April 19, 1927. 1,625,769

A. J. ERSTED

CLUTCH ENGAGING DEVICE

Filed Oct. 5, 1925

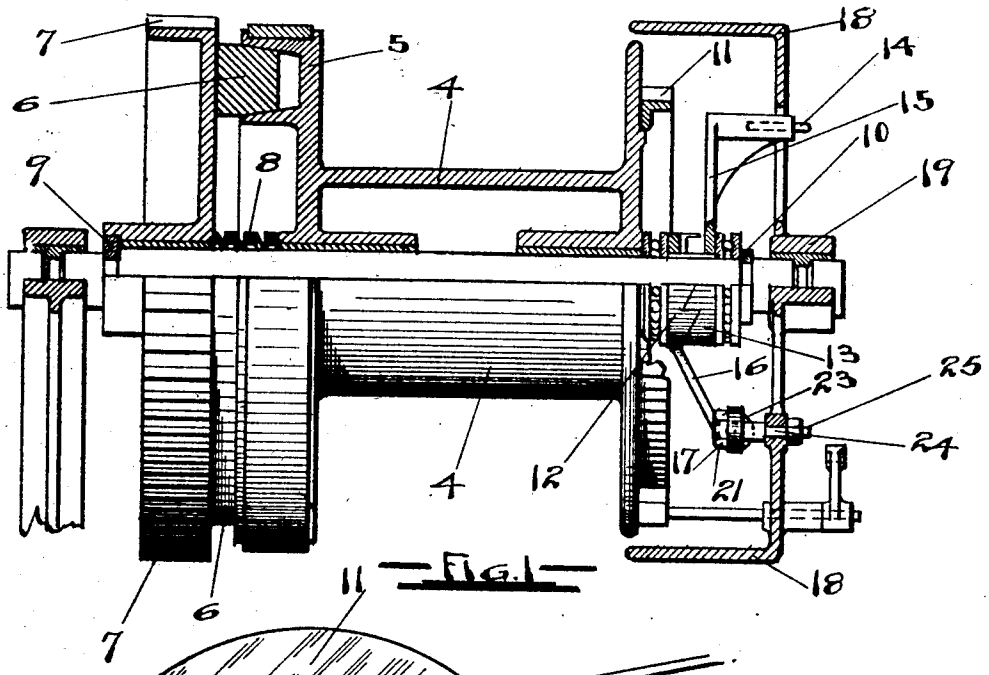


Fig. 1

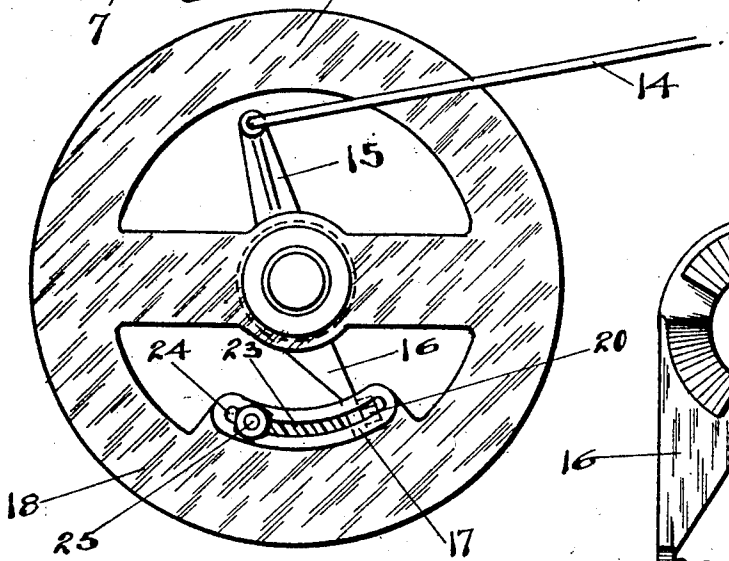


Fig. 2

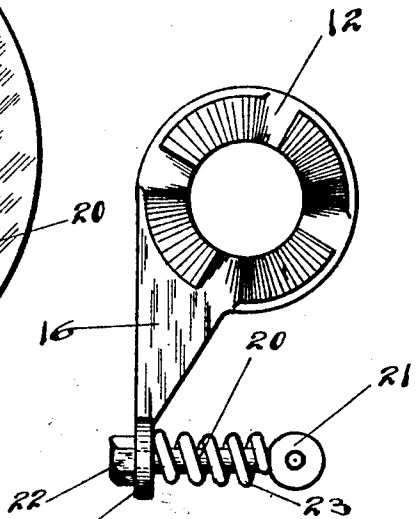


Fig. 3

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Patented Apr. 19, 1927. 1,625,769

UNITED STATES PATENT OFFICE.

ALFRED J. ERSTED, OF PORTLAND, OREGON.

CLUTCH-ENGAGING DEVICE.

