Jan. 4, 1955 G. M. HOLLAND 2,698,764

GRAPPLE

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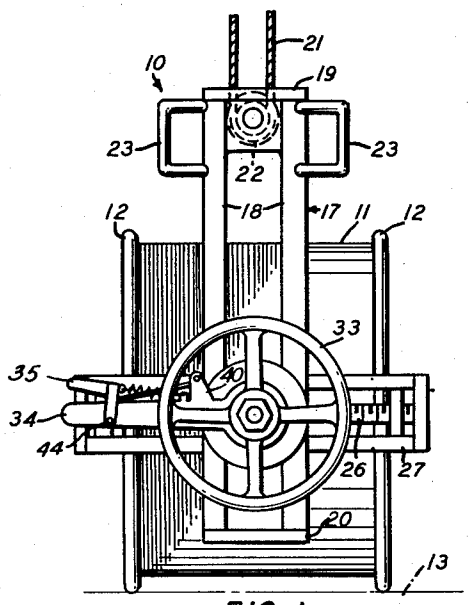


FIG. 1

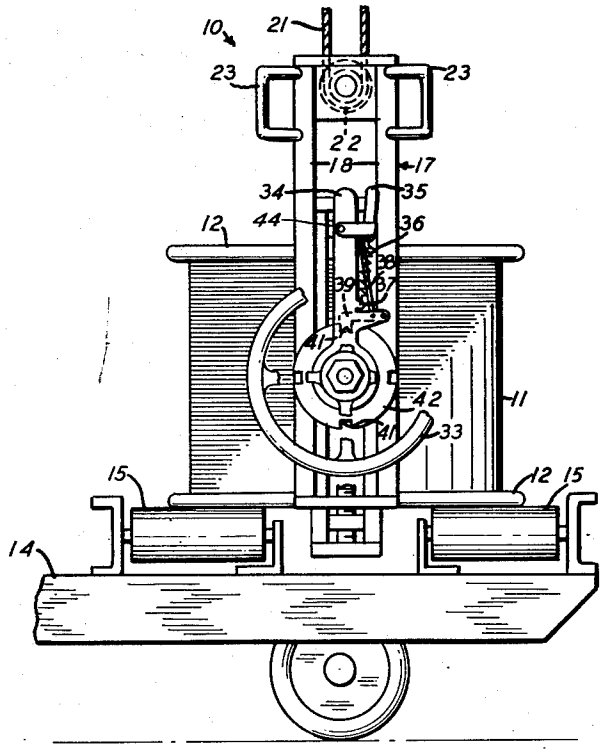


FIG. 2

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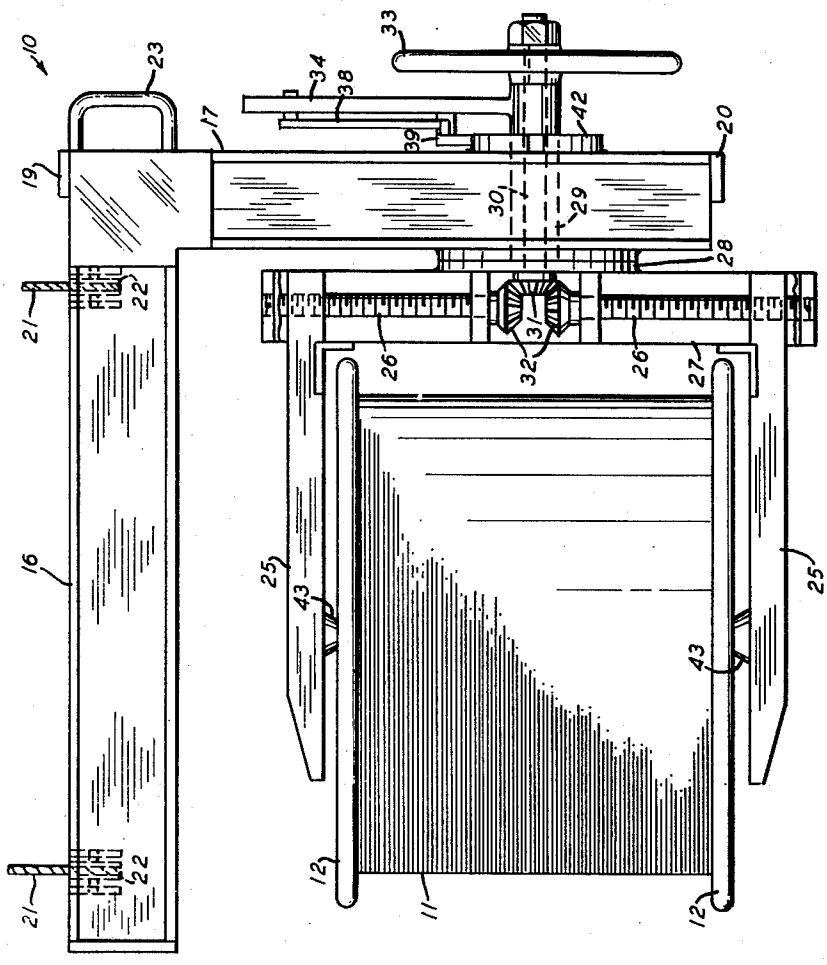


FIG. 3

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United States Patent Office

2,698,764

Patented Jan. 4, 1955

2,698,764

GRAPPLE

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Application February 6, 1952, Serial No. 270,258

2 Claims. (Cl. 294—67)

This invention relates to grapples, and more particularly to grapples suitable for handling reels.

