April 19, 1932. R. C. OSGOOD 1,854,422

HAULING MECHANISM

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Fig.1.

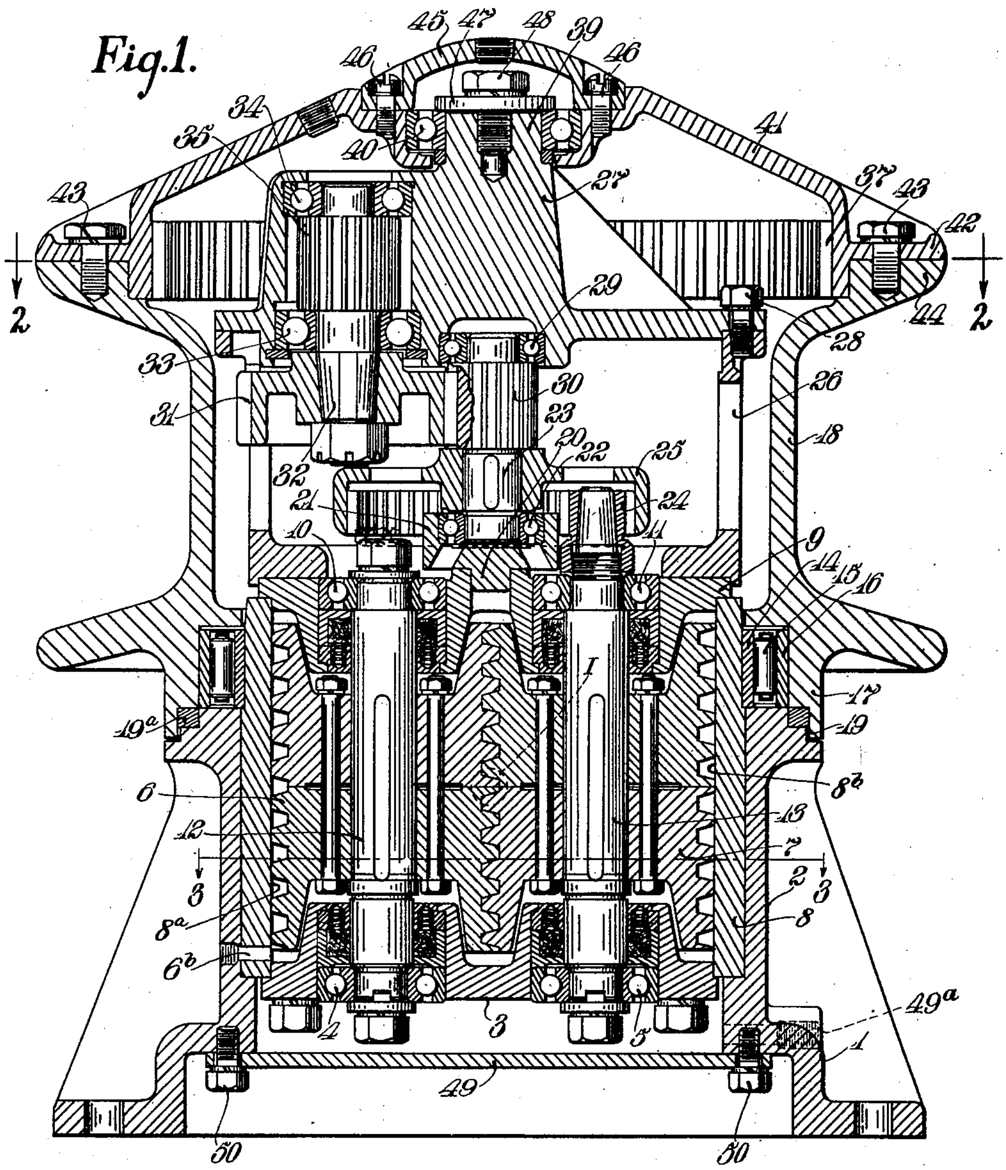

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Fig. 2.

