May 13, 1952 F. W. COFFING 2,596,326

FABRIC BELT HOIST

Filed Nov. 27, 1950

FIG. 1

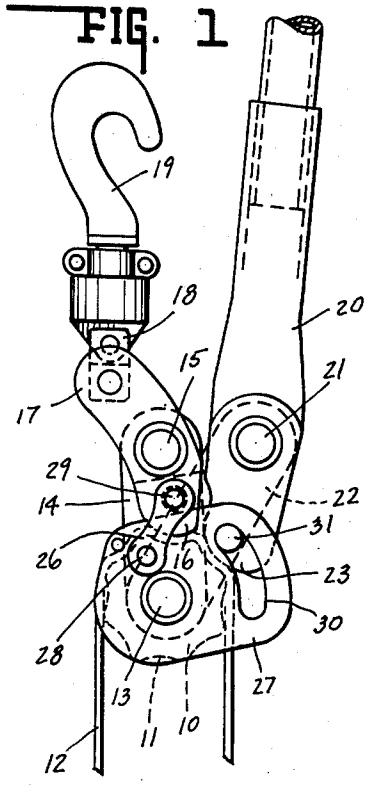


FIG. 2

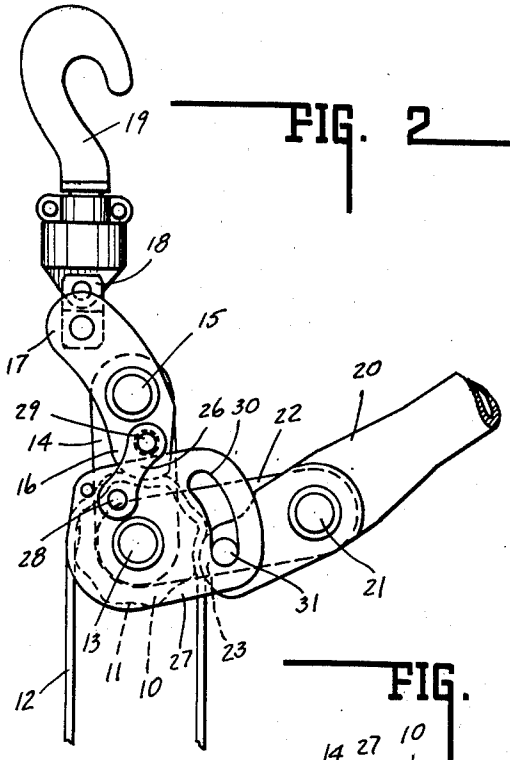


FIG. 3

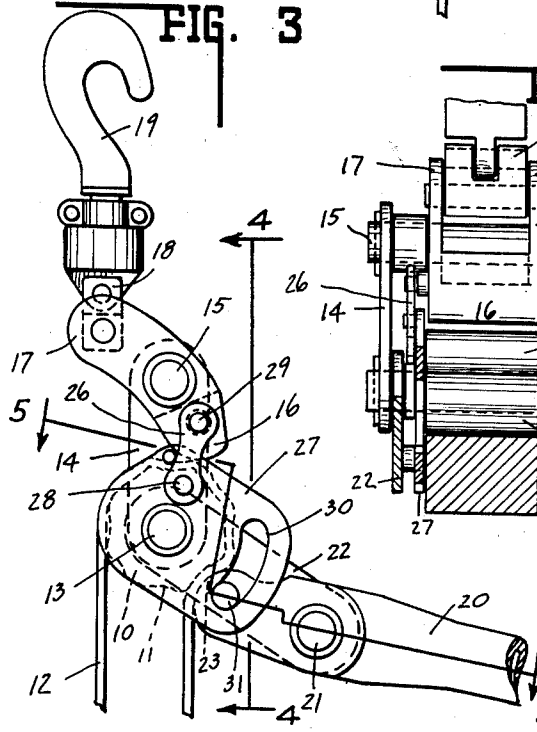
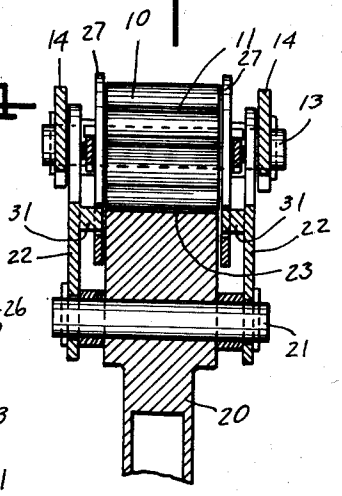


