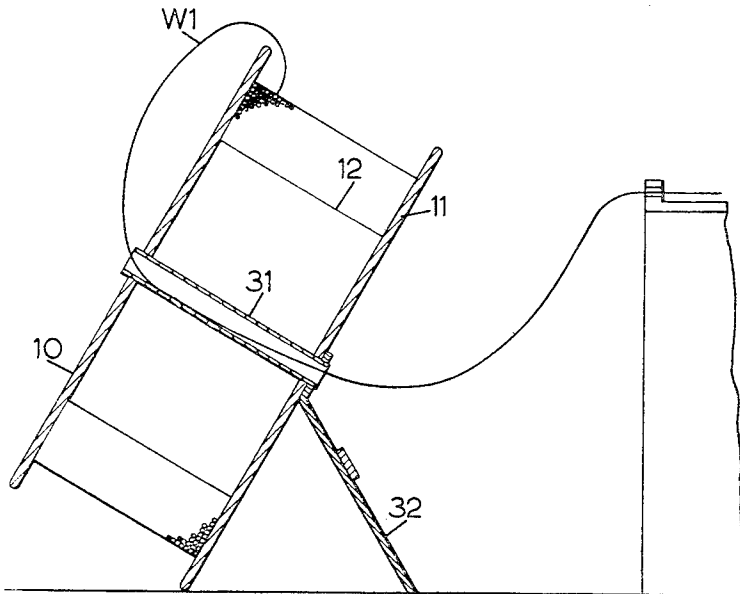
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METHOD AND MEANS FOR DISPENSING WIRE FROM A REEL

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-FIG.7-



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3,484,054

METHOD AND MEANS FOR DISPENSING WIRE FROM A REEL

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Int. Cl. B65h 49/00

U.S. Cl. 242—128

3 Claims

ABSTRACT OF THE DISCLOSURE

The invention provides an arrangement for dispensing wire from a reel in which the reel is tilted and supported so that a periphery of one of its flanges is raised. One end of a tubular guide member is inserted through the bore of the reel and beyond one end thereof so as to form a stand for supporting the reel in this tilted attitude. A guide member is rotatably mounted on the other end of the tube so as to be free to gyrate about the raised flange of the reel. The wire to be dispensed is taken from the reel, through an eyelet on the extremity of said gyrating guide member and then through the tubular guide member to a capstan and thence to a wire consuming machine. As the capstan is operated and a pull is applied to the wire a loop of wire is formed which gyrates with the guide member about the raised flange of the reel and uncoils the wire from the reel, the wire of the loop then passing through the tubular guide member.

In the automatic manufacture of wire products (e.g. wire springs) it would be very convenient and advantageous to have the wire stock on relatively large reels so that the manufacturing process can operate without interruption over a long period. Heretofore, however, this has not been possible or at least convenient because of the difficulty and equity required in lifting and mounting a heavy reel for rotation so that the wire can be taken off it. Furthermore, the strain to which the wire is subjected in pulling it off a rotatably supported reel, particularly during initial starting and when the feed is intermittent, puts a limit on the weight of the reel.

In other words, the size and weight of reel which wire makers could heretofore use to market their products has been very materially limited.

An object of the present invention is to provide a method and means whereby wire can readily be taken off or dispensed from large and heavy reels (e.g. reels carrying 1,000 lbs. or more of wire) without the necessity of providing a stand for rotatably supporting the reel and without the absolute necessity for mechanical handling equipment to position the reel ready for the wire to be taken off it.

According to the present invention there is provided a method of taking off or dispensing wire from a reel wherein the reel is tilted and supported so that the periphery of one of its flanges or cheek plates is raised and the wire is taken through the bore of the reel so that when a pull is applied to the wire (e.g. by a take-off mechanism) a loop of wire is formed which gyrates about said raised flange and uncoils the wire from the reel, the wire of the loop then passing through the bore of the reel.

Preferably the wire is taken through a guide element (e.g. a pigtail or eyelet) mounted on the reel so as to gyrate about the raised flange thereof. This prevents the radius of gyration of the loop becoming excessive and also helps to prevent more than one convolution of wire coming off the reel at the same time.