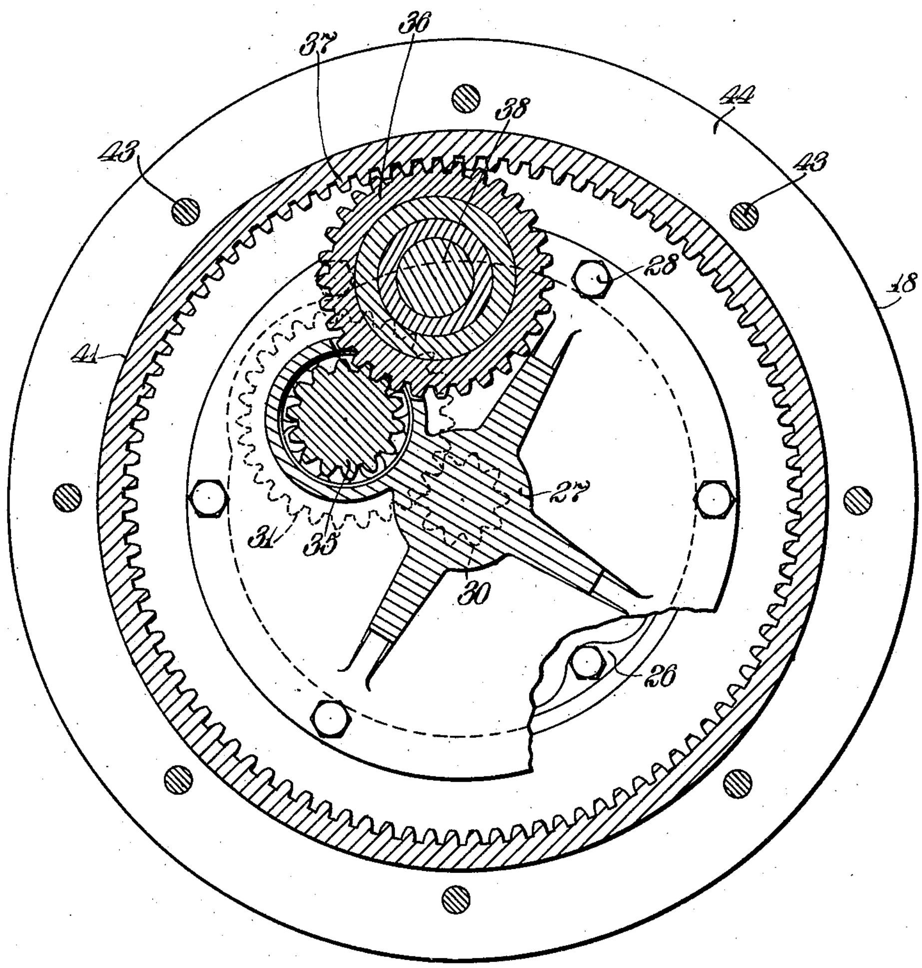
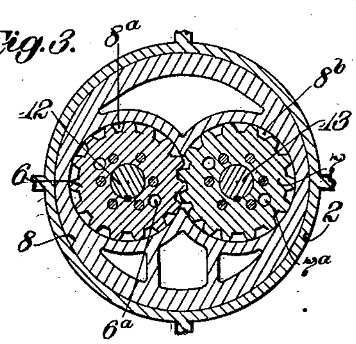


Fig. 3.



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UNITED STATES PATENT OFFICE

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HAULING MECHANISM

Application filed May 27, 1929. Serial No. 366,461.

This invention relates to hauling mechanisms, and more particularly to hauling mechanisms of the power driven capstan type.

An object of my invention is to provide an improved haulage mechanism. A further object of my invention is to provide an improved haulage mechanism of the capstan type in which substantial support is provided the winding head. A still further object of my invention is to provide an improved haulage mechanism of the capstan type in which rotatable support for the winding head closely adjacent the rope engaging portion is afforded in an improved manner. Other objects and advantages of my invention will hereinafter more fully appear.

