March 24, 1925. 1,530,499

R. W. KNODE

CONVEYER LIFTING DEVICE

Filed Oct. 26, 1922

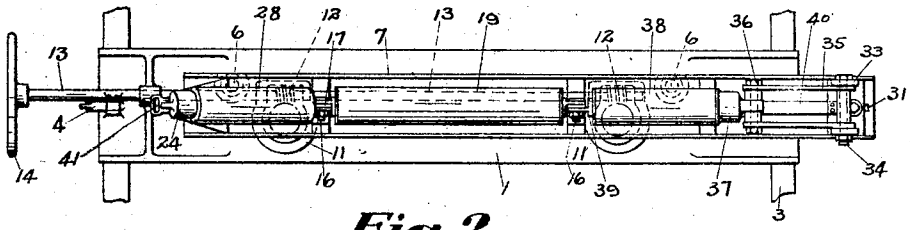


Fig. 2

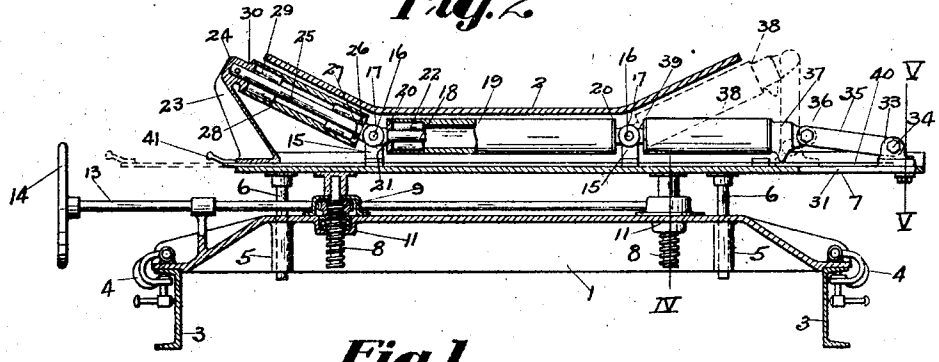


Fig. 1

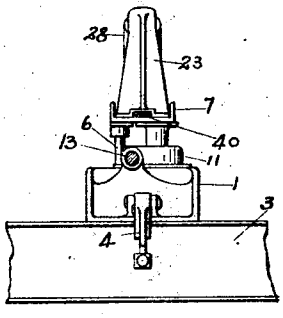


Fig. 3

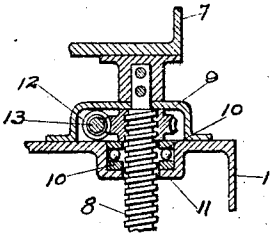


Fig. 4

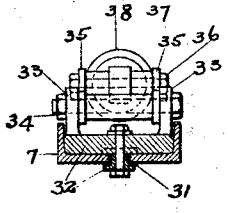


Fig. 5

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UNITED STATES PATENT OFFICE.

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CONVEYER-LIFTING DEVICE.

Application filed October 26, 1922. Serial No. 597,125.

To all whom it may concern:

Be it known that I, RUSSELL W. KNODE, a citizen of the United States, residing at Columbus, in the county of Franklin and State of Ohio, have invented certain new and useful Improvements in Conveyer-Lifting Devices, of which the following is a specification, reference being had therein to the accompanying drawing.

The present invention relates to certain new and useful improvements in conveyer lifting devices adapted to be inserted beneath a trough conveyer belt and to lift said belt from its supporting idlers to facilitate their renewal or repair.

In many industries large quantities of material are moved by endless belt conveyers under conditions requiring their continuous operation for long periods of time. In such installations interruption of the conveyer service is commonly accompanied by the cessation of other activities, causing great inconvenience and financial loss. The idler pulleys upon which such belts are supported often operate under conditions which produce relatively frequent failure of these parts, and heretofore such failures have necessitated the interruption of conveyer service until the completion of repairs or renewals of the damaged idler pulleys.