FIG. 4

FIG. 5



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Patented May 13, 1952

2,596,326

UNITED STATES PATENT OFFICE

2,596,326

FABRIC BELT HOIST

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Application November 27, 1950, Serial No. 197,774

7 Claims. (Cl. 254—167)

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The present invention relates to improvements in pulling devices and primarily to pulling devices of the type adapted for use in hoisting and lowering loads. More particularly, the invention relates to that type of pulling device wherein the fabric belt is used as a hoisting and lowering medium.

It is one of the objects of the invention to provide a hoisting device wherein there is provided a drum over which a flexible, relatively inextensible hoisting belt is adapted to pass and be moved thereover by step by step movement imparted to the drum through the medium of a lever.

Another object of the invention is that of providing the brake means for normally holding the drum against rotation under load during the reciprocating release movement of the operating lever.

A further object of the invention is to provide means whereby during the lowering operation the drum is permitted to rotate under the weight of the load being restrained against excessive rotation by the operating lever and means of providing for during this lowering operation releasing the braking means which is normally operative under the weight of the load.

The full nature of the invention will be understood from the accompanying drawings and the following description and claims:

For the purpose of illustrating the invention an embodiment thereof is illustrated in the accompanying drawings in which

Fig. 1 is a side elevation of a hoist embodying the invention with certain of the links of the structure removed for the purpose of clarity.

Fig. 2 is a similar view to Fig. 1 showing the operating lever at its lowermost hoisting position.

Fig. 3 is a similar view showing the operating lever in a position to reverse the holding means.

Fig. 4 is a sectional view on the line 4—4 of Fig. 3.

Fig. 5 is a sectional view on the line 5—5 of Fig. 3.

In the embodiment illustrated there is provided a hoisting drum 10 having its periphery corrugated to provide axially extending grooves 11 and over this drum there is adapted to pass a hoisting belt or tape 12 which is formed of fabric preferably of the type which is flexible and is relatively inextensible. It has been found that a belt woven of nylon provides a very satisfactory structure as it has extremely long wearing qualities and is extremely flexible while being practically inextensible.

This drum 10 is rotatably mounted upon a

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shaft 13 which is supported between a pair of side links 14. Pivotally mounted on the shaft 15 extending between the upper ends of the side links 14 is a holding pawl which has somewhat the formation of a bell crank lever and is provided with a holding nose 16 adapted to engage in the grooves 11 of the drum 10. The outer end of this holding pawl is bifurcated to provide a pair of arms 17 between which is mounted a block 18 swingably connected to the shank of a hook 19.

It is to be noted that due to the configuration of the holding pawl and the angular disposition of its shaft 15 with respect to a line passing vertically through the holding hook 19 the weight of the load will bias the nose 16 into the grooves 11 of the drum 10 thereby frictionally locking the belt into the grooves and at the same time locking the drum against rotative movement.

For rotating the drum 10 I provide an operating handle or lever 20 pivoted on a shaft 21 extending between a pair of links 22, the lower ends of which are pivotally mounted on the shaft 13. This lever is extended beyond the pivot point 21 to provide an engaging nose 23 which through the combined action of swinging the links 22 on the pivot 13 and swinging the lever 20 on the shaft 21 is adapted to be moved into the grooves 11 of the drum 10.

The arrangement is such that starting at the upward position on the lever as shown in Fig. 1 as the lever is pulled downwardly the nose 23 is forced into a groove of the drum and with a continued downward movement and with it the drum is rotated and with it the belt 12 so that a hoisting action is imparted to one side of the belt. As the lever is swung upwardly after having completed its downward lifting movement the nose 23 is somewhat released from the grooves 11 riding over the corrugations, but at the same time the nose 16 of the holding pawl is forced into one of the grooves thereby locking the belt or tape against reverse rotation and holding the belt or tape against movement.