In certain aspects, the mechanism disclosed herein is an improvement over the somewhat similar mechanism disclosed in my prior Patent 1,665,068, patented April 3, 1928.

In the accompanying drawings I have shown for purposes of illustration one form which my invention may assume in practice.

In these drawings,—

Fig. 1 is a central vertical section (certain small details being shown in elevation) through the illustrative embodiment of my invention.

Fig. 2 is a transverse section on the line 2—2 of Fig. 1.

Fig. 3 is a horizontal section on line 3—3 of Fig. 1.

The base 1 of the illustrative embodiment of my invention supports a cylindrical casing 2 which surrounds a motor housing 8 which is bored to provide intercommunicating rotor chambers 8^a and 8^b of the type more fully illustrated in my above mentioned patent. These chambers are closed at their lower ends by a common closure plate 3 in which are provided bearings 4 and 5 for the lower ends of the shafts 12 and 13 of intermeshing rotors 6 and 7. The rotors 6 and 7 are provided with intermeshing teeth cooperating to form expansion chambers to which fluid pressure may be admitted in a manner commonly followed in this type of motor, as through an inlet I. A plate 49 is secured to the base 1 by screws 50 to protect the lower end of the motor, the plate 49 being spaced from the bottom of the base as shown in Fig. 1. Upon the top of the housing 8 is mounted a second closure plate 9 which carries ball bearings 10 and 11 for the upper ends of the rotor shafts 12 and 13. Registering apertures (not shown) through both the casing 2 and the housing 8 provide for exhaust of the motive fluid. Drainage is established between the upper and lower ends of the rotors through passages 6^a and 7^a, and the rotor chambers are drained through a passage 6^b provided with a drain cock (not shown). The space above plate 49 is vented through a passage 49^a, also preferably controlled by a drain cock not shown.

Surrounding the upper portion of the housing 8 is a race 14 which forms part of a roller bearing 15, the outer race 16 of the same being carried by the lower flange 17 of the rope winding portion or drum 18 of the capstan head. The lower inner edge of the flange 17 is rabbeted and the upper outer portion of the base 2 is correspondingly rabbeted to afford an annular chamber 19 for a packing ring 19^a which prevents leakage of oil from the roller bearing 15.

An aperture is provided centrally of the upper plate 9 and the boss 20 of a member 21 is disposed within this aperture. The member 21 supports a ball bearing 22 in which is journaled one end of a short shaft 23. An internal gear 25 is keyed to the shaft 23 and meshes with a pinion 24 secured to the end of the rotor shaft 13. Mounted upon the plate 9 is a frame member 26 which carries upon its upper portion a top plate or spindle member 27, bolts 28 being provided to secure the two in assembled relation. A recess is provided centrally of the under portion of the member 27, and a ball bearing 29 is disposed within this recess for rotatably mounting and guiding the upper end of the shaft 23. A small gear 30 is secured to the shaft 23 adjacent the ball bearing 29, it being obvious that if preferred the gear 30 may be formed integrally with the shaft 23. The gear 30 meshes with a gear 31 mounted on and secured to the lower end of a stub shaft 32, which is rotatably supported in spaced ball bearings 33, 34, carried by the member 27. A gear 35 is secured to the shaft 32 or, if desired, may be formed integrally therewith.

As best seen in Fig. 2, the gear 35 meshes with an idler gear 36, the latter meshing with an internal gear 37. The idler gear 36 is rotatably mounted on a stub shaft 38 supported by the member 27. The upper portion 39 (see Fig. 1) of the member 27 carries a ball bearing 40 which cooperates with an opening in a cover member 41 which is formed integrally with the internal gear 37. The peripheral radial flange 42 on the cover member is secured by bolts 43 to a corresponding flange 44 extending radially from the upper end of the member 18. A cap 45 is secured to the cover member 41 by screws 46, the cap serving additionally to hold in place the outer race of the ball bearing 40. A washer 47 and cap screw 48 serve to hold the inner race of this ball bearing 40 in position.

