

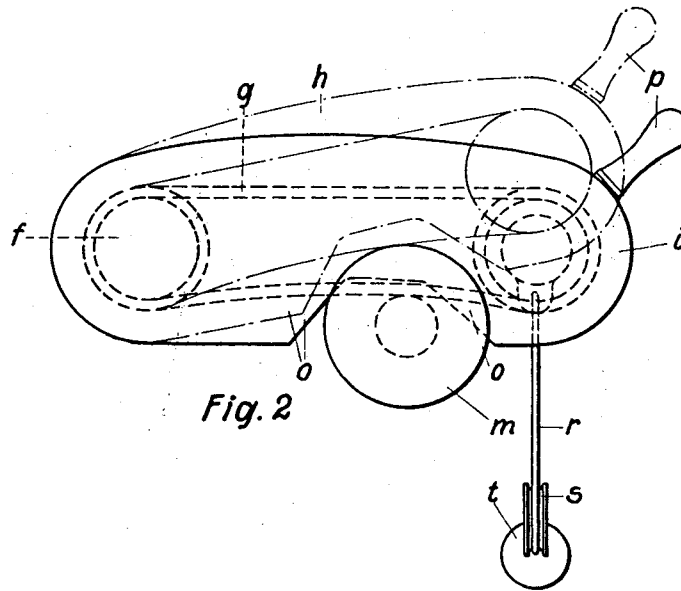
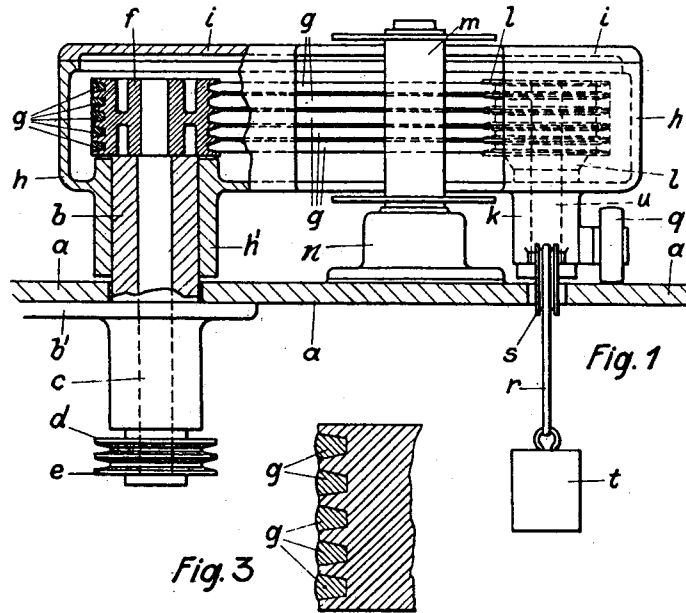
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APPARATUS FOR WINDING WIRE ON ROTARY DRUMS

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APPARATUS FOR WINDING WIRE ON
ROTARY DRUMS

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My invention relates to improvements in apparatus for winding wire on rotary drums, and more particularly in apparatus comprising a driving member for the said drum which is in frictional engagement with the body of wire being wound on the drum, so that the circumferential velocity of the wire being wound on the drum remains constant. In apparatus of this type such as are now in use the power is transmitted to the drum by means of a broad endless belt frictionally engaging the body of wire. Though it is assumed that the velocity thus imparted to the wire is constant, it has been found in practice that the wire is sometimes broken. The object of the improvements is to provide an apparatus in which the danger of thus breaking the wire is reduced to a minimum, and with this object in view my invention consists in dividing the member frictionally engaging the circumference of the body of wire into several sections engaging the body of wire one beside the other and independently of one another. As far as I understand the matter at present the reason for the better operation of such driving members resides in the fact that the body of wire has not the same diameter all over the length of the drum, and very small differences in the diameter and therefore in the circumferential velocity are sufficient to cause an objectionable increase of the tension in the wire which may result in a breaking of the wire.

Another object of the improvements is to provide an apparatus in which the members such as belts frictionally engaging the circumference of the body of wire are formed at their outer sides engaging the body of wire with rounded surfaces. I believe that when thus constructing the belts they may make contact with the body of wire only with their median portions, while the edges of the belt do not engage the body of wire or the wire passing on the drum.

Finally an object of the improvements is to provide the apparatus with belts which taper in cross-section from the outer to the inner side, the grooves made in the pulleys being shaped accordingly.

For the purpose of explaining the invention an example embodying the same has been shown in the accompanying drawing, in which the same letters of reference have been used in all the views to indicate corresponding parts. In said drawing,

Fig. 1 is an elevation partly in section showing the winding apparatus,

Fig. 2 is a top plan view of Fig. 1, and

Fig. 3 is a detail sectional elevation on an enlarged scale showing the rim of the belt pulleys in sectional elevation.

The wire winding apparatus may be combined for example with a machine for drawing wire. In the example shown in the figures the winding apparatus comprises a base *a* on which a frame or casing *h* is mounted for rocking about a vertical axis. As shown, a bearing block *b* is fixed to the said base by means of a flange *b'*, and on the said bearing block a bushing *h'* fixed to or made integral with the frame or casing *h* is rockingly mounted. At its free end the said frame or casing *h* is formed with a lug *k* on which a roller *q* is rotatably mounted, which is supported on the top of the base *a*. The frame or casing *h* carries a handle *p* by means of which it may be rocked about the pivotal axis *b*, as is shown in Fig. 2 in dotted lines, and it may be provided with a cover plate *i*.

