

S. H. LIBBY.

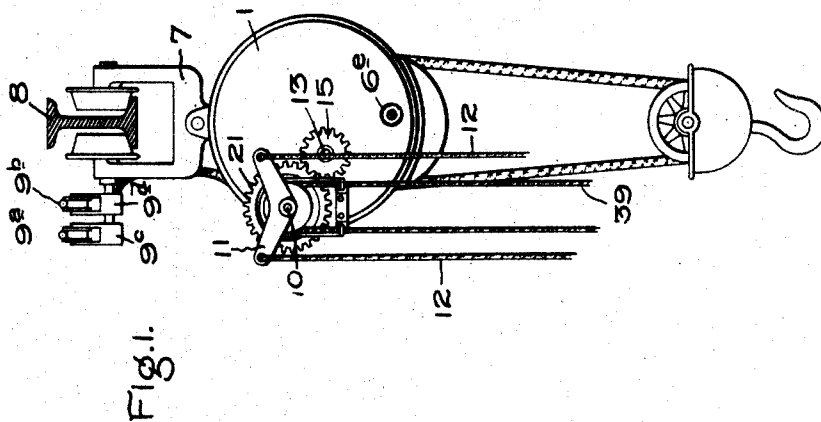
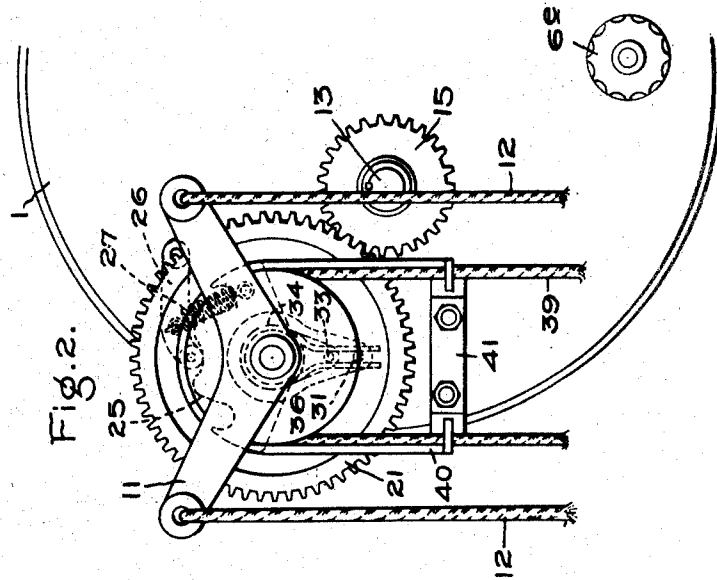
HOIST.

APPLICATION FILED MAY 6, 1907.

927,417.

Patented July 6, 1909.

2 SHEETS—SHEET 1.



Witnesses:

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J. Ellis Klen

Inventor:

Sam H. Libby,

by *Albert Davis* Att'y.