It will now be apparent that the ball bearing 40 and the roller bearing 15 provide rotatable support for the capstan head including the drum member 18. Due to the improved construction of the positioning means for the ball bearing 40, the latter carries the major portion of the weight of the capstan head and drum. The strain induced by hauling in on the rope is principally taken up by the roller bearing 15 which is closely adjacent the rope winding surface of the drum member 18. It is therefore apparent that I have provided an improved haulage mechanism of the capstan type which provides rotatable support for the capstan head closely adjacent the application of the pulling strain At the same time the mechanism is compact in spite of the fact that the gearing provides ample reduction in the winding speed of the capstan.

While I have in this application specifically described one form which my invention may assume in practice, it will be understood that this form of the same is shown for purposes of illustration and that the invention may be modified and embodied in various other forms without departing from its spirit or the scope of the appended claims.

What I claim as new and desire to secure by Letters Patent is:

1. A power driven capstan comprising a base housing a motor, a winding drum rotatable on a vertical axis and having its lower portion surrounding said housing, said base providing on its periphery a bearing for receiving from the drum the greater portion of the strain of winding, a non-rotatable bearing support projecting upwardly from and carried by said base for rotatably supporting the upper end of said drum, and operative driving connections between said motor and drum including gearing supported above said motor between the ends of the drum.

2. A power driven capstan comprising a cylindrical base housing a motor, a winding drum rotatable on a vertical axis and having its lower portion surrounding and journaled on said housing, means providing a non-rotatable and rigid bearing support for the upper end of said drum, and operative driving connections between said motor and drum including reduction gearing disposed above the plane of the journal between the drum and housing and between the ends of the drum.

3. A power driven capstan comprising a frame, a motor housed therein with its axis vertical, a winding drum rotatable on a vertical axis and surrounding at least a portion of said motor, and operative driving connections between said motor and drum, said frame providing a non-rotatable spindle for rotatably mounting said drum and said frame having in addition a bearing on its periphery for receiving from the drum the greater portion of the strain of winding, and said operative driving connections between said motor and drum including drum driving reduction gearing disposed above said motor.

4. A power driven capstan comprising a frame, a motor housed therein with its axis vertical, a winding drum rotatable on a vertical axis and surrounding at least a portion of said motor, and operative driving connections between said motor and drum, said frame providing spaced bearings for said drum, the upper bearing being formed as a fixed spindle and the lower bearing journaling the lower portion of said drum on the periphery of said frame so that the frame receives from the lower portion of the drum the greater portion of the strain of winding, and said operative driving connections between said motor and drum including drum driving reduction gearing disposed above said motor.

5. In a haulage mechanism, a motor, a gear housing mounted upon the motor, gearing in said housing driven by said motor, said housing having at the upper end thereof rigid means providing a bearing to support axial and radial thrusts, a gear mounted on said bearing and driven by said gearing, and a drum suspended from said gear and driven thereby, said drum enclosing said housing and journaled at its lower end on the motor.

6. In a haulage mechanism, a motor, a bearing surrounding said motor and a second coaxial bearing materially above the motor and having a rigid support mounted upon the motor, reduction gearing connected with the motor and supported above the latter but below the second bearing, and a drum journaled on said bearings and operatively connected with said reduction gearing.

7. In a haulage mechanism, a motor, a bearing having a support disposed adjacent said motor, said bearing being arranged pri-

marily to care for radial loads, a second coaxial bearing supported above the motor and having a support in rigid relation to the first bearing support, said second bearing providing for support of its load in an axial direction, reduction gearing connected with the motor and arranged above the motor and first bearing but below the second bearing, and a drum engaging both said bearings and suspended from the second mentioned bearing.

8. In a haulage mechanism, a base, a substantially vertical motor carried thereby, a bearing which encompasses the motor, a bearing in rigid relation to the base but beyond the end of the motor which is more remote from the base, reduction gearing driven by said motor and between the latter and the second bearing, and a drum supported by said bearings and connected with said reduction gearing.

In testimony whereof I affix my signature.

ROBERT C. OSGOOD.