It is the especial object of this invention to provide a lifting device which may be expeditiously and conveniently adjusted in position to lift and support the conveyer belt to permit renewal or repair of a defective idler pulley without interruption to the service of the conveyer.

The devices by which I attain this object are fully set forth in the following specification, and illustrated in the accompanying drawings of which—

Fig. 1, is a side elevation partly in section of the preferred embodiment of my invention.

Fig. 2, is a plan view of the devices illustrated in Fig. 1.

Fig. 3, is an end elevation of the devices illustrated in Figs. 1 and 2.

Fig. 4, is a sectional view taken along the line IV.—IV. of Fig. 1.

Fig. 5, is a sectional view taken along the line V—V of Fig. 1.

Like numerals refer to similar parts in the several figures.

As shown in the drawings my improved belt lifter or jack comprises a main frame 1 adapted to be inserted beneath the carrying strand of an endless belt conveyer 2, and to be supported upon any suitable members of the supporting structure such as the longitudinally extending channel bars 3. Clamping members 4 are hinged to the main frame 1, and are adapted to engage the flanges of the channel bars 3 to securely hold the apparatus in position. Formed in the main frame 1 are two vertically extending guideways 5 in which are slidably mounted the guide members 6 which are attached to the under side of the jack frame 7. The jack frame 7 is composed of a suitable channel bar, and to its lower side are rigidly attached two downwardly projecting screw shafts 8 which extend through suitable apertures of the main frame 1, and are engaged by the nuts 9. The nuts 9 rest upon ball bearing thrust collars 10 mounted in suitable recesses 11 of the main frame, and are arranged to support the weight of the jack frame. Formed on the peripheries of the nuts 9 are worm gear teeth which engage the worms 12 formed integral with a transversely extending shaft 13. The shaft 13 is rotatably mounted in suitable bearings of the main frame 1, and is provided with a hand wheel 14, convenient to the hand of the operator, by the rotation of which the nuts 9 may be rotated to move the screw shafts 8 upwardly or downwardly to vertically adjust the jack frame 7 relative to the main frame 1.

Projecting upwardly from the jack frame 7 are two lugs 15 having transverse apertures through which extend the coupling bolts 16. The coupling bolts 16 also extend through suitable apertures in the heads 17 formed on the ends of inwardly projecting stud shafts 18. The stud shafts 18 project into the pulley 19 which is composed of a length of metallic tubing having a hardened and polished steel plate 20 fitted into each end and adapted to engage the shoulders 21 formed on the heads 17 of the stud shafts to limit longitudinal movement of the pulley. Positioned within the pulley 19 are a plurality of longitudinally extending rollers 22 which engage the stud shafts 18 and constitute antifriction bearings for the support of the pulley 19.

At the operating end of the jack frame 7

is rigidly attached an upwardly projecting bracket 23 having a socket 24 into which is fixed the upper end of an inclined shaft 25. Upon the lower end of the shaft 25 is formed a head 26 having an eye which engages the coupling bolt 16, and this head is also provided with a shoulder to engage the hardened and polished steel plate 27 fitted into the lower end of the inclined pulley 28. The pulley 28 is of similar construction with the pulley 19 and is provided at each end with a plurality of longitudinally extending rollers 29 which engage the inclined shaft 25 to form antifriction bearings for the support of the pulley 28. The upper end of the pulley 28 is closed by a suitable flange 30 formed on the socket 24 which fits sufficiently close to exclude dirt from the inside of the pulley without occasioning frictional resistance to its rotation.

Formed in the jack frame 7 near the end opposite the operator is a longitudinally extending slot 31 in which is slidably mounted a slide block 32. Formed on the slide block 32 are upwardly projecting lugs 33 through which extends the pivot bolt 34. Freely mounted upon the pivot bolt 34 are two links 35 which also engage a coupling bolt 36 attached to the head 37 of a shaft similar to the shaft 25, upon which is mounted a pulley 38 of similar construction to the pulley 28. At its lower end this shaft is provided with a head 39 which pivotally engages the coupling bolt 16. Attached to the slide block 32 is a pull rod 40 extending longitudinally of the jack frame and provided with a handle 41 convenient to the hand of the operator.

