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SYSTEM FOR REELING OUT WIRE AND THE LIKE FROM COILS

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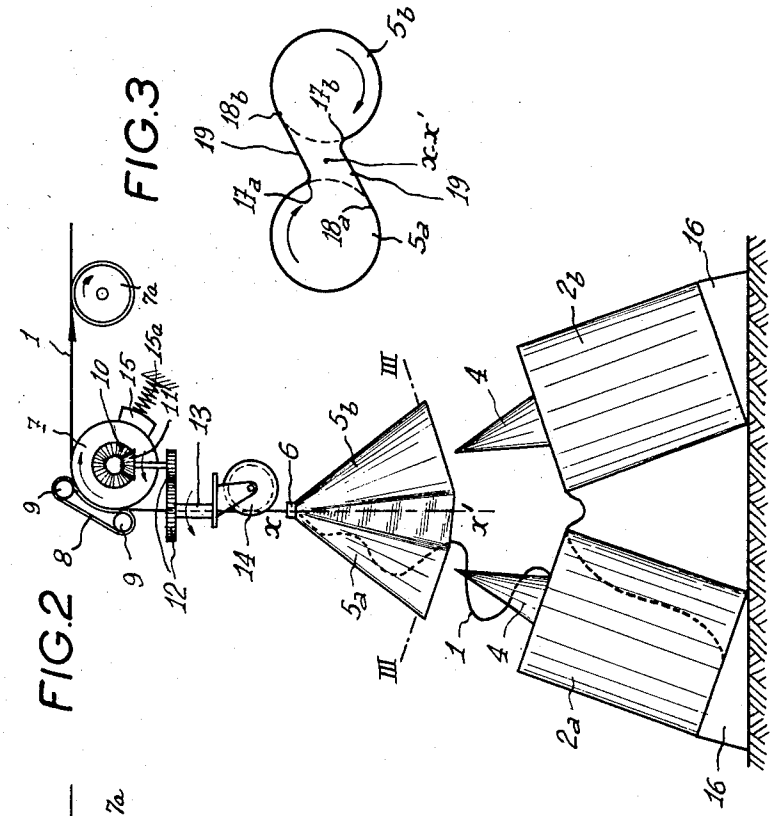

FIG. 3



FIG. 2

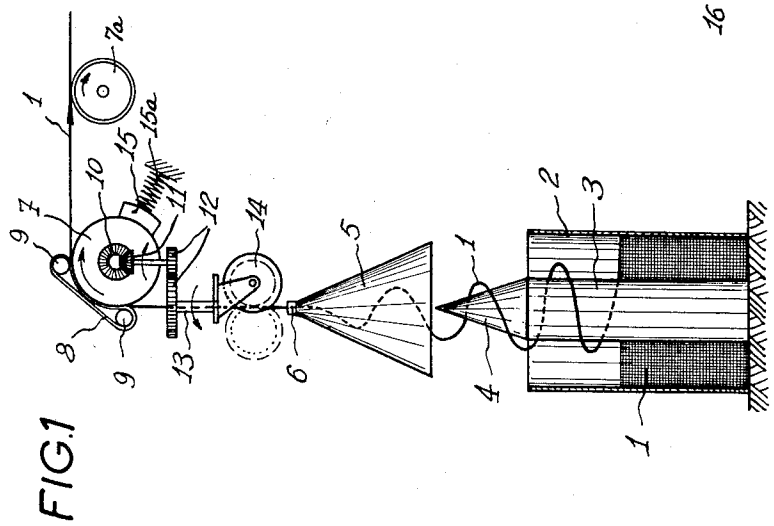

FIG. 1

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# SYSTEM FOR REELING OUT WIRE AND THE LIKE FROM COILS

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This invention relates to system for reeling out wire and similar flexible elongated elements, from coils in which the wire is stored.

In conventional reeling systems of this kind, guide means are usually provided in the form of a conical funnel overlying the coil of wire, coaxially with said coil and with the enlarged base of the funnel directed downwards. The wire as it is reeled off the coil in successive turns or loops, is passed through an outlet orifice in the apex of the funnel and is then usually trained over an idling pulley and passed to an output apparatus in which said wire is to be used, e.g. for twisting a cable.

