March 1, 1949. C. B. KING 2,463,394

HOIST

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Fig. 1.

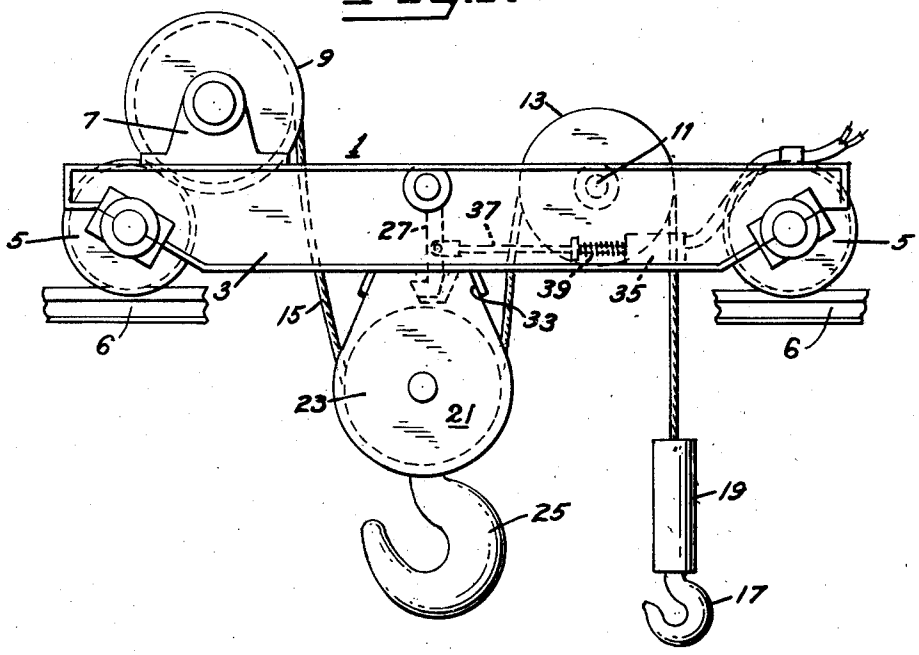
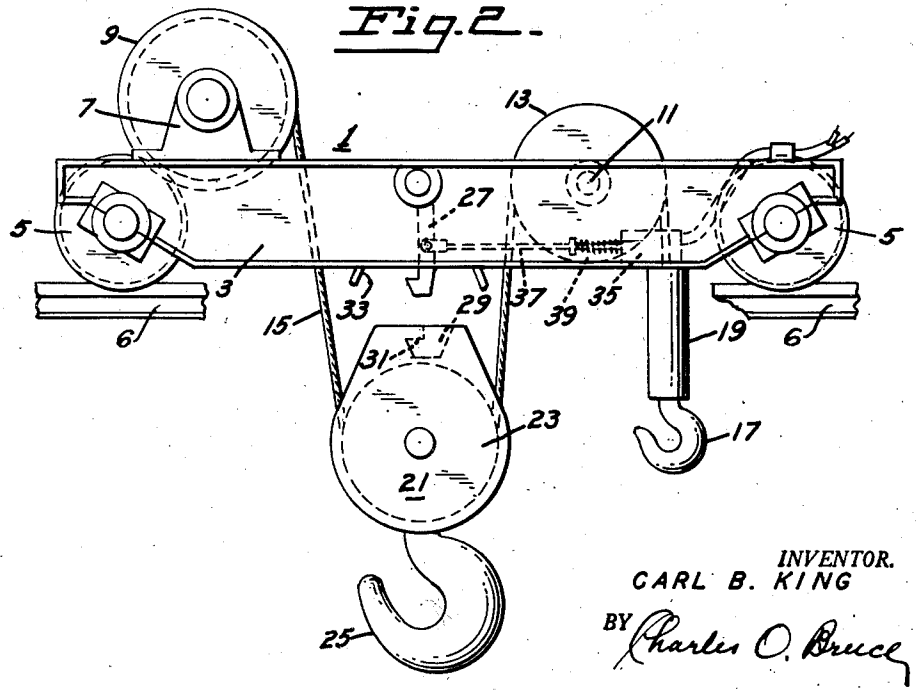


Fig. 2.