In an axial bore of the bearing block *b* a shaft *c* is rotatably mounted which has a pulley *f* secured to its top end and which carries a rope pulley *d*, *e* at its bottom end, rotary movement being imparted to the shaft *c* and the pulley *f* by means of belts trained on the pulleys *d*, *e*. On a pivot bolt *u* fitted in the lug *k* a belt pulley *l* is loosely mounted. Both pulleys *f* and *l* are provided with a series of corresponding circumferential grooves which are reduced in cross-section from the outer side inwardly, and which have endless belts *g* of trapezoidal cross-section trained thereof. Preferably the said belts are rounded at their outer faces, as is best shown in Fig. 3.

At the side of the frame or casing *h* a spool or drum *m* is rotatably mounted on a vertical axis, the said axis being fixed to a bearing block *n* secured to the base *a*. Adjacent to the said drum *m* the casing or frame *h* is formed with a cut-out portion *o*, so that the belts *g* located within the casing or frame *h* are adapted for engagement with the drum *m* or the body of wire wound thereon. Preferably the belts *g* are somewhat slack on the pulleys *f* and *l*, and when the casing *h* is rocked towards the drum *m* the said belts engage the body of wire with a comparatively large circumferential surface, as is indicated in Fig. 2. The belts engage the circumference of the body of wire with uniform pressure, and for this purpose the casing *h* is acted upon by a weighted body *t* attached by means of a rope *r* to the lug *k*, the said rope *r* being trained on a pulley *s*.

In the operation of the apparatus the casing

h is pulled by the weighted body *t* towards the drum *m*, and the pulley *f* is rotated by means of the pulleys *d*, *e* in a direction for winding the wire on the drum *m*. Thus the power is transmitted to the drum *m* or the body of wire trained thereon through the intermediary of the belts *g*, the said belts being in frictional engagement with the body of wire.

By providing a plurality of endless belts *g* in lieu of a single belt slight differences in the circumferential velocity of the parts of the drum *m* or the body of wire wound thereon may be compensated by the belts *g* slightly sliding on their pulleys independently of one another. Therefore I prefer to mount the belts so that sliding on the pulleys is to some extent assisted, of course, only so far that the belts are able to transmit the necessary power to the drum *m*.

The lag of the belts *g* on the pulleys depends first on the surface of contact between the belts and the pulleys, second on the pressure of the belts on the pulley, and third on the surface condition of the contacting surfaces. When using belts having tapering cross-sections, as is shown in Fig. 3, the surface pressure is considerable only on the bottom faces of the grooves, which are comparatively narrow. Therefore, the tapering shape of the belts favours lagging thereof on the pulleys.

In the figures I have shown solid pulleys each formed with a plurality of circumferential grooves. But I wish it to be understood that my invention is not limited to this feature.

Further, the construction may be such that the belts are capable of lagging on the body of wire, or that lagging is possible between the belts and the said body of wire as well as the pulleys. In this case the lagging of the belts on the body of wire depends on the surface condition of the outer surfaces of the belts *g*, the length of the arc through which the belts are in engagement with the body of wire, and the pressure of the belts on the said body of wire. The harder and smoother the outer surface of the belts *g*, and the smaller the said arc and the pressure, the greater is the lagging of the belts on the body of wire.

The belts *g* or the outer faces thereof are preferably made from rubber or rubber reinforced by a suitable fabric, or from a fabric which is impregnated with rubber.

While in describing the invention reference has been made to a machine in which endless belts are used for imparting rotary movement to the drum and the body of wire wound thereon, and in which the belts are mounted for being moved towards the said drum, and the said drum is mounted on a stationary axis, I wish it to be understood that my invention is not limited to these features, and that the claims stating that the driving members are adapted to engage the body of wire are not intended to exclude constructions in which the

endless belts or driving members are mounted on a fixed support and the spool or drum is mounted on a movable axis.

I claim:

1. In an apparatus for winding wire, the combination, with a drum adapted to have the wire wound thereon, of a plurality of endless belts adapted to engage the body of wire being wound on said drum and located axially of said drum one beside the other, and means for driving said belts, said belts being mounted so as to be yieldable relatively to one another.

2. In an apparatus for winding wire, the combination, with a drum adapted to have the wire wound thereon, and means to supply wire to said drum, of a plurality of belts adapted for direct frictional engagement with the body of wire being wound on said drum and located axially of said drum one beside the other, said belts having rounded outer surfaces, and means for driving said belts.

3. In an apparatus for winding wire, the combination, with a drum adapted to have the wire wound thereon, and means to supply wire to said drum, of a plurality of belts adapted for direct frictional engagement with the body of wire being wound on said drum and located axially of said drum one beside the other, said belts being rounded at their edges, and means for driving said belts tangentially of said drum.

4. In an apparatus for winding wire, the combination, with a drum adapted to have the wire wound thereon, and means to supply wire to said drum, of a plurality of endless belts adapted for direct engagement with the body of wire being wound on said drum and located axially of said drum one beside the other, pulleys on which said belts are trained, and means for rotating said pulleys.

5. In an apparatus for winding wire, the combination, with a drum adapted to have the wire wound thereon, and means to supply wire to said drum, of a plurality of endless belts adapted for direct frictional engagement with the body of wire being wound on said drum and located axially of said drum one beside the other, said belts having rounded faces adapted for engagement with said body of wire, pulleys on which said endless belts are trained, and means for rotating said pulleys.

6. In an apparatus for winding wire, the combination, with a drum disposed with its axis vertically and adapted to have the wire wound thereon, and means to supply wire to said drum, of a plurality of belts adapted for direct frictional engagement with the body of wire being wound on said drum and located axially of said drum one beside the other, regulatable means for pressing said belts into engagement with said body of wire, and means for driving said belts.

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