The normal raising and lowering positions of the operating lever 20 is illustrated in Figs. 1 and 2. For lowering the load it is necessary to release and hold in its released position the holding pawl including its engaging nose 16 and rely on the holding effect of the lever nose 23 in the grooves of the drum 10, the lever engaging the grooves at its lowermost position and gripping the same to hold the fabric belt from slipping and to restrain the same from slipping backwards and the drum from undue rotation as the lever is moved upwardly.

To this end I provide a pair of releasing and

holding links 26 which are so disposed that during the hoisting movement of the lever 20 the holding pawl will be normally operative but when the lever 20 is moved beyond a predetermined lowermost position these links are thrown into a position to move and hold the holding pawl out of effective position. For operating these links there is provided on opposite sides a pair of operating plates 27 which are oscillatingly mounted on the shaft 13. One of the ends of the links 26 is pivotally connected as at 28 to this plate and the opposite ends of the links are pivotally connected as at 29 to the lower end, or nose end, of the holding pawl. The angle of these links is such that when the plate 27 is locked to its uppermost position the links will be ineffective to hold the pawl member out of operative position.

To permit the normal oscillation of the lever 20 for elevating the load or rotating the drum 10 in a clockwise direction, these plates at their outer ends are slotted as at 30 to receive side pins 31 on the links 22 connected to the lever 20. During normal raising operation this pin oscillates in the slot 30 from the position illustrated in Fig. 1 to the position illustrated in Fig. 2 and during this movement the lever is adapted to engage the grooves 11 of the drum and on its downward movement rotate the drum in a clockwise direction rotating with the belts 12 for hoisting purposes. On its upward movement the lever is swung on its shaft 21 to a releasing position but at this time the nose 16 of the holding pawl will press into one of the grooves of the drum holding the belt against slippage during the releasing movement of the lever 20. In event, however, it be desired to permit the weight of the load to rotate the drum 10 in a counter-clockwise direction under the control of the lever 20, the lever is moved to its extreme downward position, the position illustrated in Fig. 3, and as the lever is moved past the predetermined lowermost point indicated at Fig. 3 the pins 31 will engage the bottom ends of the slots 30 rocking the plates in a clockwise direction on the shaft 13 and thereby moving the lower end of the links 26 to a camming position, or the position illustrated in Fig. 3, wherein the links are moving practically past dead center and maintain the holding pawl in its released position. At the same time, however, the nose of the lever 20 engages the drum holding the drum against rotation except as the operator permits the lever to move upwardly.

As the lever moves upwardly to the limit of its movement as shown in Fig. 1, the pins 31 will engage the top wall of the slot 30 rocking the plates 27 in an opposite direction to move the links into neutral position.

On the next downward stroke of the lever, and due to its pivotal connection at 21 this downward stroke may be taken without engaging the same with the drum with the lever moving to its extreme downward position and then swing into engagement with the drum. Another controlled clockwise movement of the drum may be permitted under the weight of the load.

The invention claimed is:

1. In a pulling device in combination a peripherally corrugated rotatable drum, a shaft for said drum, a pair of links between which said shaft is mounted, a supporting holding pawl pivotally supported between said links and having a holding nose biased into braking engagement with the corrugations of said drum by the weight of the load, a relatively inextensible flexible hoisting belt carried by said drum, a pair of links pivoted on said drum shaft, an operating lever pivotally mounted between said links having a nose engageable with the corrugations of said drum and effecting a rotation of said drum in a hoisting direction by the downward rocking of said lever to a predetermined point, and means operating by a downward movement of said lever beyond said predetermined point for maintaining said pawl holding means ineffective during the oscillation of said lever below said predetermined point.

