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F. E. STAHL

1,984,604

HOIST DRUM

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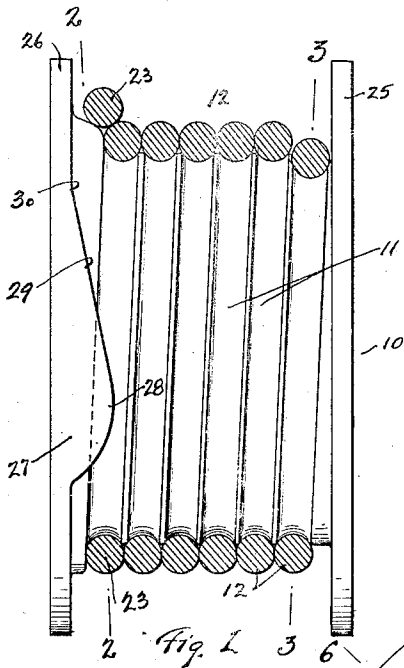
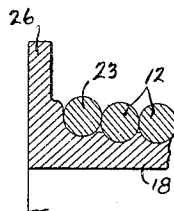


Fig. 4.

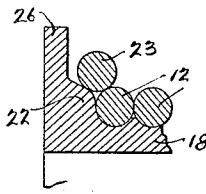


Fig. 6.

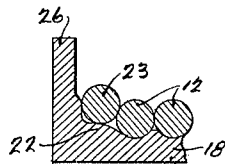


Fig. 5.

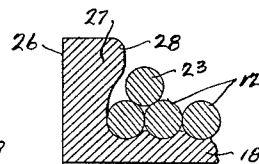


Fig. 7.

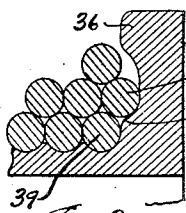


Fig. 8.

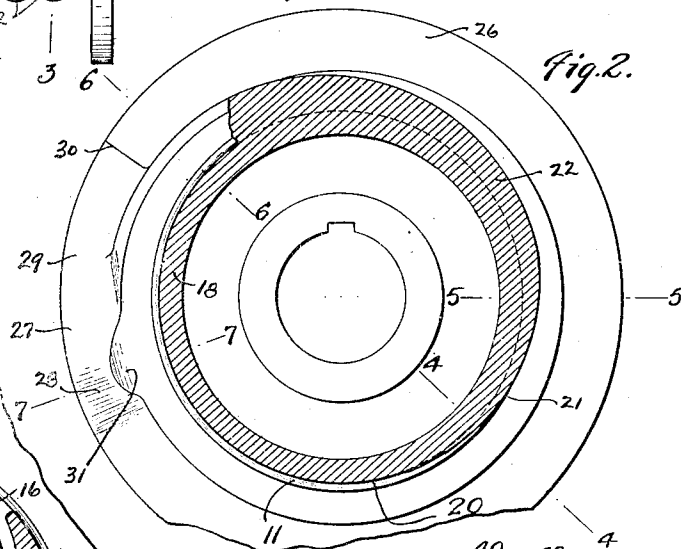


Fig. 2.

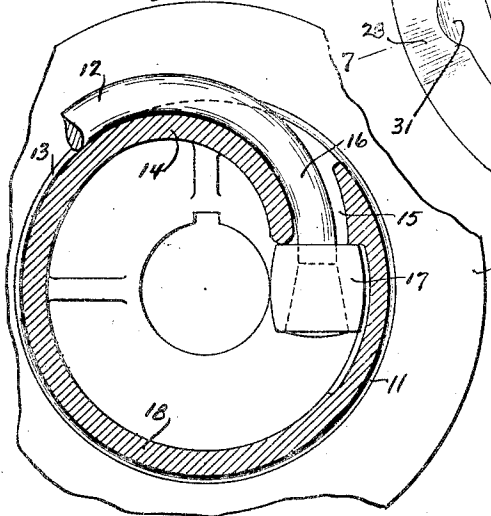


Fig. 3.