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HOIST

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7 Claims. (Cl. 254—188)

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My invention relates to hoists and more particularly to hoists adapted to travel on overhead rails, though the invention is not necessarily limited to this type.

Among the objects of my invention are:

(1) To provide a novel and improved hoist having an overall increased load and speed range;

(2) To provide a novel and improved hoist having duplex features;

(3) To provide a novel and improved hoist having a pair of lift hooks selectively operable from a common drive;

(4) To provide a novel and improved hoist capable of selectively operating within different load and speed ranges, without recourse to gear shift apparatus;

(5) To provide a novel and improved hoist adapted for rapid convertibility to operation within either of two load or speed ranges of operation.

Additional objects of my invention will be brought out in the following description of a preferred embodiment of the same, taken in conjunction with the accompanying drawing wherein—

Figure 1 is a side elevational view depicting my improved hoist in condition for operation within one load or speed range;

Figure 2 is a corresponding view depicting the apparatus in condition for operation in another load or speed range.

Referring to Figure 1 of the drawings, the embodiment of my invention illustrated therein comprises a trolley 1 including a frame 3 and wheels 5 mounted thereon and adapting the trolley to ride upon overhead tracks 6 in conventional manner. Toward one end of the carriage the frame carries suitable bearings 7 for rotatably mounting a drum 9, the rotation of which may be under the control of any suitable motor in accordance with conventional practice. Toward the other end of the trolley and rotatably mounted on a shaft 11 within the frame, is a sheave or pulley 13. This is preferably disposed in symmetrical alignment with the drum 9.

A hoist rope 15 which may take the form of a cable or chain, is wrapped around the drum and passed over the sheave or pulley 13 beyond which it terminates in a suspended hook 17 at its free end. Adjacent this hook, I provide a stop preferably in the form of a collar 19, adapted to abut against one or another of the frame elements of the trolley, to function as a stop and preclude withdrawal of the rope and hook over the pulley.

Intermediate the drum and sheave 13, and carried by the rope 15, is another sheave 21 including a block 23 from which is suspended a hook 25. This latter hook it is noted is supported by two strands of the rope whereas the first mentioned hook 17 is supported by a single strand only. Consequently, the mechanical advantage of the intermediate sheave arrangement, insofar as load is involved, will be twice that of the single strand supported hook arrangement, and therefore the intermediate sheave 21 and its associated hook 25 will be designed for operation within a heavier load range than that of the other hook 17.

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The combined weight of this intermediate heavy duty sheave 21 and associated hook 25 should be more than twice that of the other hook 17 and its associated stop element 19 in order to more than counterbalance the same, and in the absence of any holding means on the intermediate sheave, cause the smaller or lighter duty hook and its stop element to be lifted into engagement with the frame and function as an anchor for the free end of the rope. Under these conditions, the intermediate sheave and its associated hook will be free to drop or rise in response to operation of the drum and thus function as a heavy-duty hoist.

By restraining the intermediate heavy-duty sheave and hook against such movement, the effect of such weight on the smaller hook is neutralized, and the smaller hook is thereby freed for vertical movement in response to operation of the drum. Under these conditions, the smaller hook is adapted to handle lighter loads, and since the rate of movement will be inversely to the mechanical advantage, the smaller hook will travel at a rate twice that of the intermediate sheave when it is permitted to function.

In order to render the use of these lifting hooks selective and at the will of an operator, I provide an automatic latching means on the trolley which is adapted to engage and latch the intermediate sheave when it reaches its uppermost point of travel, and thereafter support the same against dropping, subject to the will of the operator. Such latching mechanism may include a claw 27 pivotally secured to the trolley frame and adapted to enter a recess 29 in the upper end of the block 23 of the intermediate sheave and engage a shoulder 31 formed in such recess. A guide 33 mounted on the underside of the frame is adapted to receive the upper end of the block 23 and guide the same into latching position.

