

April 6, 1943.

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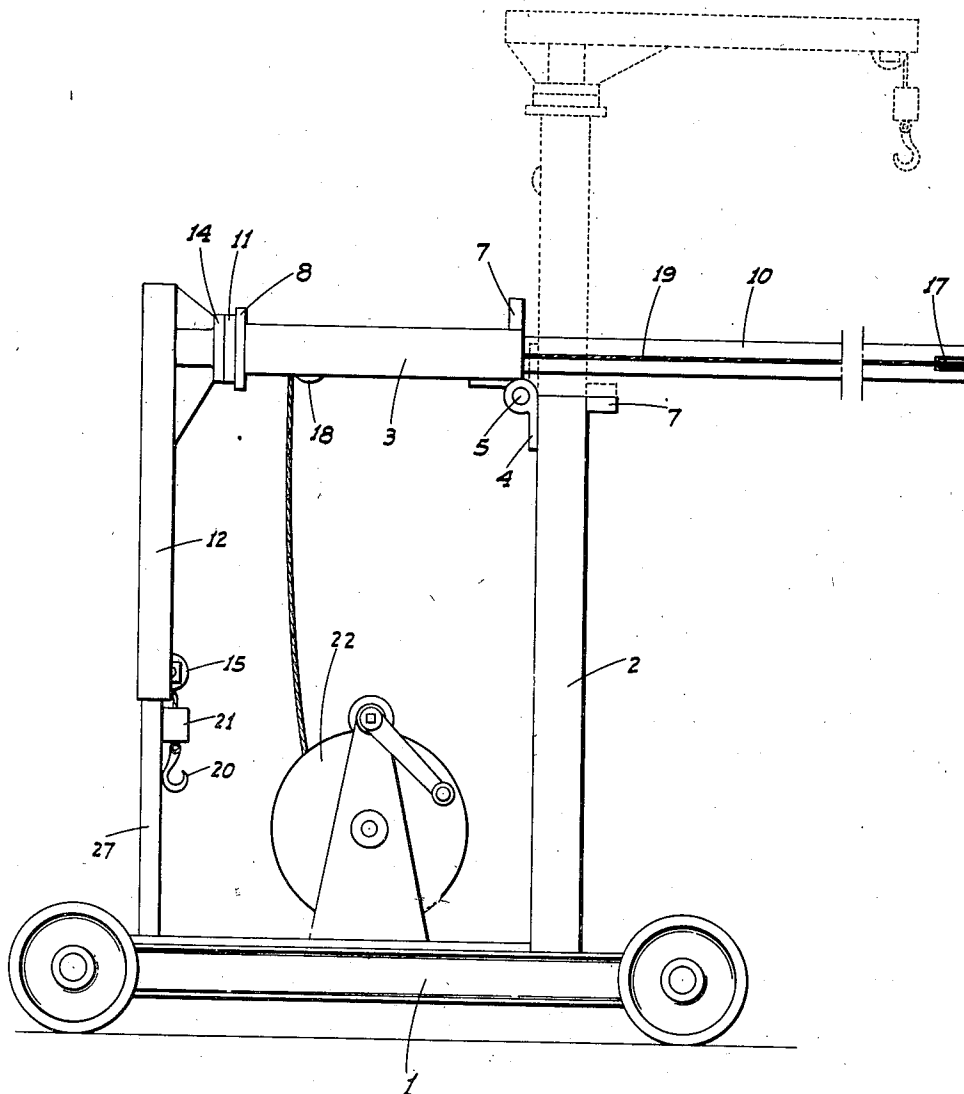
2,315,873