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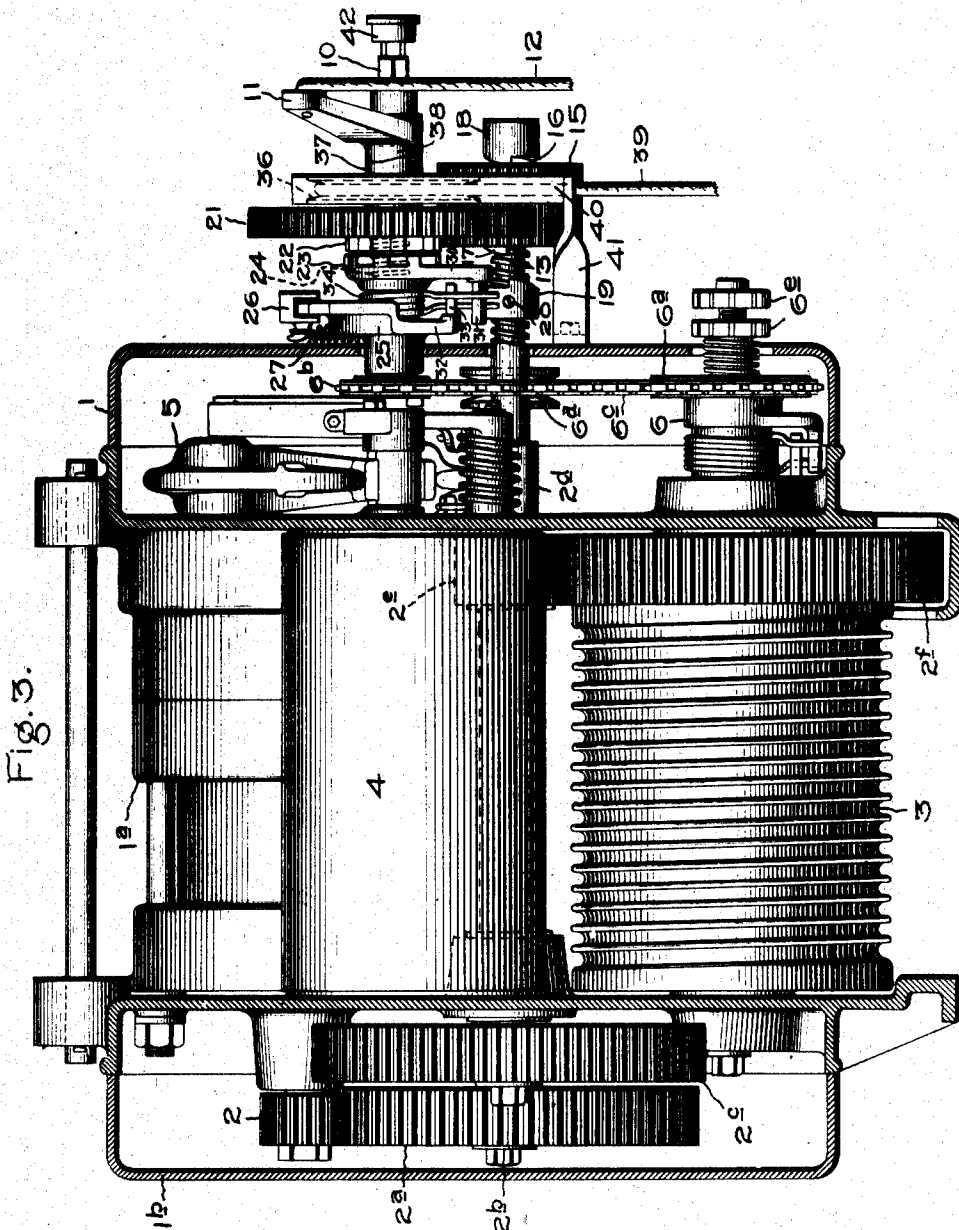
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2 SHEETS—SHEET 2



Witnesses:
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UNITED STATES PATENT OFFICE.

SAM H. LIBBY, OF EAST ORANGE, NEW JERSEY, ASSIGNOR TO SPRAGUE ELECTRIC COMPANY,
A CORPORATION OF NEW JERSEY.

HOIST.

No. 927,417.

Specification of Letters Patent.

Patented July 6, 1909.

Application filed May 6, 1907. Serial No. 371,968.

To all whom it may concern:

Be it known that I, SAM H. LIBBY, a citizen of the United States, residing at East Orange, county of Essex, State of New Jersey, have invented certain new and useful Improvements in Hoists, of which the following is a specification.

My invention relates to hoists and particularly to motor-driven hoists, although it may be applied to power-driven hoists of many kinds.

My invention is especially intended for use in hoists which serve to move material into and out of tanks containing baths with which the material is to be treated.

One of the objects of my invention is to provide automatic means whereby the hoist can be used to repeatedly dip the material in the bath so as to thoroughly rinse the same.

Another object of my invention is to provide means whereby the distance through which the hoist works between reversals may be adjusted.

Another object of my invention is to so arrange the reciprocating mechanism that it can be easily thrown into or out of operation without, in the latter condition, in any way interfering with the ordinary operation of the hoist.

Referring to the drawing, in which is shown one embodiment of my invention, Figure 1 illustrates in front elevation a hoist, to which my invention is applied; Fig. 2 is an elevation, similar to Fig. 1 on an enlarged scale certain parts being shown in dotted lines, of a portion of the control mechanism shown in Fig. 3; and Fig. 3 is a side elevation, partly in cross-section, of the hoist shown in Fig. 1 illustrating especially the controlling mechanism in which my invention is embodied.

Like parts throughout the several views are referred to by the same reference characters.

In the drawings, 1 indicates a casing within which are housed many of the parts of the controlling mechanism of the hoist. Within a casing 1^a is the motor by which the hoist is driven, the armature shaft of which carries a pinion 2 which engages with a gear 2^a mounted on and secured to a countershaft 2^b to which is also secured a pinion (not shown) which engages with another gear 2^c carried by another countershaft 2^d

