Jan. 8, 1952 F. W. COFFING 2,581,577

HOIST JACK

Filed Feb. 18, 1950 2 SHEETS--SHEET 1

FIG. 1

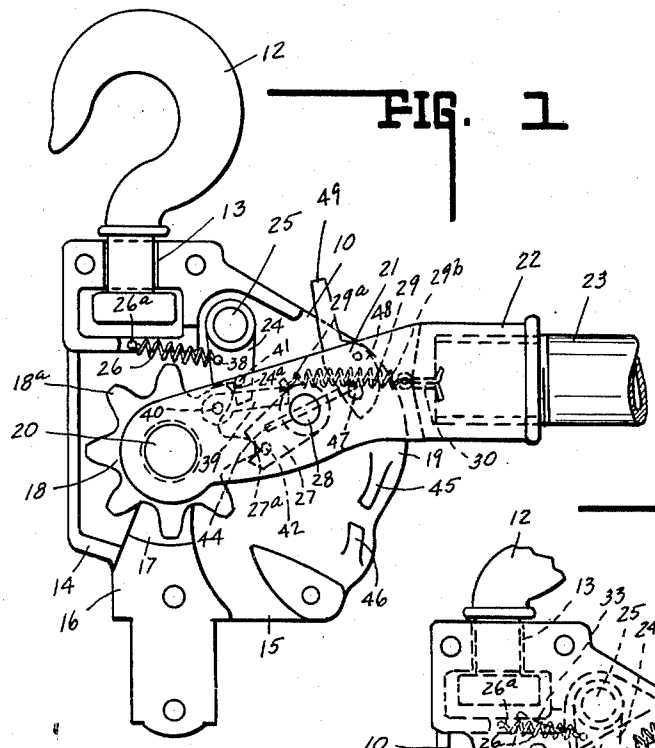


FIG. 3

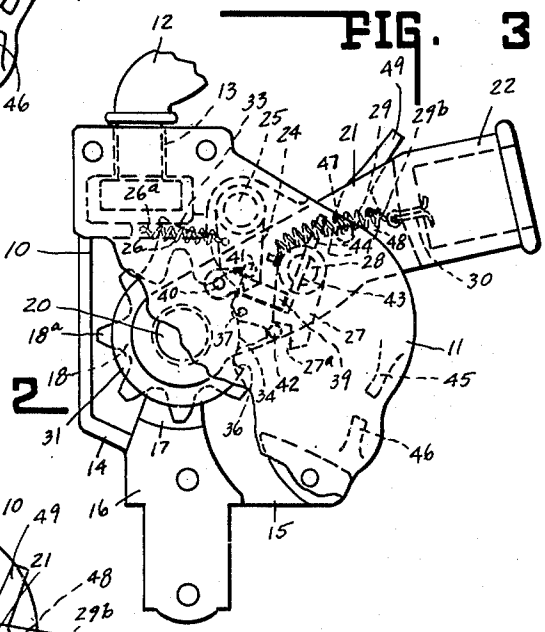
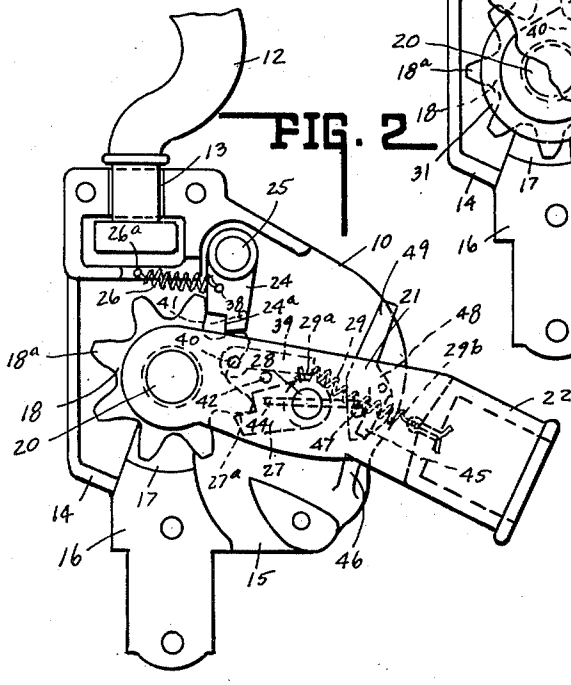