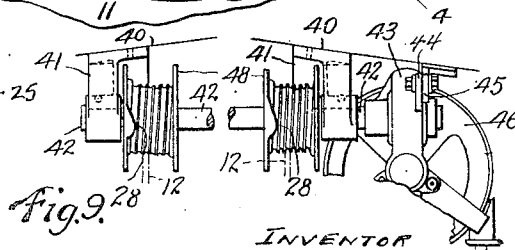


Fig. 9.

INVENTOR
FRANK E. STAHL

BY *J. W. Ellis*

ATTORNEY

UNITED STATES PATENT OFFICE

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HOIST DRUM

Frank E. Stahl, Tonawanda, N. Y., assignor to
Columbus McKinnon Chain Company, Tona-
wanda, N. Y., a corporation of New York

Application January 21, 1933, Serial No. 652,843

6 Claims. (Cl. 254—184)

My invention relates in general to improve-
ments in hoist drums and more particularly to
means for causing the second layer of cable to
wind uniformly upon the first layer.

It is well known to those skilled in the art
that in winding a second layer of cable upon a
hoist drum, there is a tendency for the cable or
wire rope to overlap and pile upon the last coil
of the first layer and/or against the flange of
the drum. This may continue for two or three
coils of the cable whereupon the additional coil
or coils will slip off of the coil or coils under-
neath and move down to the level of and in con-
tact with the first layer of cable with resultant
jarring of the load which the cable has been
lifting.

The principal object of my invention has been
to overcome the disadvantages above pointed out
and to provide means whereby the cable shall be
started off on its second layer without an oppor-
tunity to pile.

Another object has been to gradually raise the
last coil of rope about the drum in such manner
that it may be carried up to the level of the sec-
ond layer whereupon it will be positively forced
over into the groove formed by the last two coils
of the first layer.

Another object has been to provide a drum in
which the point where reeving of the second layer
of rope starts shall be definitely determined,
making it possible to place two drums on a single
shaft and to so set such drums as to effect syn-
chronous reeving.

Another object has been to provide means for
fastening the inner end of the cable to a relatively
small drum so as to prevent breaking of the cable,
thereby increasing its life.

Furthermore, the above objects have been
brought about in a manner which does not add
materially to the cost of an ordinary hoist drum.

The above objects and advantages have been
accomplished by means of the device shown in the
accompanying drawing, of which:

Fig. 1 is a front elevation of my complete drum,
showing the cable coiled about it and in cross-
section.

Fig. 2 is an end sectional view taken on line
2—2 of Fig. 1.

Fig. 3 is a similar section taken on line 3—3
of Fig. 1 and shows the fastening means for the
inner end of the cable.

Fig. 4 is a fragmentary, transverse, sectional
view taken on line 4—4 of Fig. 2.

Fig. 5 is a similar view taken on line 5—5 of
Fig. 2.

Fig. 6 is a similar view taken on line 6—6 of
Fig. 2.

Fig. 7 is a similar view taken on line 7—7 of
Fig. 2.

Fig. 8 is a fragmentary, transverse, sectional
view of a drum provided with guiding means at
the opposite end, whereby a third layer of cable
may be properly reeved.

Fig. 9 is a side elevation showing my invention
as applied to two drums carried on a single shaft.

Referring to the drawing, 10 represents my
hoist drum which is provided with a periphery
having the customary helical groove 11 for the
cable or wire rope 12. The bottom of this groove
is, of course, concave so as to fit the size of wire
rope or cable 12 being used. The starting end
13 of the groove 11 terminates in a curved wall
14 which forms the bottom wall of a hole 15
through which the fixed end 16 of the cable 12
passes into the interior of the drum. The curva-
ture of the wall 14 meets and joins the curva-
ture of the drum periphery in a very smooth
gradual manner so that this end of the cable is
not bent to such a degree that it will be kinked
or weakened by such bend. The extreme inner
end of the cable is passed into the interior of
the drum where it is provided with an anchor
17 which is fitted over and secured to the end
of the cable by well known means, whereby it
will be securely fastened to the cable. When
tension is placed upon the cable, the anchor
will bear against the end face of the wall 14
which extends around the hole 15 and joins the
body 18 of the drum. The helical groove 11 ex-
tends across the periphery of the drum from
the starting end 13 at a pitch equal to substan-
tially the diameter of the cable or wire rope 12.
This helical groove is concave as hereinbefore
pointed out but starting at substantially the
point 20 (see Fig. 2) in its last turn, the bottom
of the groove is gradually filled in up to sub-
stantially the point 21 so as to bring the bottom
of the groove up to the level of the top edge
thereof. At the point 21, the surface is merged
into and continues in a ridge 22. As shown in
Fig. 4 the last coil 23 of the cable is in the last
turn of the groove 11, but at a point which is
slightly above the normal level of the previous
turns. This view, therefore, shows the cable
slightly raised, and in Fig. 5 this layer of the
cable is raised still higher and is carried upon
the upper surface of the ridge 22. The ridge 22
is of increasing radius and thereby gradually
raises the last coil of rope up to a point where
it is substantially on a level with the top surface
of the first layer of rope. This position is shown