carrying a pinion 2^e engaging with a gear 2^f secured to the cable drum 3. The pinion 2, gear 2^a, the pinion (not shown) on the countershaft 2^b, and the gear 2^c are covered by the gear casing 1^b. Within the casing 4 is a controller, of any suitable form, by which the direction of rotation of the motor and thereby the hoisting and lowering movements of the hoist are controlled. Within the casing 1, as shown in Fig. 3, is the holding brake 5, which is released in a well-known manner when the shaft of the controller 4 is in "on" position and is applied when the controller is in its "off" position. A limit mechanism 6 for automatically stopping the hoist at its extreme upper and lower positions is shown geared to the controller shaft by sprockets 6^a and 6^b and a chain 6^c, an idler 6^d being provided in order to take the chain 6^c out of the way of the shaft 13, hereinafter referred to. Knobs 6^e are shown projecting from the casing 1 for adjusting the limit device 6 which, as here shown, is similar to that illustrated in the patent to Darlington #808,273, dated December 26, 1905. The parts so far referred to may be of any suitable and well-known construction and since they form no part of my invention need not be described in detail. The hoist may be hung from a frame 7, in a well-known manner, which frame may carry wheels which run on the I-beam 8. The current for the hoisting motor may be taken from the conductors 9^a and 9^b by trolleys 9^c and 9^d in a well-known manner.

The shaft of the controller is shown at 10, projecting from the casing 1. Fixed to the shaft 10 is the controller lever 11 to the ends of which may be attached the ropes 12 for operating the controller in the usual manner. The countershaft 2^d for carrying the speed-reducing gears 2^c and 2^e between the motor and the hoisting drum 3 is extended through the casing 1 and is shown at 13. This shaft is threaded as shown and has freely threaded thereon a pinion 15. This pinion has on each face lugs 16 and 17 which, as the pinion moves back and forth, engage respectively the stop 18 secured to the end of shaft 13 and the stop 19 adjustably secured by means of screws 20 to the shaft 13. A gear 21 is revolvably mounted on the shaft 10 and engages with the pinion 15. This gear has attached to one face the clutch member 22

which engages with a complementary clutch member 23 revoluble on shaft 10, said clutch members being normally held out of engagement by a spring 24 coiled about the shaft 10. Secured to the shaft 10 is a cam member 25, of the form shown in Figs. 2 and 3, with which a pawl 26 engages, said pawl being held yieldingly by a spring 27. The purpose of this pawl will be hereinafter explained. The clutch member 23 has projecting therefrom a lug 30 which carries a pin 31, and the cam 25 has a lug 32 carrying the pin 33. A spring 34 loosely coiled about the shaft 10 has one of its ends extending on one side of the pins 31 and 33 and its other end extending on the other side of said pins, as shown. The spring 34, therefore, serves as a yielding connection between clutch member 23 which is rotatable on the shaft 10 and the cam member 25 which is fixed to the shaft 10. On the outside of the gear 21 a wheel 36 is rotatably mounted on the shaft 10. This wheel has a hub 37 on which is a cam surface which is complementary to a cam surface on the hub 38 of the lever arm 11 which is keyed to the shaft 10. By rotating the wheel 36, the hub 37 engages the hub 38 and forces the gear 21 and the clutch member 22 to the left, as shown in Fig. 3, thereby causing the two clutch members to engage. A rope 39 may be used on the wheel 36 to facilitate the rotation thereof, and this rope may be held in the groove of said wheel by a guard 40 carried by the bracket 41 in a well-known manner. The end of the shaft 10, as shown in Fig. 3, may be hexagonal and has secured thereto an oil cup 42 which, through holes in the shaft 10, serves to lubricate the various parts which rotate or slide thereon. The operation of my device is as follows: The wheel 36 being turned to force the clutch members into engagement and the controller shaft 10 having been turned to one of its operative positions by pulling one of the ropes attached to the lever arm 11, the shaft 13 begins to rotate and the pinion 15 moves along it in one direction or the other. When this pinion 15 has moved sufficiently so that one of its lugs 16 or 17 engages with one of the stops 18 or 19, the pinion turns with the shaft 13 and, meshing as it does with the gear 21, rotates that gear and through the clutch member 22 rotates the complementary clutch member 23 which carries the pin 31. This movement of the pin 31 places the spring 34 under a tension which is exerted against the pin 33 carried by the cam member 25. The cam member 25 is, however, held from rotation by the spring-pressed pawl 26 and does not rotate until the pin 31 has moved far enough to strike it which will occur, as is obvious from Fig. 2, after the clutch member 23 has made a little more than a quarter revolution. When the pin 31 strikes the cam member 25, the latter

starts to rotate and under the influence of the spring-pressed pawl 26 snaps over from one extreme position to the other. The controller is thereby thrown from one extreme position to the other, the motor is reversed and the shaft 13 commences to rotate in the opposite direction, thereby starting the pinion 15 traveling in a direction opposite to that in which it previously moved until it is engaged by the other stop 18 or 19. The gear 21 will then be rotated in the opposite direction, and through the clutch members, the spring 34 and the cam 25 will turn the controller back to its first position. This operation will obviously be repeated as long as the wheel 36 is allowed to hold the clutch closed.