Such reeling systems are unsatisfactory especially in cases where said wire (or other flexible element) possesses substantial stiffness, in that the loops as they are cast off the storage coil tend to tighten up and kink before they have passed through the funnel orifice and result in the necessity of shutting down the system to remove the kinks, and/or cause breakage of the wire.

It is an object of the invention to provide improved means for reeling off flexible elements such as wire from a coil thereof, which will not be liable to kinking or other similar difficulties. Another object is to provide means for uncoiling wire at increased velocity without danger of fouling and breakage. A further object is to provide improved funnel-type guide means for enabling smooth continuous transfer from one coil to another during a continuous reeling process.

Exemplary embodiments of the invention will now be described for purposes of illustration but not of limitation with reference to the accompanying diagrammatic drawings wherein:

FIG. 1 is a simplified view in elevation, partly in section, of a first embodiment of the invention;

FIG. 2 is a similar view of an embodiment of the invention involving transfer between alternate coils; and

FIG. 3 is a section on line III—III of FIG. 2.

As shown in FIG. 1, wire is stored in a coil 1 provided in a conventional barrel-shaped casing 2 having an axial core 3 around which the coils are looped. The core 3 is shown as having an upwardly projecting tapered part 4. Supported in spaced coaxial relation above the casing is a conical funnel-shaped guide member 5 formed with an apical orifice 6. Wire from the coil is pulled upwards from the store and through the orifice 6, and is then trained about an idler pulley 7 rotatable about a horizontal axis. A small endless belt device including belt 8 and sheaves 9 is provided adjacent the pulley 7 to press the wire trained about the pulley into engagement with part of the periphery of said pulley. The wire 1 issuing from the pulley 7 is then passed to some output apparatus such as a driven pulley 7*a* which exerts upon it an axial pulling force for continuously reeling the wire off the coil.

The system thus described is more or less conventional and, as noted above, the loops of wire within the funnel 5 will often tend to tighten up and kink especially if the wire is relatively stiff and the reeling speed is high. According to the invention, it has been found that this objectionable tendency of the wire can be completely overcome if there is imparted to the wire, between the store or coil thereof and the pulley 7, a twisting force in a



sense tending to open up the loops as they are cast off the coil, so that such force in effect opposes the natural tendency of the wire loops to tighten up.

In both exemplary embodiments shown herein, this twisting force is imparted by the means now to be described.

Arranged somewhat above the outlet orifice 6 in funnel 5 is a further pulley 14 rotatable about a horizontal axis and arranged so that the bottom of the grooove in said pulley is substantially tangential to the wire issuing out of the funnel outlet 6, as shown. The wire is trained about the pulley 14 in one or more turns. The pulley 14 is journalled in a support which is rotatable about a vertical axis coaxial with the path of the wire. Thus, the support for pulley 14 may, as shown, comprise an horizontal flange having fork arms projecting downwardly from it between which the pulley 14 is journalled, said flange being secured at the lower end of a tubular shaft 13 through which the wire extends. The tubular shaft 13 is supported, through any suitable means not shown, for rotation about its vertical axis. A gear transmission is provided from pulley 7 to the tubular shaft 13, said transmission including, as shown, a pair of bevel gears 10—11 and a pair of spur gears 12. Preferably the spur gears 12 are provided interchangeable for readily selecting a desired gear ratio in the transmission.

In operation, the wire 1 is pulled upwards and outwards by the feed pulley 7*a* of the output unit, and frictionally rotates the idler pulley 7. Rotation of the pulley 7 imparts through the gearing 10—11—12 a bodily rotation to the assembly comprising tubular shaft 13 and pulley 14 about the axis of the shaft 13. The gearing is such that rotation of pulley 7 clockwise, as indicated, due to the pull on the wire, rotates the pulley assembly 13—14 in the sense indicated by the arrow (clockwise as seen from the top of the system), this being the sense required, in the illustrative example, for opening or spreading out the loops of the wire 1 as they are drawn off, one by one, from the coil. It is found that by this means the kinking tendency may be completely eliminated.

The optimum gear ratio from pulley 7 to shaft 13 can be determined by trial and error since it will vary depending on the nature of the wire 1 and the reeling velocity. Generally speaking, such ratio should be held down to the minimum value which will successfully suppress the kinking tendency.

