June 12, 1934. P. S. LABORA 1,962,670

CRANE

Filed July 6, 1931

FIG. 1

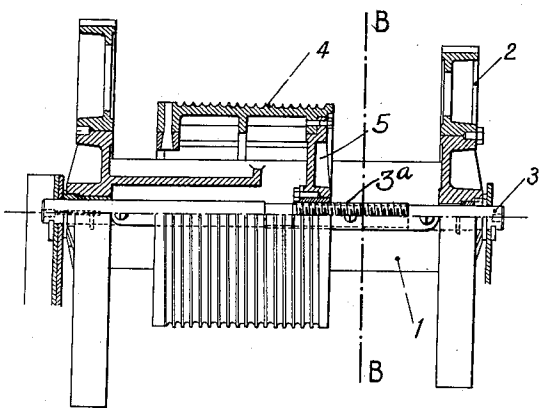



FIG. 2

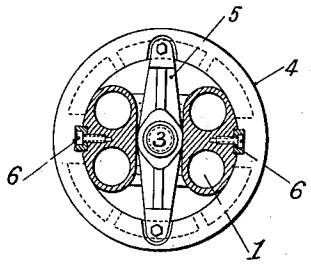
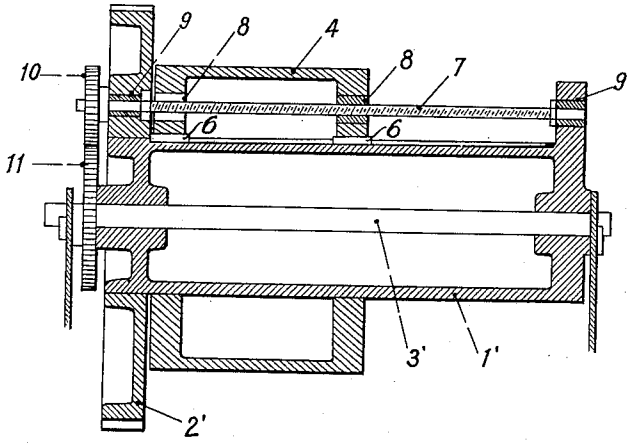



FIG. 3




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Patented June 12, 1934 1,962,670

# UNITED STATES PATENT OFFICE

1,962,670

## CRANE

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Application July 6, 1931, Serial No. 549,018
In Great Britain July 7, 1930

1 Claim. (Cl. 242—158)

There is nothing new in cranes, particularly luffing jib cranes, in which, on account of the small distance separating the lifting gear from the guide pulleys, the latter are mounted on shafts of more or less length allowing of an axial travel of the pulleys sufficiently ample to prevent the maximum inclination taken by the cable on entering the drum from exceeding normal limits. But, as any increase of length of the shafts entails an increase also of their diameter, in order that they may resist the greater bending strain to which they are then subjected, the final consequence thereof is a considerable increase of the passive resistances of the hoisting mechanism.

According to the present invention this drawback is overcome by substituting for the axial travel of the guide pulleys an axial travel of the drum of the lifting gear which allows of the cable winding thereon passing into the groove in which it is to lie, in a direction that is constantly orthogonal to the rotation axis of the drum.

This travel of the winding drum is secured by making the drum in two parts, viz. an inner part which rotates loosely on its spindle and to one of the ends of which is secured the driving wheel, and an outer part, on which the cable is wound. This outer part is obliged to travel along and over the inner part, according as the drum rotates, by means of a screw fitted either on the spindle common to both drum-parts or located parallel to such spindle. The torque is transmitted from one drum-part to the other by one or two pairs of grooves and splines.

An embodiment of the invention in either of the cases mentioned is shown by way of example on the attached drawing, in which:

Fig. 1 is a longitudinal view, partly in section, of a winding drum according to the invention;

Fig. 2 is a section through the plane B—B of Fig. 1;

Fig. 3 is a longitudinal view in section of the variant form of execution.

According to Figs. 1 and 2, illustrating the preferred embodiment, the drum is composed of two parts, viz. an inner part 1, to one end of which is secured the driving wheel 2 and which rotates on the driving spindle 3, fixed to the bed of the lifting gear, and an outer part 4, on which the cable winds. This outer member 4 slides along the inner part 1 by means of the spindle 3, which is threaded over a certain length as at $3^a$ and engages in a threaded opening in the center of a cross bar 5, the ends of which are fixed to the outer drum 4, so that when the latter turns it is carried along in axial direction upon the kinetic couple, formed by the cross bar 5 and the screw threaded portion on the spindle 3, entering into action. The torque is transmitted from the inner member 1 to the outer member 4 of the drum by the grooves and splines 6.

The variant form of execution of the invention is shown in Fig. 3 as follows:—The drum here also is formed of two parts: an inner part 1', to one of the ends of which is secured the driving wheel 2', and an outer part 4', on which the cable is wound and which is concentric with the inner one. The inner one, that is to say 1', rotates loosely on the spindle 3', which is fixed, and the second part 4' slides along 1', the forces being transmitted from one to the other by means of grooves and splines 6. The axial movement of this outer drum is obtained by means of the spindle 7, which is screw-threaded and passes through two nuts 8 arranged at the ends of the drum 4'. The said spindle 7 rotates in two bearings 9, which are secured to the ends of the inner drum 1', and has secured to one of its ends the toothed wheel 10, which meshes with a toothed wheel 11, mounted in fixed position on the bed of the lifting gear.

On the lifting gear being actuated for the purpose of raising or lowering the load, the movement of the outside drum 4' in one or the other direction will be automatically produced owing to the fact that the spindle 7, which will rotate with the drum 1' round 3', will receive, in consequence of the engagement of the wheel 10 with the fixed wheel 11, another movement of rotation about itself, which causes it to rotate in the nuts 8, which slide the outside drum 4' axially along the inner drum.

I claim

A winding drum comprising a fixed shaft having a threaded portion, an inner drum member having bearings at its ends on said fixed shaft and also having a centrally arranged longitudinal opening intermediate its end bearings, an outer drum member of less length than the inner drum member and through which the inner drum member extends, said outer drum member being slidably fitted on, supported by, and splined on said inner member for longitudinal movement thereon and also for rotation therewith, and a travelling arm having engagement with the threaded portion of the fixed shaft, said arm extending through and movable in the longitudinal opening of the inner member and being secured to the outer member to impart longitudinal movement to the outer member on the inner member when the drum members revolve, the said inner member, on and by which the outer member is supported preventing said outer member from imposing bending stress on the said shaft through said travelling arm.

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