FIG. 2



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FIG. 4

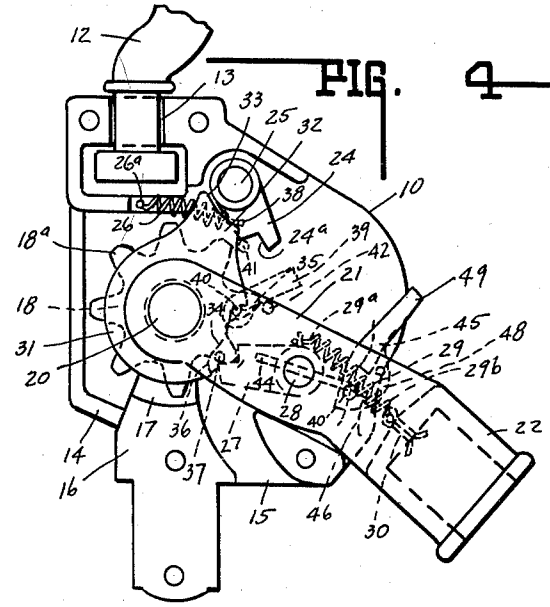
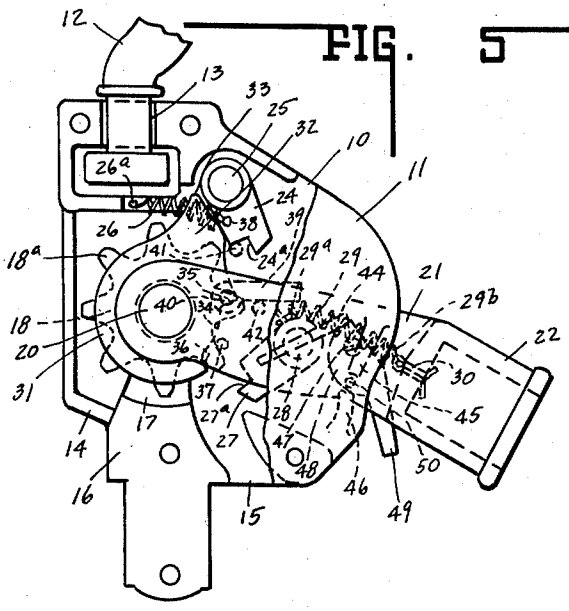


FIG. 5



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2,581,577

HOIST JACK

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Application February 18, 1950, Serial No. 145,075

6 Claims. (Cl. 254—167)

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This invention relates to a hoist structure that comprises a pair of pawls, an oscillatory handle, a housing and a wheel therein arranged to support a flexible, relatively inextensible elongated means such as a log or coil chain, a sprocket or side link and pintle chain, or a web or tape.

In each instance the wheel conforms to the said means, thus a pocket wheel can be utilized with the log chain, a sprocket wheel with the sprocket chain, and a corrugated wheel with the tape or web. In the first instance the flatwise links on the wheel provide pawl abutments, in the second instance the sprocket chain pintles and the like provide pawl abutments, and in the last instance the wheel corrugations conform the tape to provide abutments therein for pawl association.

In each of the aforesaid types the operative ends of the pawls are identical, and each pair conforms to the flexible means, all as more fully illustrated in the copending application Serial No. 148,727, filed March 9, 1950, and entitled Full Automatic Hoist and Binder.

The foregoing is set forth to emphasize the universal adaptability of the present invention for herein the sprocket chain embodiment only has been selected for purposes of illustration. It is further pointed out that while this selected form bears some resemblance to the hoist shown in Patent No. 2,377,324, dated June 5, 1945, and the present hoist has, in common therewith, the parts initially enumerated herein and the basic movements of the said similar parts are similar, the present invention is otherwise essentially different as hereinafter pointed out.

Herein merely to emphasize departures from said patented hoist, the invention is illustrated in the form wherein the pawls engage the sprocket teeth on the wheel, although the wheel need not include such teeth, see said application aforesaid.