It is found that the system of the invention makes it possible safely to impart much greater higher linear feed velocities to the wire without running any danger of breakage or other mishaps.

Desirably, a brake device 15, operated through any suitable means such as a spring 15*a* is associated with the periphery of the outlet pulley 7 to adjust the tension of the wire beyond the reel-out system shown.

FIG. 2 illustrates the reel-out system of the invention as applied to an installation for continuously uncoiling wire from a plurality of reels or coils without having to interrupt the uncoiling process to change the coils. Such systems are, per se, conventional, and in them two or more casings 2*a*, 2*b*, each of which may be similar to the casing 2 shown in section in FIG. 1, are arranged so that the trailing end of the coil of wire in one casing, e.g. 2*a*, is connected with the leading end of the coil in the other casing 2*b*. When the coil in casing 2*a* is spent, the coil in casing 2*b* begins to unwind; during this time the spent casing 2*a* is removed and replaced with a fresh casing, and the leading end of the coil in it is connected with the trailing end of the coil in casing 2*b*, and so on; this procedure makes possible an uninterrupted feed of wire as will be readily understood.

In accordance with a feature of this invention, improved guide means are provided for promoting smooth

transfer between the alternate positions of the coils. The guide means comprise a dual funnel structure comprising the recessed funnel sections **5***a* and **5***b* in the general shape of a pair of similar cones having a common apex. A common outlet **6** for the wire is provided at the common apex of the two funnel sections. The spaces within the recessed conical sections **5***a* and **5***b* are interconnected by a pair of spaced parallel walls **19** (see FIG. 3) each of which merges with one of the conical portions tangentially thereto, as at **18***a* and **18***b*, and connects with the other conical portion along a generatrix at a suitable angle, as at **17***a* and **17***b*. The arrangement is symmetrical about a central vertical line *x*—*x'* extending through the common apex **6** of the funnel.

The casings **2***a* and **2***b* are supported on the ground at angled orientations by means of angular blocks or shims **16**, so that their apices converge upwardly towards the common apex **6** of the funnel, and so that each conical section **5***a* and **5***b* is coaxial with a related one of the casings **2***a* and **2***b*. It is found that with such an arrangement perfectly smooth and reliable transfer is effected alternately between the two funnel sections of the guide structure whenever one of the coils is spent and the reeling operation is switched to the other coil.

In FIG. 3 the sense of reeling of the loops from the two coils are indicated by arrows.

Since the remaining components in the system of FIG. 2 are identical with those of FIG. 1, the same reference numerals have been used to designate them and no further description thereof is needed.

It will be understood that many departures may be made from the details of the systems shown. In particular, the coiled stores of wire (or other elements) may assume forms other than the cylindrical casings with axial cores as shown, provided the elements are stored in coils.

What I claim is:

1. In a system for reeling a wire-like element off a coil, means connected to the element applying a pulling force thereto to draw off loops from the coil generally axially of the coil, recessed guide means for the element beyond the coil, a first rotatable pulley engaged by said element at a point beyond and spaced from said guide means, brake means cooperating with said first pulley for controllably retarding rotation thereof, a second rotatable pulley between the guide means and the first pulley and having at least one turn of said element trained therearound, a tubular shaft surrounding said element, means attached to said tubular shaft for supporting said second pulley for bodily rotation about an axis generally coinciding with the axis of the element, and gearing means coupled to said first pulley for rotating said supporting means bodily about said element at a predetermined angular rate.

2. In a system of the type described for uninterrupted reeling of a wire-like element from alternate ones of an interconnected pair of coils, means for supporting said coils with their axes converging towards a common point, a dual funnel-like guide structure overlying said coils and having an outlet through which said element is passed, and means connected to said element beyond said outlet for imparting an axial pulling force thereto, said structure comprising two similar recessed cone portions respectively coaxial with said coils and having a common apex positioned substantially at said point of convergence, said outlet being formed at said common apex, and means defining a passage connecting the inner recesses of said cone portions, said passage-defining means comprising a pair of spaced walls one wall tangent to one of said cone sections and angularly intersecting the other cone portions along a generatrix thereof, and the other wall tangent to the other of said cone portions and angularly intersecting the one cone portion along a generatrix thereof, said generatrices being symmetrical about an axis bisecting the axes of said cone portions.

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