In the manufacture of wires and cables, it frequently is necessary to transport heavy reels of wire from one factory area to another. The sides of such reels are ordinarily provided with circular flanges, and it is customary to allow the reels to rest on the rims of their flanged sides so that they can be maneuvered along the factory floor to some extent. At other times it may be more desirable to have the reels resting on one of their flat sides. For example, in some arrangements for paying off wire from a reel, it is preferred to have the reel resting on one side.

When a reel must be transported from one location to another, the hub of the reel may conveniently be engaged by a pair of clamping arms of a grapple supported from some type of overhead conveyor. The means heretofore known for transporting a reel have generally been designed to carry the suspended reel with the sides thereof in vertical planes, and to pick up and deposit the reel in that position. Where it is desired to have the reel rest on one of its sides in one location and to rest on the rims of its flanges in another location, considerable labor has been involved in properly positioning the reel before or after its travel on an overhead conveyor.

In the manufacture of wires and cables, reels may be employed which, with their contents, may weigh as much as 800 lbs. Consequently, it is necessary to have mechanical facilities for turning and positioning such reels, and the apparatus provided for this purpose must be quite sturdy. Various devices are available for rotating the axis of a reel while it rests at the floor level, but heretofore no such device has been incorporated into a suspended grapple carried by an overhead conveyor.

An object of this invention is to provide new and improved grapples.

A further object of the invention, is to provide new and improved grapples suitable for handling reels.

Another object of the invention is to provide new and improved suspended grapples for transporting and positioning reels.

A grapple illustrating certain features of the invention may include a frame capable of being suspended, a pair of relatively movable jaws carried by the frame for engaging and supporting a reel, means for moving the jaws toward and away from each other and means for rotating the jaws to rotate the axis of a reel carried by the jaws.

A complete understanding of the invention may be obtained from the following detailed description of an apparatus forming a specific embodiment thereof, when read in conjunction with the appended drawings, in which:

Fig. 1 is a front elevation of a grapple embodying the invention shown engaging a reel;

Fig. 2 is a view corresponding with Fig. 1, but with the axis of the reel rotated 90° and the reel resting upon a transfer car, and

Fig. 3 is an enlarged side elevation of the grapple in the position shown in Fig. 2.

Referring now in detail to the drawings, a grapple **10** embodying the invention is designed to engage a reel **11**, the sides of which are provided with circular flanges **12—12**. From a position in which the rims of the flanges **12—12** rest upon a floor **13**, the reel **11** may be elevated, its axis rotated 90°, and then the reel may be deposited upon a transfer car **14** with the flanges **12—12** in a horizontal position. The transfer car **14** is

provided with a plurality of spaced, horizontal rollers **15—15** between which the grapple **10** may enter in depositing or removing a reel therefrom. The reel may be shoved across these rollers onto a supply stand (not shown) at an operating station in another factory location.

The grapple **10** includes a generally L-shaped frame, having a horizontal leg **16** suspended from a twin hook hoist movable along an overhead conveyor (not shown) and a vertical leg **17** extending downwardly from one end of the horizontal leg **16**. Both of these legs are constructed of spaced, parallel channels suitably joined together. As shown in Figs. 1 and 2, a pair of channels **18—18** forming the vertical leg **17** are joined by a plate **19** at the top of the leg and by another plate **20** at the bottom of the leg. The grapple **10** is suspended from the hoist on the overhead conveyor by a pair of cables **21—21**, which pass around a pair of sheaves **22—22** journalled near the opposite extremities of the upper leg **16** of the grapple. At the juncture of the legs **16** and **17** there are secured a pair of handles **23—23** that an operator may grasp in case it may become necessary to swing the grapple slightly away from its normal suspended position.

A pair of relatively movable jaws **25—25** together form a generally U-shaped clamp carried by the vertical leg **17** of the grapple. The jaws **25—25** are slidably engaged by a pair of aligned, similarly threaded shafts **26—26** journalled within a housing **27** secured to a plate **28** mounted upon a rotatable hollow shaft **29** which extends between the channels **18—18** of the vertical leg **17** of the grapple. One end of a second rotatable shaft **30**, which extends concentrically through the axial center of the shaft **29**, is provided with a bevel gear **31** which meshes with a pair of bevel gears **32—32** secured to adjacent ends of the threaded shafts **26—26**. By suitably turning a hand wheel **33** secured to the other end of the shaft **30**, both of the jaws **25—25** may be moved toward or away from each other.