PORTABLE FOLDING HOIST

Filed May 12, 1941

3 Sheets-Sheet 1

Fig. 1



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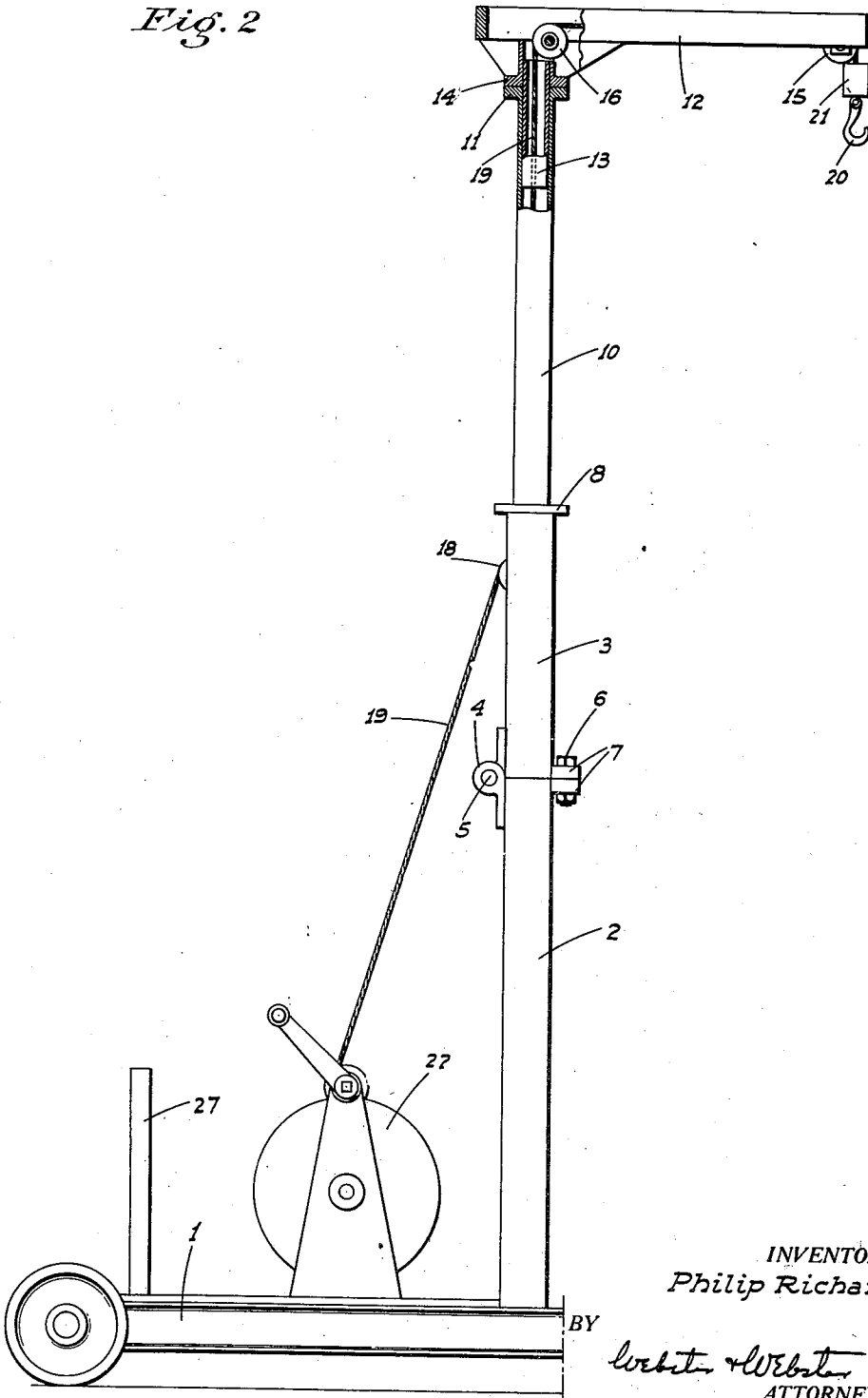
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Fig. 2