By the mechanism above described, it is obvious that the hoist may either be used in the ordinary way under the control of the operator through the ropes attached to the lever 11, or it may at any position be used to automatically and repeatedly raise and lower the load through a certain definite distance. This distance, as before explained, may be changed by adjusting the position of the stop 19.

While I have shown but one form of my invention, I wish it distinctly understood that I realize that the construction illustrated may be varied in many ways without departing from the spirit of my invention. It is my intention to cover all such modifications in the following claims.

What I claim as new and desire to secure by Letters Patent of the United States, is,—

1. In a hoist, a hoisting mechanism, a controller, a reversing mechanism driven from the hoisting mechanism for automatically and repeatedly throwing the controller from its hoisting to its lowering position and vice versa, means for adjusting the distance through which the hoist works between reversals, and means for throwing said reversing mechanism into and out of operation.

2. In a hoist, a hoisting mechanism, a controller, a reversing mechanism comprising an auxiliary shaft driven from the hoisting mechanism, driving mechanism connecting said controller and said auxiliary shaft, and means on said auxiliary shaft for intermittently rendering said driving mechanism operative whereby the controller is automatically and repeatedly thrown from its hoisting to its lowering position and vice versa.

3. In a hoist, a hoisting mechanism, a controller, a reversing mechanism comprising an auxiliary shaft driven from the hoisting mechanism, driving mechanism connecting said controller and said auxiliary shaft, means on said auxiliary shaft for intermittently rendering said driving mechanism operative whereby the controller is automatically and repeatedly thrown from its hoisting to its lowering position and vice versa, and

means for throwing said reversing mechanism into and out of operation.

4. In a hoist, a hoisting mechanism, a controller therefor having an operating shaft, a reversing mechanism comprising an auxiliary shaft driven from the hoisting mechanism, driving mechanism connecting said controller shaft and said auxiliary shaft, means on said auxiliary shaft for intermittently rendering said driving mechanism operative whereby the controller shaft is automatically and repeatedly thrown from its hoisting to its lowering position and vice versa, and a clutch on said controller shaft for throwing said reversing mechanism into and out of operation.

5. In a hoist, a hoisting mechanism, a controller therefor having an operating shaft and means for operating it, of a reversing mechanism comprising an auxiliary shaft driven from the hoisting mechanism, a pinion threaded for rotation on said auxiliary shaft, stops fixed to said auxiliary shaft on each side of said pinion, lugs on said pinion arranged to engage said stops, a gear free to rotate on said controller shaft and engaging said pinion, a clutch member secured to said gear, a complementary clutch member operatively connected to said shaft, and means for causing said clutch members to engage and disengage.

6. In a hoist, a hoisting mechanism, a controller therefor having an operating shaft and means for operating it, of a reversing mechanism comprising an auxiliary shaft driven from the hoisting mechanism, a pinion threaded for movement along said auxiliary shaft, adjustable stops fixed to said auxiliary shaft on each side of said pinion, lugs on said pinion arranged to engage said stops, a gear free to rotate on said controller shaft and engaging said pinion, a clutch member secured to said gear, a complementary clutch member connected to said shaft through a yielding connection, and means for causing

said clutch members to engage and disengage.

7. In a hoist, a hoisting mechanism, a controller therefor having an operating shaft and means for operating it, of a reversing mechanism comprising an auxiliary shaft driven from the hoisting mechanism, a pinion threaded for movement along said auxiliary shaft, stops fixed to said auxiliary shaft on each side of said pinion and arranged to engage therewith, a gear free to rotate on said controller shaft and engaging said pinion, a clutch member movable with said gear, a complementary clutch member rotatable on said controller shaft, a cam secured to the controller shaft, a pawl yieldingly engaging said cam, a spring connection between said complementary clutch member and said cam, and means for causing said clutch members to engage and disengage.

8. In a hoist, a hoisting mechanism, a controller therefor having an operating shaft and means for operating it, of a reversing mechanism comprising an auxiliary shaft driven from the hoisting mechanism, a pinion threaded for movement along said auxiliary shaft, stops fixed to said auxiliary shaft on each side of said pinion and adapted to engage therewith as the pinion moves along the shaft, a gear free to rotate on said controller shaft and free to slide thereon a limited amount, a clutch member moving with said gear, a complementary clutch member connected to said shaft through a yielding connection, a cam rotatable on said controller shaft, and a second cam with which said first-mentioned cam coacts to close and open said clutch.

In witness whereof, I have hereunto set my hand this thirtieth day of April, 1907.

SAM H. LIBBY.

Witnesses:

ROGER H. BUTTERWORTH
ANNA MAY GILLIN.