The chief object of the present invention is to provide a hoist of the two pawl, oscillatory handle type wherein load moving in opposite directions, as for example load raising and load lowering, is effected in step by step increments and automatically in that no separate or additional manual control is required to shift from one operation or movement to the other.

The chief feature of the present invention resides in oscillation of the handle to different degrees of the total possible handle oscillation to thereby selectively effect load raising and load lowering, these terms being utilized herein in their broad relative sense as previously indicated.

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In the present invention so-called "free chain" movement can be effected. In this instance a manually operable control is provided. This feature is broadly disclosed in the aforesaid patent but herein, as distinguished therefrom, the handle, when the hoist is manually conditioned for free chaining, is locked against oscillation.

The present invention has the further advantage that for successful operation it is not dependent upon critical values of the springs associated with the pawls, which dependency is present in the aforesaid patented hoist. The present invention, accordingly, eliminates in production, dependence upon spring manufacturers, in other words, the present hoist is positive and certain in operation regardless of minor variations in springs.

Other objects and features of the invention will be set forth more fully hereinafter.

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

In the drawings, Fig. 1 is a side elevation of a sprocket embodiment of the invention, one side plate of the housing being omitted, the parts being shown in the "up" limit of handle movement for load raising.

Fig. 2 is a similar view, the parts being shown in the "down" limit of handle movement for load raising.

Figs. 3 and 4 are similar views respectively for load lowering.

Fig. 5 is a similar view with parts in the "free" chain position.

Since the hoist selected for illustration is of the sprocket chain type, and since the invention can work directly upon the flexible means or the sprocket wheel, if such a wheel be used, the illustration of the chain is omitted for clearness and the dual pawls have notched ends for sprocket tooth engagement as shown in said patent.

In the several views, 10 indicates a plate-like half housing with which is associated, as shown in said patent, a complementary half-housing 11, see Figs. 3 and 5. An anchoring hook 12 is swiveled at 13 therein. This housing has chain intake 14, chain outlet 15 and an intermediate divider or partition 16 which is relieved at 17 for tooth clearance when a sprocket type wheel 18 is utilized as shown herein. The housing, opposite the intake 14, includes the handle accommodating slot 19.

Wheel 18 includes teeth 18a and is mounted on shaft 20. A bifurcated handle forming member having spaced arms 21 is also mounted on said

shaft 20 and terminates in a socket 22 that detachably receives a handle extension that may comprise a pipe 23 threaded into the socket if desired or may be otherwise detachably secured thereto.

Load holding pawl 24 is pivoted in the housing upon shaft 25 or may be rigid therewith whereupon said shaft 25 then is pivoted in the housing. The holding pawl in this embodiment has notched end 24a for reasons assigned in said patent. A spring 26 is anchored to pawl 24 at one end by pin 38 and to the housing at the opposite end 26a. It normally tends to constrain the holding pawl 24 into sprocket or flexible means engagement depending upon the particular wheel and means utilized.

The load moving pawl 27 herein has notched end 27a for reasons assigned in said patent. It is disposed between arms 21 of said handle and pivotally mounted by shaft 28 that is mounted in said arms. Said shaft here preferably is separate from said pawl for assembly purposes. A spring 29 has one end 29a anchored to said pawl and the other end 29b cotter key 30 connected to the handle socket 22 as shown which is a relatively simple type of anchorage to effect.

Oscillatable upon said wheel shaft 20 is a floating cam plate 31, see Figs. 3, 4 and 5. It includes a tongue portion 32 having cam surface 33. It also includes concentric arcuate notch 34 with "upper" and "lower" end walls 35 and 36 respectively. Herein the cam plate is disposed between the handle arms 21 so herein cam plate actuating pin 37 extends inwardly from the adjacent arm 21 and rides in said notch 34. If desired dual plates 31 and pins 37 may be utilized.