Application filed October 5, 1925. Serial No. 60,646.

My invention relates to clutch engaging devices in general, and particularly to such devices as are used upon hoisting machines to engage the clutch portion of the drum with the driving portion of the clutch. The object of my invention is to provide mechanism that will always engage the clutch members with the same pressure therebetween, to predetermine said pressure to be approximately but little above that required to effect the satisfactory driving of the clutch independently of the operator, and that will eliminate all overstraining of the various parts due to efforts of the operator to use all possibile force upon the operating lever.

With these and incidental objects in view, the invention consists in certain novel features of construction and combination of parts, the essential elements of which are set forth in the appended claims and a preferred form of embodiment of which is hereinafter shown with reference to the drawings which accompany and form a part of this application.

Fig. 1 is an elevation of a hoisting drum and clutch, partially in section, with my device installed thereon.

Fig. 2 is an end elevation of the same.

Fig. 3 is a detail of the drum engaging helix member.

Like reference characters refer to like parts throughout the several views.

In general my device consists of a pair of coacting helix members mounted upon the shaft intermediate the drum and a collar upon said shaft, one of said members being rotatably operated by the operator of the machine, and the other of said members secured from rotation by a yieldable structure.

The type of hoisting machine to which my device is particularly applicable is shown in Fig. 1, wherein 4 is the hoisting drum, 5 the female clutch member mounted upon the drum and adapted to engage with the male clutch member 6 mounted upon a driving gear 7. The drum and gear are each mounted in a rotatable manner upon the shaft with the usual releasing spring 8 therebetween, and retaining collars 9 and 10 mounted within grooves in the shaft to receive all longitudinal pressure. The drum is also provided with a ratchet 11. That is the usual construction of such hoisting machines.

To engage the clutch members 5 and 6 the drum is moved longitudinally upon the shaft, and to effect this longitudinal movement of the drum a pair of coacting helix members 12 and 13 are provided. These members are rotatably mounted upon the shaft intermediate the drum and the collar 10, and conveniently ball bearing thrust members are installed upon each side of the helix members, as shown in Fig. 1.

The helix member 13, being that adjacent the collar 10 as illustrated, is provided with an operating rod 14 connected to an arm 15 which is secured to the helix member 13, preferably being constructed integral therewith, as shown. The rod 14 also connects with suitable operating mechanism not shown in the drawing.

The helix member 12 is also provided with an arm 16 terminating in an orificed eye 17, the axis of said orifice being normal to the axis of the drum shaft.

A housing 18 incloses the above described mechanism as shown in Fig 1, and upon said housing is a bearing 19 for the drum shaft.

Mounted within the orifice of the eye 17 is an eye bolt 20 having an eye 21 upon one extremity thereof and a nut 22 securing the eye bolt to the member 17, as shown in detail in Fig. 3.

Upon the eye bolt 20 is a spring 23, which spring is preferably given an initial compression as it is assembled between the eye 21 and the member 17.

The housing, or support, 18 is provided with an arcuate slot 24 formed concentric with the drum shaft and spaced from the center of the drum shaft a distance equal to the length of the arm 16, and a stud 25 is adjustably mounted in said slot and is adapted to engage the eye 21 of the bolt 20.

When the operator, by means of the rod 14, and the mechanism (not shown) to which said rod is attached, rotates the helix member 13, the helix member 12 moves longitudinally of the drum shaft and away from helix 13, the helix member 12 being held stationary by the arm 16, bolt 20 and stud 25 secured to the housing. The axial separation of the helix members forces the drum 4 and its clutch member 5 toward the gear 7 and its clutch member 6, thus engaging said clutch members and causing the drum to be driven by the gear 7.

If, after said clutch members have been

engaged with sufficient pressure to effect the driving of the drum, the operator continues to exert additional force upon the rod 14, the two helix members 12 and 13 will then limitedly rotate as a unit about the drum shaft and the arm 16 of the helix 12 will press upon the spring 23, at the same time the compressing of the spring 23 will maintain pressure between the clutch members approximately constant.

In actual practice, the operator may be positioned at some distance from the hoist, and would therefore be unable to see that the clutches were properly engaging or would be unable to observe when the engagement occurred. Therefore, provision must be made whereby the operator can tell whether the clutches properly engage after exerting pressure upon the bar 14 through the medium of the operating mechanism connected therewith, so that in the event he should continue to exert pressure upon the bar 14 after the clutch faces have engaged sufficiently to cause the drum 4 to revolve, both of the helix members will as before stated, limitedly rotate upon the drum shaft as a unit, and the arm 16 of the helix 12 will press upon the compression spring 23, which had theretofore been compressed to give an initial load or compression of slightly greater force than that required to properly engage the clutch faces. The operator can then tell, by the "feel" or back pressure of the spring 23, exerted upon the helices, the rod 14, and the operating mechanism, that the clutches are properly engaged. Of course, in actual practice, where the operator is near the device and can watch the actual engagement of the clutch members, little or no compression need be given to the spring 23, and in fact there may be a little play between the eye 17 and the compression spring 23.