The concentric shafts **29** and **30** are arranged to permit independent rotation of each, the rotation of the shaft **30** serving to cause relative motion between the jaws **25—25**, and the rotation of the shaft **29** being effective to rotate these jaws and a reel carried thereby about the axis of this shaft. The rotation of the jaws **25—25** is carried out in 90° steps, since this motion is used only to turn a reel from a position in which its flanged sides are vertical to a position in which its sides are in a horizontal plane, and vice versa.

The rotation of the shaft **29** is effected by actuation of a handle **34** secured thereto and extending radially outward therefrom. A latch **35** pivotally secured to the handle **34** near the outer end thereof is provided with a spring **36** which is attached to a lug **37** mounted on another portion of the handle. One end of a rod **38** is pivotally secured to the latch **35**, and the other end of the rod **38** is pivotally joined to a pawl **39** pivotally mounted on a lug **40** protruding from the inner end of the handle **34**. The pawl **39** may selectively engage one of four notches **41—41** spaced 90° apart on the periphery of a disc **42** which functions as a ratchet surrounding the concentric shafts **29** and **30** and is secured to the vertical leg **17** of the grapple.

Ordinarily, the shaft **29** is prevented from rotating by the engagement of the pawl **39** with one of the notches **41—41**. An operator may squeeze the latch **35** against the end of the handle **34**, thereby moving this latch arcuately about a pivot point **44** and raising the pawl **39** away from the notches on the disc **42**. This action permits the handle **34** to be actuated to rotate the shaft **29** and the jaws **25—25**. When squeezing of the latch **35** is stopped, the spring **36** through its influence on the latch **35** and the rod **38** urges the pawl **39** against the periphery of the disc **42**, and the pawl slides along the periphery of the disc until it falls into engagement with one of the notches **41—41**, thereby halting the rotation of the shaft **29**. Thus, the rotation of the jaws **25—25** may conveniently be halted after a 90° turn. When the jaws **25—25** engage a reel, a pair of conical projections **43—43** carried by the jaws fit into the hub of and support the reel.

Grapples embodying the invention are admirably suited for transportation operations in which a reel must be elevated and the axis of the reel must be rotated to change the plane in which flanged sides of the reel lie when it is at rest. Since both actions can be performed by the same piece of equipment, the handling of reels is greatly facilitated. The structure of this grapple is not complicated, and it provides a sturdy and reliable means for eliminating an otherwise very laborious operation.

What is claimed is:

1. A grapple for reels, which comprises a generally L-shaped frame having a horizontal leg provided with means for suspending the frame and having a vertical leg extending downwardly therefrom, a rotatable shaft mounted horizontally on the vertical leg, a pair of threaded members carried at one end of said rotatable shaft, a pair of relatively movable jaws mounted on the threaded members and designed to engage a reel hub to support a reel, means mounted on the shaft for simultaneously rotating the threaded members and thereby moving the jaws toward and away from each other, a handle extending radially outward from the shaft for rotating the shaft to cause rotation of the axis of a reel carried by the jaws, a circular ratchet secured to the vertical leg of the frame and surrounding the rotatable shaft, said ratchet having notches spaced at 90° intervals on the periphery thereof, a pawl mounted pivotally on the inner end of said handle and associated with the rotatable shaft for selectively engaging one of said notches whereby the rotation of the axis of the reel may be halted selectively in horizontal and in vertical positions, and a latch mounted pivotally on the outer end of said handle and connected to the pawl for actuating the pawl.

2. A grapple for reels, which comprises a generally L-shaped frame having a horizontal leg provided with means for suspending the frame and having a vertical leg extending downwardly therefrom, a pair of independently rotatable concentric shafts extending horizontally through the vertical leg of the frame, a housing mounted beneath the horizontal leg of the frame and secured to an end of one of said concentric shafts, a bevel gear secured to an end of one of said concentric shafts, a pair of aligned similarly threaded shafts rotatably mounted in the housing with one end of each adjacent to said bevel gear, a pair of bevel gears one for each shaft secured to the adjacent ends of the similarly threaded shafts and in meshing engagement with the first-mentioned bevel gear, a pair of relatively movable jaws mounted in threaded engagement with the similarly threaded shafts so that rotation of one of said concentric shafts simultaneously causes both jaws to move toward and away from each other and so that rotation of the other one of said concentric shafts causes the jaws to rotate simultaneously about the axis of the concentric shafts, said jaws having a pair of conical projections designed to engage a reel hub to support a reel, an actuating handle secured to the concentric shaft that causes rotation of the jaws, a circular ratchet secured to the vertical leg of the frame and surrounding the concentric shafts, said ratchet having notches spaced at 90° intervals on the periphery thereof, and a pawl pivotally associated with the handle for selectively engaging one of said notches whereby rotation of the axis of a reel carried by the jaws may be halted selectively in horizontal and in vertical positions.

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