For load raising the handle and pawl operation is as disclosed in said patent except that herein pin 37 rides freely in the notch 34 aforesaid and does not effect any movement of said cam plate or plates. For load lowering the handle is brought down farther, compare Figs. 2 and 4, and in this movement pawl 27 is wheel or means engaged and the pin 37 engages end wall 36 to tilt the cam 31 clockwise to have the face 33 of tongue 32 engage the holding pawl 24 at pin 38, see Fig. 4. Slight further downward movement of the handle removes the draft lock on pawl 24 and then the holding pawl 24 is cam tilted by face 33 against the force of spring 26 and to the non-holding position, see Fig. 4. Face 33 then holds this holding pawl in this position until handle pin 37 engages the top of notch 35 in cam 31. Further handle movement counter-clockwise then moves similarly the cam plate 31 which removes portion 32 from pin 38. Holding pawl 24 through spring 26 now reengages the wheel or the flexible means, see Fig. 3. Further upward movement of the handle now effects moving pawl 27 tilting to the non-engaging position which will be described.

Having thus described holding pawl control in load lowering operation reference will now be had to moving pawl control. This also is cam effected and the control cam is tiltably mounted. Herein cam 39 is pivoted at 40, see Fig. 3, upon one arm 21 of the handle and disposed between that arm and the adjacent housing.

Herein the housing has inwardly extending spaced abutments 41 and 42 selectively engaged by moving pawl control cam 39. The moving pawl shaft 28 on the end adjacent the cam 39 is slotted at 43 and secured therein is a plate 44.

In handle oscillation beyond the limits shown in Figs. 1 and 2 and for load lowering in addition to oscillation of holding pawl cam 24, the moving pawl cam 39 is moved by the housing abutments (pins) 41 and 42. As the handle is brought down to take a new "bite" on the chain, cam 39 engages stop 42 which tilts the cam counter-clockwise from the position shown in Fig. 3.

Thereupon the cam 39 is relieved from plate 44 and holding pawl 27 is snapped by spring 29 into engagement with the sprocket. The load is now held by pawl 27. When this is effected further handle movement relieves the draft on holding pawl 24 and cam tongue 32 is tilted to tilt the pawl 24 to the position shown in Fig. 4.

Then with one pawl in and the other out the handle is raised from the position shown in Fig. 4 to that shown in Fig. 3. Near the end of this handle movement the cam tongue 32 is retracted from the holding pawl 24 and it returns toward holding position and takes the load just before cam 39 engages pin 41 to force pawl 27 from the chain and lock out this pawl, see Fig. 3. When this is effected the handle is lowered to the position shown in Fig. 4 for the moving pawl to take another "bite." The aforesaid describes load lowering.

For free chaining, with no load upon the chain, the handle is brought down, see Fig. 4, to lock up the load holding pawl 24. Then the handle is brought up to the position shown in Fig. 5. The housing includes a pair of spaced stops 45 and 46.

Pivoted on the handle at 47 between it and the housing is a cam 48 having manually actuable tail or finger piece 49. When this cam is tilted, see Fig. 4, clockwise, see Fig. 5, it engages plate 44 opposite from the cam 39 engaged portion thereof and tilts the moving pawl 27 counter-clockwise against its spring 29. This, if there be no load upon the chain, then frees the chain from the moving pawl.

While the chain can be freely moved in either direction it is highly desirable to prevent handle oscillation and prevent other undesirable operations and to permit the operator to let go of cam 48. Accordingly, cam 48 mounts a pin 50.

The effect thereof is such that cam 48 cannot be tilted clockwise to effect free chaining until the handle 22 is properly disposed for the pin 50 to enter between the aforesaid abutments 45—46. When so entered, see Fig. 5, the cam 48 is tilted clockwise, the load moving pawl 27 is locked out and the handle 22 cannot oscillate. To release the hoist for operation tail 49 is tilted counter-clockwise. Cam 48 disengages from plate 44 and spring 29 snaps pawl 27 into sprocket engagement, the holding pawl 24 being still held out, see Fig. 4. Then the handle can be short range oscillated for load elevation or long range oscillated for load lowering as desired or required.

Except for free chaining, and if desired handle locking, no additional manually operable member is required for load lowering or raising or for shifting from one to the other.

While the invention has been illustrated and described in great detail in the drawings and foregoing description, the same is to be considered as illustrative and not restrictive in character.

The several modifications described herein as well as others which will readily suggest themselves to persons skilled in this art, all are considered to be within the broad scope of the invention, reference being had to the appended claims.