A further advantage of the gyrating guide element is that it is possible to apply the invention to the dispensing of various types of wire from a reel. For instance, using the gyrating guide element, the invention can be applied not only to the dispensing of hard drawn mild steel wire and high carbon, high tensile wire (e.g. for the manufacture of springs) but also to the dispensing of annealed or soft wire and also wire of fairly fine gauge.

In some cases it is desirable to apply frictional restraint to the gyrating guide element.

The present invention also provides wire take-off or dispensing means, for use in the method above set forth, comprising a rest member or stand for supporting the reel in its tilted attitude and a guide tube for insertion through the bore of the reel so as to guide the wire therethrough.

Conveniently the guide tube is elongated so as to extend beyond one side of the reel and form the rest or stand, or a part thereof, for supporting the reel in its tilted attitude. The extended portion of the tube which forms the rest or stand for the reel may be provided at or near its extremity with a wheel or roller. This facilitates maneuvering of the reel, when tilted, into the most convenient position with respect to a machine which is to take the wire off the reel.

Preferably the wire take-off means further comprises a guide member having a guide element (e.g. a pigtail or eyelet) and adapted to be rotatably mounted on the reel so that said guide element, through which the wire is led, will gyrate about the raised flange of the reel. Conveniently said guide member is mounted for rotation on an end of the guide tube which lies adjacent the raised flange of the reel.

Two particular embodiments of the invention will now be described, by way of example, with reference to the accompanying drawings in which:

FIGURE 1 is a longitudinal sectional view of one form of reel and wire dispensing means according to the invention,

FIGURE 2 is a fragmentary view of a part of FIGURE 1 to a larger scale,

FIGURES 3 and 4 are detail views of a guide arm forming part of the embodiment of the invention shown in FIGURES 1 and 2,

FIGURE 5 is a side elevation of the wire take-off means in use,

FIGURE 6 is a plan view of FIGURE 5, and

FIGURE 7 is a sectional side elevation of a further embodiment of the invention.

Referring to the embodiment of the invention shown in FIGURES 1 to 6 of the drawings, the reel, which may be of conventional form, comprises cheek plates 10 and 11, a nave or barrel 12, on which the wire is wound, and a tubular hub or bore 13. The guide tube 14 for the wire has a reduced portion 15 which passes through the hub 13, a shoulder 16 being formed on the guide tube, which shoulder butts up against one end of the hub 13.

The portion 15 of the guide tube has its end screw-threaded as indicated at 17. The free end of the portion 14 of the guide tube is provided with a small wheel or roller 18 which may be keyed or welded to the guide tube or be freely rotatable thereon. This end of the guide tube is also provided with a tungsten carbide bush 19. A similar bush may be provided in the screwthreaded end 17 of the guide tube. Such a bush provides a smooth guide surface for the wire and is not subjected to material wear.

The guide arm 20 may be a piece of spring wire or rod coiled into a loop 21 at one end and into an eyelet or pigtail 22 at its other end.

To apply the wire take-off means, so far described, to the reel the portion 15 of the guide tube is inserted through the hub 13 of the reel, as shown in FIGURE 1,

a washer 23 is located over the protruding end of the tube followed by the loop 21 of the guide arm 20. A knurled nut 24 is then screwed onto the thread 17 followed by a knurled locknut 25.

The nut 24 is not tightened to such an extent as to prevent rotation of the guide arm 20, on the guide tube, but sufficiently to apply some frictional restraint to the rotation of the arm. When the nut 24 has been adjusted to the required degree it is locked by means of the locknut 25.

The wire W from the reel is taken through the eyelet 22 of the guide arm 20, through the guide tube 13, 14 and out of the latter by way of the bush 19.

The reel is then tilted until it is supported by the roller 18 coming to rest on the ground as shown in FIGURES 5 and 6.

As the wire is drawn through the guide tube (e.g. by the consuming machine) the guide element or pigtail 22 and the loop of wire passing through it gyrate about the raised flange 10 of the reel and the wire is neatly taken off the reel.