To release the sheave from such restraint, any suitable means may be employed for withdrawing

the claw from engagement therewith. As one means for accomplishing this function, I have illustrated an electrically operated solenoid **35** having a core extension **37** connected to the claw, which upon energization of the solenoid, is adapted for movement in the release direction against the action of a spring **39**, whereby upon mere closure of the circuit, the hoist may readily be converted from light duty operation to heavy duty operation, The spring **39** will normally urge the claw to its latching position.

The embodiment of my invention as thus illustrated represents the same reduced to its most fundamental terms. By increasing the mechanical advantage of the intermediate sheave, the load range thereof may be increased with of course a corresponding decrease in its speed of travel. Thus, one or more single or multiple pulleys or sheaves may be mounted on the frame above the intermediate sheave, the number so added depending of course on the load range which it is desired that the intermediate sheave possess. It is understood of course that when such additional pulleys or sheaves are mounted on the frame of the trolley, that the rope will be passed under the intermediate pulley and over the added sheaves in conventional manner before the rope is ultimately passed over the end pulley **13** on the frame.

While I have described preferred embodiments of my invention, the same is subject to modification and alteration, such as previously indicated for example, without departing from the underlying principles of the invention, and I accordingly do not desire to be limited in my protection to the specific embodiments illustrated except as may be necessitated by the appended claims.

I claim:

1. A hoist including a drum and a fixed pulley, a rope wound on said drum and including a free end extending over said fixed pulley and terminating in a depending load supporting element, means precluding withdrawal of said rope from said fixed pulley, a sheave supported by said rope intermediate said drum and said pulley, said sheave having a load supporting element, and means for anchoring said sheave when desired, to preclude movement thereof.

2. A hoist comprising a frame, a drum mounted on said frame, a pulley carried by said frame, a rope wound on said drum and including a free end extending over said pulley and terminating in a depending hook, means precluding withdrawal of said rope from said pulley, a sheave supported by said rope intermediate said drum and said pulley, said sheave having a hook depending therefrom, and means for anchoring said sheave to said frame when desired.

3. A hoist comprising a frame, a drum mounted on said frame, a pulley carried by said frame, a rope wound on said drum and including a free end extending over said pulley and terminating in a depending hook, means on said rope adjacent said hook adapted to bear against a portion of said frame to function as a stop, a sheave supported by said rope intermediate said drum and said pulley, said sheave having a hook depending therefrom, and means for anchoring said sheave to said frame when desired.

4. A hoist comprising a frame, a drum mounted on said frame, a pulley carried by said frame, a rope wound on said drum and including a free end extending over said pulley and terminating in a depending hook, means on said rope adjacent said hook adapted to bear against a portion of said frame to function as a stop, a sheave supported by said rope intermediate said drum and said pulley, a hook depending from said sheave, said sheave and hook having a combined weight in excess of twice the combined weight of said first hook and stop means.

5. A hoist comprising a frame, a drum mounted on said frame, a pulley carried by said frame, a rope wound on said drum and including a free end extending over said pulley and terminating in a depending hook, means on said rope adjacent said hook adapted to bear against a portion of said frame to function as a stop, a sheave supported by said rope intermediate said drum and said pulley, a hook depending from said sheave, said sheave and hook having a combined weight in excess of twice the combined weight of said first hook and stop means, and means for anchoring said sheave to said frame when desired.

6. A hoist including a drum and a fixed pulley, a rope wound on said drum and extending over said fixed pulley, a load supporting means carried by said rope intermediate said drum and fixed pulley, a load supporting means carried by said rope beyond said fixed pulley, and means for selectively utilizing either of said load supporting means.

7. A hoist including a drum and a fixed pulley, a rope wound on said drum and extending over said fixed pulley, a load supporting means carried by said rope intermediate said drum and fixed pulley, a load supporting means carried by said rope beyond said fixed pulley, and electrical control means for selectively utilizing either of said load supporting means.

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