The invention claimed is:

1. In a hoist for moving a flexible inextensible

means therethrough and having a reversibly rotatable wheel for means support, a handle oscillating about the axis of wheel rotation, a load holding pawl pivotally supported adjacent said wheel and normally constrained toward wheel or means engagement, and a load moving pawl pivotally supported upon the handle and normally constrained toward wheel or means engagement, the combination therewith of a floating cam oscillatory upon the wheel axis, said cam having arcuately spaced abutments, a handle carried means disposed in juxtaposition to said abutments and selectively engageable therewith in handle oscillation, a follower carried by the holding pawl and selectively engageable with said cam and disengageable therefrom in cam oscillation incident to handle operation, a second cam carried by said handle for moving said moving pawl out of operative position and means stationarily mounted relatively to said handle and rendered effective for controlling the operation of said second cam moving means by the oscillation of said handle.

2. In a hoist having an oscillatory handle, a pair of pawls, a housing, an inextensible flexible means, a wheel for the latter, and in the housing, and a spring for each pawl, one pawl being carried by the housing and the other by the handle, the combination of a pair of spaced abutment means, a manually tiltable means, one of said last two mentioned means being carried by the housing and the other being carried by the handle, a lock carried by the tiltable means and movable into the space between the spaced abutment means for handle locking, a pair of oscillatory cams, one for each pawl for effecting pawl throwout and hold out thereof, and an actuator means for each cam operable in the relative movement of the handle.

3. In a hoist having an oscillatory handle, a pair of pawls, a housing, an inextensible flexible means, a wheel for the latter, and in the housing, and a spring for each pawl, one pawl being carried by the housing and the other by the handle, the combination of a pair of spaced abutments, a manually tiltable means, one of said last two mentioned means being carried by the housing and the other being carried by the handle, a lock carried by the tiltable means and movable into the space between said abutment means for handle locking, a pair of oscillatory cams, one for each pawl, for effecting pawl throwout and holdout thereof, and an actuator means for each cam operatively effective thereon in the relative movement of the handle, one actuator means being carried by the handle and the other by the housing.

4. In a hoist having an oscillatory handle, a pair of pawls, a housing having an inextensible flexible means, a wheel for the latter and in the housing, and a spring for each pawl, one pawl being carried by the housing, and the other by the handle, the combination of a pair of spaced abutment means, a manually tiltable means, one of said last two mentioned means being carried by the housing, and the other being carried by

the handle, a lock carried by the tiltable means and movable into the space between the spaced means for handle locking, a pair of oscillatory cams, one for each pawl, for effecting pawl throwout and holdout thereof, and an actuator means for each cam operatively effective thereon in the relative movement of the handle, one actuator means comprising a pin carried by the handle and the other actuator means being carried by the housing.

5. In a hoist having an oscillatory handle, a pair of pawls, a housing, an inextensible flexible means, a wheel for the latter, and in the housing, and a spring for each pawl, one pawl being carried by the housing and the other by the handle, the combination of a pair of spaced abutment means, a manually tiltable means, one of said last two mentioned means being carried by the housing and the other carried by the handle, and a lock carried by the tiltable means, and movable into and against said spaced abutment means for handle locking, a pair of oscillatory cams, one for each pawl, for effecting pawl throwout and holdout thereof, and an actuator means for each cam operatively effective thereon in the relative movement of the handle, one actuator means being carried by the handle and the other by the housing, one of said actuator means comprising a pair of spaced carried abutments.

6. In a hoist for moving a flexible inextensible means therethrough and having a reversibly rotatable wheel for means support, a handle oscillating about the axis of wheel rotation, a load holding pawl pivotally supported adjacent said wheel and normally constrained toward said wheel for means engagement, a load moving pawl pivotally supported upon the handle and normally constrained toward said wheel for means engagement, the combination therewith of a floating cam oscillatory upon the wheel axis, said cam having arcuately spaced abutments, a handle carried means disposed in juxtaposition to said abutments and selectively engageable therewith in handle oscillation, a follower carried by said holding pawl and selectively engageable with said cam and disengageable therefrom in cam oscillation incident to handle operation, an oscillating load pawl control cam carried by said handle, operating means for said load pawl and spaced stop means engageable with said load pawl control cam for moving said cam into and out of engagement with said load pawl operating means.

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