in Fig. 6. The upper surface of the ridge 22 is inclined toward the axis at the opposite end of the drum, such inclination increasing as the outer end of the ridge is reached, thus causing the last coil of the rope to slide over in close contact with the last previous coil.

The drum is, of course, provided with end flanges 25 and 26. The flange 25 is at the starting end of the drum, and the flange 26 is at the finishing end of the drum. Fig. 1 shows the last coil of cable raised to a position just preceding the position shown in Fig. 6. Carried by the inner face of the flange 26 is a push-over cam 27. This cam is at its maximum lateral dimension at the apex 28 and gradually rises to this apex over an inclined surface 29 which starts at point 30 which is slightly back of the point where the sectional view of Fig. 6 is taken. The apex 28 extends over and above the first layer of rope or cable and the cam at its maximum lateral dimension is undercut, as shown at 31 in Fig. 2, so as not to interfere with the winding of the last coil of the first layer of the wire rope. The apex 28 of this cam extends over the first layer at a point about over its center line. It will be obvious that as the rope extends from the drum, it will be gently pushed or urged over toward the groove formed between the first and second last coils of the first layer of the cable, thus insuring its engagement with this groove when the first coil of the second layer is wound upon the drum.

Where the amount of cable handled is too great to be wound upon the drum in two layers, the drum may be formed with a ridge 35 and a cam 36 at the starting end of the drum, as shown in Fig. 8. In this figure the drum flange 37 is so located with respect to the first turn of the groove 11 that a plane passing through the inner face of the flange 37 is interspaced with the first coil 39 of the first layer so as to allow the last coil 38 of the second layer to move beyond the first coil 39 of the first layer. The ridge 35 will be gradually increased in diameter so as to cause the last coil 38 of the second layer on the drum to be raised up to the elevation of the third layer in a manner similar to that at the starting of the second layer, the cam 36 being so positioned as to cause this last coil of the second layer when it is elevated to be pushed over between the first and second last coils of the second layer in a manner similar to that described in connection with the winding of the first coil of the second layer.

From the foregoing it will be obvious that as the cable 12 approaches the last convolution of the first layer in the groove 11, it is first gradually raised to the top of the periphery of the drum and then further gradually elevated by the ridge 22 until it is substantially at the top of the previous coil of the first layer. As the drum continues to rotate, the cam 27 will come in contact with the cable as it is being reeved thereon and gently push it over into the groove formed by the two last coils of the first layer, thus positively guiding the first coil of the second layer and preventing the possibility of its piling on top of the last coil of the first layer or between the first coil of the second layer and the flange of the drum.

In cases where two or more drums are used on a single shaft, as shown in Fig. 9, my invention makes it possible to accurately set both drums so that the second layer of rope or cable on each drum will start at the same time it being well known that two drums have heretofore been used