The spring 23 also is a controlling element, controlling the pressure between the clutch members, and maintaining said pressure approximately constant and at a measured value predetermined by the initial compression placed in the spring.

Adjustment for the wear of the clutch members and other parts of the device is effected by moving the stud 25 in the slot 24 and securing said stud in the desired position.

My device may be made of any materials and constructed of any size found convenient and suitable for a device of this character, and while I have illustrated and described a form of construction and arrangement of parts found desirable in materializing my invention, I wish to include in this application all mechanical equivalents and substitutes that may fairly be considered to come within the scope and purview of my invention as defined in the appended claims.

While the form of mechanism herein shown and described is admirably adapted to fulfill the objects primarily stated, it is to be understood that it is not intended to confine the invention to the one form of embodiment herein shown and described, as it is susceptible of embodiment in various forms, all coming within the scope of the claims which follow:

What I claim is:—

1. In a clutch engaging device: a pair of coacting helix members; a slotted housing enclosing said members; means to rotate one of said members; and yieldable mechanism adjustably mounted within the slot of said housing for holding the other of said helix members stationary.

2. In a clutch engaging device: a pair of coacting helix members; mechanism for rotating one of said members; a slotted housing enclosing said helix members; mechanism for holding one of said helix members substantially stationary, said mechanism being yieldably and adjustably secured within the slot of said housing.

3. In a clutch engaging device, a pair of coacting helix members, a housing enclosing said members and having an arcuate slot therein; means to rotate one of said helix members, adjustable mechanism securing the other of said helix members within the arcuate slot of said housing; and a spring rendering said adjustable mechanism yieldable.

4. In a clutch engaging device; a pair of coacting helix members; a housing enclosing said members, and having an arcuate slot formed therein; a member adjustably mounted within said slot; an arm upon one of said helix members; yieldable mechanism connecting said arm and said member; and means for rotating the other of said helix members.

5. In a clutch engaging device; a pair of coacting helix members; means for relatively rotating said helix members until a predetermined longitudinal pressure results; means permitting said helix members to limitedly rotate as a unit after said predetermined longitudinal pressure is obtained; and an element arcuately movable about said last mentioned means for adjusting said last mentioned means.

6. In a clutch engaging mechanism; a shaft, a housing supporting said shaft and having an arcuately curved slot therein; a pair of coacting helix members upon said shaft; mechanism for relatively rotating said helix members; an arm upon one of said helix members; a bolt transversely positioned relatively to said shaft and slidably mounted upon said arm; a member secured to said bolt and adjustably mounted in the slot of said housing; and a spring upon said bolt intermediate said arm and said member.

7. In a clutch engaging mechanism; a

shaft; a housing having an arcuately curved slot therein, a pair of coacting helix members upon said shaft adjacent said housing; a member adjustably mounted in the slot of said housing; mechanism for relatively rotating said helix members; and yieldable mechanism connecting said member with one of said helix members to hold said member substantially fixed.

8. In a clutch engaging mechanism; a shaft; a member having a slot therein arcuately curved about said shaft; coacting helix members upon said shaft; a member adjustably mounted in the curved slot of said member; yieldable mechanism connecting one of said helix members with said member; and mechanism to relatively rotate said helix members.

9. In a clutch engaging device; a pair of coacting helix members; mechanism for relatively rotating said helix members until longitudinal pressure results; mechanism permitting said helix members to limitedly rotate as a unit after said pressure is obtained; and an element arcuately movable about said last mentioned mechanism for adjusting said last mentioned mechanism.

10. In a clutch-engaging mechanism, a shaft, a supporting member, a pair of co-acting helix members upon said shaft, means for relatively rotating said helix members, an arm upon one of said helix members, a bolt transversely positioned relative to said shaft, said bolt being secured to said support member and slidably engaging said arm, and a yieldable member upon said bolt intermediate said arm and said support member.

11. In a clutch engaging device, a shaft, a support member, a pair of co-acting helix members upon said shaft, an element adjustably mounted upon said support, an arm upon one of said helix members, yieldable mechanism connecting said arm and said element; and means for oscillating the other of said helix members.

12. In a clutch engaging device, a shaft, a support member, a pair of coacting members positioned about said shaft, said members being provided with coacting faces whereby relative rotation of said members may produce axial pressure, an element adjustably mounted upon said support, an arm upon one of said coacting members, yieldable mechanism connecting said arm and said element, and means for oscillating the other of said coacting members.

In witness whereof I claim the foregoing as my own I hereunto affix my signature at Portland, county of Multnomah, State of Oregon, this 10th day of Sept., 1925.

ALFRED J. ERSTED.