When one of the idler pulleys which support the belt 2 has become deranged, my improved lifting jack may be inserted beneath the belt adjacent the defective idler pulley, and the clamping members 4 adjusted to securely hold the main frame 1 in operative relation to the belt. By pulling the pull rod 40 towards him the operator will cause the pulley 38 to assume the inclined position shown by dotted lines in Fig. 1. The operator then rotates the hand wheel 14 to elevate the jack frame 7 to cause the pulleys 19, 28, and 38 to engage the conveyer belt 2 and lift it clear of the defective idler pulley. The conveyer belt 2 may thus continue in operation during the repair of the defective parts, after which the hand wheel 14 may be rotated to lower the pulleys 19, 28, and 38 away from contact with the conveyer belt. The rod 40 may be pushed from the operator to restore the pulley 38 to its horizontal position, the clamping members 4 loosened and the entire apparatus withdrawn, to be available for use at another time and place.

From the foregoing it will be seen that the movable pulleys 38 when aligned with the pulleys 19 as shown in Figure 1, permit by reason of their unobstructed ends the slipping of the apparatus beneath a conveyer belt without interference. Furthermore, by placing the slide block operating handle 41, and the wheel 14 of the frame adjusting shaft 13 on the same side, the operator, after placing the device, can readily manipulate the pulley raising mechanism and the frame adjusting mechanism.

What I claim is:—

1. In an apparatus of the class described, the combination with a main frame adapted to be removably secured in position beneath a conveyer belt, an auxiliary frame adjustably connected with said main frame, a plurality of idler pulleys mounted upon said auxiliary frame, and means to vertically adjust said auxiliary frame relative to said main frame as and for the purpose set forth.

2. In an apparatus of the class described, the combination with a main frame adapted to be removably secured in position beneath a conveyer belt, an auxiliary frame adjustably connected with said main frame, a plurality of idler pulleys mounted upon said auxiliary frame, means to adjust some of said pulleys to conform to the contour of said conveyer belt, and means to vertically adjust said auxiliary frame relative to said main frame as and for the purpose set forth.

3. In an apparatus of the class described, the combination with a main frame adapted to be removably secured in position beneath a conveyer belt, an auxiliary frame adjustably connected with said main frame, a plurality of idler pulleys mounted upon said auxiliary frame, manually controllable devices to adjust some of said pulleys to conform to the contour of said conveyer belt, and manually controllable means to vertically adjust said auxiliary frame relative to said main frame as and for the purpose set forth.

4. In an apparatus of the class described, the combination of a main frame adapted to be removably mounted beneath a conveyer belt, an auxiliary frame adjustably connected with said main frame, a plurality of flexibly connected idler pulleys mounted upon said main frame with the ends of some of said pulleys unobstructed, means for raising or lowering some of said pulleys to inclined or aligned positions relative to others of said pulleys, and means for adjusting said auxiliary frame vertically.

5. In an apparatus of the class described the combination of a main frame adapted to be removably mounted beneath a conveyer belt, an auxiliary frame adjustably connected with said main frame, a plurality of flexibly connected idler pulleys mounted upon said main frame with the ends of some of said pulleys unobstructed, means for raising or lowering pulleys on one side of said frame to inclined or aligned positions rela-

tive to others of said pulleys, and means for adjusting said auxiliary frame vertically.

6. In an apparatus of the class described, the combination of a main frame adapted to be removably mounted beneath a conveyer belt, an auxiliary frame adjustably connected with said main frame, a plurality of flexibly connected idler pulleys mounted upon said main frame to lie transversely of a conveyer with the ends of some of said pulleys unobstructed, slide blocks connected with pulleys on one side of said frame, means operable from the other side of said frame to move said slide blocks and raise or lower pulleys to inclined or aligned position relative to others of said pulleys, and means operable from the same side of the frame as the slide block operating means to adjust said auxiliary frame vertically.

In testimony whereof, I affix my signature.

RUSSELL W. KNODE.