for handling only single layers of cable. This can be done because the point in the rotation of each drum where the first coil of the second layer starts is accurately determined by the push-over cam 27, such coil being brought up to such starting point by the filled-in portion of the end of the groove 11 and by the ridge 22. This feature of my invention is of great value in a two-drum hoisting device, such as that shown in Fig. 9. In this figure the lines 40 indicate the lower inclined surface of a roof of a box car or other suitable supporting surface to which the bearing brackets 41 are attached. These brackets are, of course, permanently secured to the supporting surface and they carry a shaft 42. One of the ends of this shaft protrudes a considerable distance beyond the end of one of the brackets and a hoist 43 is mounted thereupon. This hoist is preferably provided with an attaching ear 44 which is permanently secured in an adjustable manner to a bracket 45, rigidly fixed to the supporting surface. This hoist is provided with the usual hand wheel 46 over which a hand chain 47 (shown in dot and dash lines) is passed. Carried by the shaft 42 and arranged preferably near each of the bearing brackets 41 is a cable drum 48. As shown by this figure, the drums are so placed upon the shaft that the apex 28 of each cam lies in substantially the same axial plane passing through the shaft, whereby when the cable 12 reaches the second layer, these push-over cams will cause the second layers on both cams to be started at the same instant.

While I have shown my invention as applied to a drum having a helically formed groove, it is obvious that my invention is applicable also to drums having smooth peripheries. This and other modifications of the details herein shown and described may be made without departing from the spirit of my invention or the scope of the appended claims, and I do not, therefore, wish to be limited to the exact embodiment herein shown and described, the form shown being merely a preferred embodiment thereof.

Having thus described by invention, what I claim is:

1. As an article of manufacture, a hoisting drum having a rope receiving periphery, a relatively long circumferential lifting ridge formed at the finishing end of the drum, said ridge being formed with a gradually increasing radius for carrying the last convolution of the first layer of rope upon the drum up to substantially the top of such layer, and a relatively short push-over cam carried on the inner face of the end flange at the finishing end of the drum and located substantially where said ridge is at its maximum radius, said cam extending above the last convolution of the preceding layer to a point over substantially the center of such convolution.

2. As an article of manufacture, a hoisting drum having a rope receiving periphery, a relatively long circumferential lifting ridge formed at the finishing end of the drum, said ridge being formed with a gradually increasing radius for carrying the last convolution of the first layer of rope upon the drum up to substantially the top of such layer, and a relatively short push-over cam carried on the inner face of the end flange at the finishing end of the drum and located substantially where said ridge is at its maximum radius, said cam being undercut and extending above the last convolution of the preceding layer to a point over substantially the center of such convolution.

3. As an article of manufacture, a hoisting drum having a helical, rope receiving groove formed in

its periphery, a relatively long circumferential lifting ridge formed at the finishing end of the drum, said ridge being formed with a gradually increasing radius for carrying the last convolution of the first layer of rope upon the drum up to substantially the top of such layer, the bottom of a portion of the last convolution of the groove being gradually brought up to the periphery of the drum where it meets and joins the starting end of the ridge, and a relatively short push-over cam carried on the inner face of the end flange at the finishing end of the drum and located substantially where said ridge is at its maximum radius, said cam extending above the last convolution of the preceding layer to a point over substantially the center of such convolution.

4. The combination with a shaft, of a plurality of drums rigidly mounted upon said shaft, each drum having a relative short push-over cam overhanging the periphery of the drum at the finishing end thereof, the push-over cams of the drums being so located on the shaft that their apices lie in the same plane, said plane being parallel to the axis of the shaft, whereby the drums may be synchronized so that the second layers of cable will be started on each drum at the same time.

5. The combination with a shaft, of a plurality

of drums rigidly mounted upon said shaft, each drum having a relative short push-over cam overhanging the last turn of the groove in the periphery of the drum, the push-over cams of the drums being so located on the shaft that their apices lie in the same plane, said plane being parallel to the axis of the shaft, whereby the drums may be synchronized so that the second layers of cable will be started on each drum at the same time.

6. The combination with a shaft, of a plurality of drums rigidly mounted upon said shaft, each drum having a relatively long circumferential lifting ridge formed at the finishing end of the drum, said ridge being formed with a gradually increasing radius for carrying the last convolution of the first layer of rope upon the drum up to substantially the top of such layer, and a relatively short push-over cam overhanging the last turn of the groove in the periphery of the drum, the push-over cams of the drums being so located on the shaft that their apices lie in the same plane, said plane being parallel to the axis of the shaft, whereby the drums may be synchronized so that the second layers of cable will be started on each drum at the same time.

FRANK E. STAHL.