2. In a pulling device in combination a peripherally corrugated rotatable drum, a shaft for said drum, a pair of links between which said shaft is mounted, a supporting holding pawl pivotally supported between said links and having an engaging nose biased into holding engagement with the corrugations of said drum by the weight of the load, a relatively inextensible flexible hoisting belt carried by said drum, a pair of links pivoted on said drum shaft, an operating lever pivotally mounted between said links having a nose engageable with the corrugations of said drum and effecting a rotation of said drum in a hoisting direction by the downward rocking of said lever to a predetermined point, and means operating by a downward movement of said lever beyond said predetermined point for maintaining said pawl holding means ineffective during the oscillation of said lever below said predetermined point, said means being operable to render said holding means effective when the lever is moved above said predetermined point.

3. In a pulling device in combination a peripherally corrugated rotatable drum, a shaft for said drum, a pair of links between which said shaft is mounted, a supporting holding pawl pivotally supported between said links and having a holding nose biased into holding engagement with the corrugations of said drum by the weight of the load, a relatively inextensible flexible hoisting belt carried by said drum, a pair of links pivoted on said drum shaft, an operating lever pivotally mounted between said links having a nose engageable with the corrugations of said drum and effecting a rotation of said drum in a hoisting direction by the downward rocking of said lever to a predetermined point, and means operated by the downward movement of said lever beyond a predetermined point and movable into a fixed position for rendering said holding pawl ineffective.

4. In a pulling device in combination a peripherally corrugated rotatable drum, a shaft for said drum, a pair of links between which said shaft is mounted, a supporting holding pawl pivotally supported between said links and having a holding nose biasing into holding engagement with the corrugations of said drum by the weight of the load, a relatively inextensible flexible hoisting belt carried by said drum, a pair of links pivoted on said drum shaft, an operating lever pivotally mounted between said links having a nose engageable with the pockets of said drum and effecting a rotation of said drum in a hoisting direction by the downward rocking of said lever to a predetermined point, and means operated by the downward movement of said lever beyond a predetermined point and movable into a fixed position for rendering said holding pawl ineffective, said means being movable out of its fixed holding position by the rocking of the lever upwardly beyond said predetermined point.

5. In a pulling device in combination, a peripherally corrugated rotatable drum, a shaft for said

drum, a pair of links between which said shaft is mounted, a supporting pawl supported between said links and having a holding nose biased into braking engagement with the corrugations of said drum by the weight of a load, a flexible relatively inextensible hoisting belt carried by said drum, a pair of links pivoted on said drum shaft, an operating lever pivotally mounted by the said links having a nose engageable with the pockets of said drum and effecting a rotation of said drum in a hoisting direction by the downward rocking of said lever, rocking plates mounted on said drum shaft, means operated by the rocking of said plates in one direction for moving and holding said holding pawl in disengaged position and means operated by said lever for operating said rocking plates.

6. In a pulling device in combination, a peripherally corrugated rotatable drum, a shaft for said drum, a pair of links between which said shaft is mounted, a supporting pawl pivotally supported by the said links and having a holding nose biased into braking engagement with the corrugations of said drum by the weight of the load, a flexible relatively inextensible hoisting belt carried by said drum, a pair of links pivotally mounted on said drum shaft and an operating lever pivotally mounted between said links having an engaging nose movable into engagement with the pockets of said drum, operating links connected to the holding nose of said holding pawl and movable in one direction for moving said holding nose out of engaging position relatively to the corrugations of said drum, rocking plates for swinging said links into operative position operated by said lever and a lost motion connection between said lever and said rocking plates.

7. In a pulling device in combination, a peripherally corrugated rotatable drum, a shaft for said drum, a pair of links between which said shaft is mounted, a supporting holding pawl pivotally supported by the said links and having a holding nose biased into holding engagement with the corrugations of said drum by the weight of a load, a flexible relatively inextensible hoisting belt carried by said drum, a pair of links pivotally connected to said hoisting drum shaft and an operating lever pivotally connected between the ends of said links and having a nose swingable into and out of engagement with the corrugations of said drum, rocking plates mounted on said drum shaft, operating links extending between said rocking plates and the nose of said holding pawl, and means carried by said lever having a lost motion connection with said rocking plates for rocking the plates in one direction to move the links past dead center to raise the holding nose out of engagement with said drum and maintaining the same in said position and movable in an opposite direction to move one end of the links past dead center to release said holding drum.

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