FIGURES 5 and 6 also show a pull-off mechanism for use in conjunction with the wire pay-off or dispensing mechanism, above described, in applications such as the production of high precision components (e.g. springs) where there is a limitation on the acceptable amount of axial twist in the wire and the load on the wire consuming machine must be uniform and minimal. For most applications, however, the pay-off mechanism is satisfactory without the pull-off mechanism. The pull-off mechanism comprises a capstan 26, a straightening bush 27 and dressing or killing rolls 28.

The capstan 26 is driven from an electric motor 29 through any suitable form of variable speed gearing 30 so that the rate of rotation of the capstan can be adjusted.

The wire is taken from the capstan 24 by, for example, the intermittently operating feed mechanism of a wire spring-making machine or other wire working machine. The capstan is driven at an appropriate speed which is a determined amount faster than that of the feed mechanism of the wire consuming machine. The reduced friction between the capstan and the wire during dwell periods of said feed mechanism, permits the capstan to slip within the convolutions of wire on it. The number of convolutions of wire on the capstan determines the load between it and the consuming machine and once determined this does not vary materially, thus ensuring uniformity of the final product of the consuming machine.

As an alternative to the guide arm arrangement 20, 21, 22 the end 17 of the guide tube may carry a false flange for the reel. In use this false flange lies against the flange 10 of the reel and it is of slightly larger diameter than said flange and has a smooth periphery against which the wire may run. This arrangement is of advantage where the periphery of the flange of the reel is damaged or in cases where the flange is not circular, e.g. is of cruciform shape.

FIGURE 7 shows a simple embodiment of the invention which may be used with some types of wire. This embodiment comprises a guide tube 31, for the wire, attached to a bracket or stand 32 for supporting the reel 10, 11, 12 in its tilted attitude as shown in FIGURE 7.

As the wire is drawn through the tube 31 the loop W1 gyrates about the raised flange 10 of the reel or about a false flange fitted thereto as previously described.

It will be noted that the position and dimensions of the stand 32 are such that the stand does not prevent

the reel being rolled in the normal way on its flanges 10 and 11.

The stand 32 is, of course, designed and positioned with respect to the centre of gravity of the full reel so that it will provide a stable support for the reel in its tilted attitude. This also applies, of course, to the case where the stand is supported by an extension of the guide tube as shown in FIGURE 5.

The arrangement shown in FIGURE 7 has been used satisfactorily for the dispensing of hard drawn mild steel and high carbon steel wire.

Means may be provided for securing the guide tube and the reel against rotation relatively to one another.

Instead of taking the wire axially out of the guide tube it may be taken out through, for example, a bush in the side wall of the tube towards the extremity thereof. The guide bush may be replaced by a rotatable pulley.

The arrangement shown in FIGURE 5 may include a stand similar to the stand 32 shown in FIGURE 7 if additional support is required for the reel in its tilted attitude.

In some cases the bore of the reel may serve as the guide tube for the wire.

The stand 32 may be in the form of an angled bracket separate from the guide tube.

We claim:

1. A method of dispensing wire from a portable reel wherein the reel is tilted onto and supported by the periphery of one of its flanges so that the periphery of its other flange is raised and the wire is taken through the bore of the reel so that when a pull is applied to the wire a loop is formed which gyrates about said raised flange and uncoils the wire from the reel, the wire of the loop then passing through the bore of the reel following which it is straightened and dressed and then taken around a capstan on which it goes slack during dwell periods of a wire consuming machine for the dispensed wire.

2. Means for dispensing wire from a portable reel comprising a stand for supporting the reel in a tilted attitude resting on the periphery of one of its flanges with its other flange raised, a guide tube for insertion through a bore of the reel, the wire to be dispensed being taken through said guide tube so that when a pull is applied to it a loop of wire is formed which gyrates about said raised flange and uncoils the wire from the reel, the wire of the loop then passing through the bore of the guide tube, and a guide member rotatable about said guide tube and having a guide element through which the wire is led, positioned so as to gyrate about the raised flange of the reel, the wire being taken through said guide element, the guide tube being elongated so as to extend beyond one side of the reel and form the stand for supporting the reel in its tilted attitude.

3. Wire dispensing means as claimed in claim 2 wherein said extended portion of the guide tube is provided at its extremity with a roller-means.

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