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Fig. 3

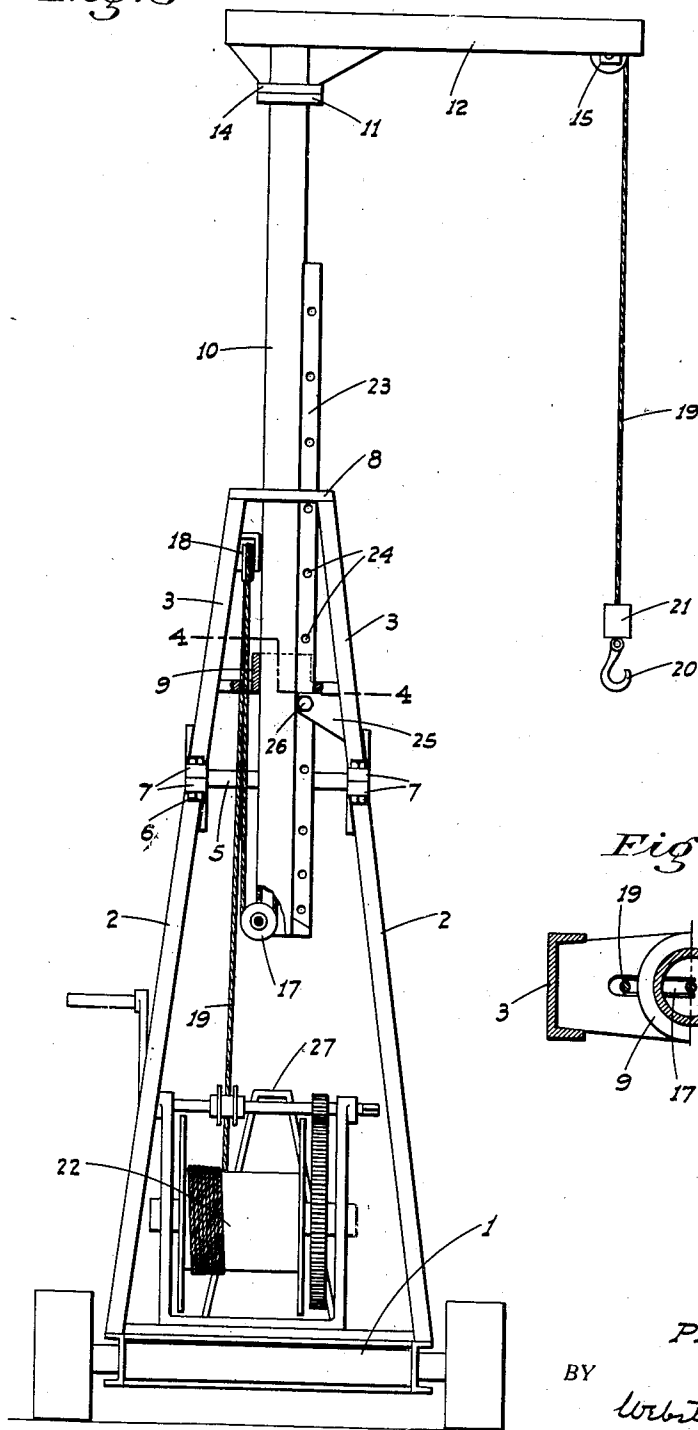
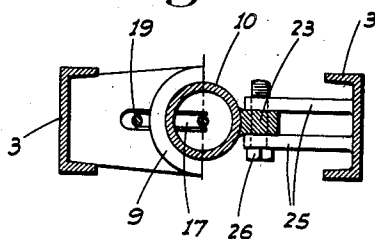


Fig. 4



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UNITED STATES PATENT OFFICE

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PORTABLE FOLDING HOIST

Philip Richards, Fresno, Calif.

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2 Claims. (Cl. 254—143)

This invention relates to hoists, and particularly to one initially designed for stacking bales, such as cotton, in warehouses; though the usefulness of my hoist is not limited to this service.

It is frequently desired to stack bales quite high, an operation now done by hand, since the roof formation and the general size of most warehouses does not permit of or warrant the use of overhead traveling cranes, and the ordinary hoisting devices at present available are not suited for this purpose.

It is therefore the principal object of my invention to provide a portable hoist or crane for the purpose having a perpendicular mast whose height from the floor may be varied according to the stacking level desired or the space under the roof available, and the raising and lowering of which perpendicular mast is controlled by the load hoist cable itself.

Another object is to provide a hoist which may travel along the relatively narrow aisles left between the stacks without interference, and whose mast is collapsible or foldable so that the hoist may pass through a doorway of ordinary height when desired.

A further object of the invention is to provide a simple and inexpensive device, and yet one which will be exceedingly effective for the purpose for which it is designed.

These objects I accomplish by means of such structure and relative arrangement of parts as will fully appear by a perusal of the following specification and claims.

In the drawings similar characters of reference indicate corresponding parts in the several views:

Figure 1 is a side elevation of my improved hoist, showing the mast contracted and collapsed or folded for passage through a doorway.

Figure 2 is a side elevation showing the mast unfolded and partly extended, the upper portion being in section.

Figure 3 is an end view of the hoist with the mast in the same position as in Fig. 2.

Figure 4 is a fragmentary enlarged sectional plan on the line 4—4 of Fig. 3.

Referring now more particularly to the characters of the reference on the drawings, the structure comprises a roller or wheel supported bed or truck 1 upstanding from which adjacent its forward end is the mast. This comprises upper and lower non-extensible sections, the lower section being permanently upright and comprising a pair of transversely spaced beams 2 and the upper section comprising similar

beams 3. The beams 2 and 3 are alined with each other and converge toward the top, being connected at their adjacent ends by hinge members 4 tied together by a common hinge shaft

5. The hinge connection is located on the side of the beams opposite said forward end of the bed, so that the upper section may front down and away from said end. In the longitudinal plane of the bed the above mast structure is perpendicular and when the beam units 2 and 3 are vertically alined or unfolded, they are held against folding movement by bolts 6 projecting through ears 7 on the beams 2 and 3 at their adjacent ends and opposite the hinge.

Slidably projecting through and guided by the top cap of beams 3 and a lower bearing 9 connecting said beams is a hollow extension mast 10, whose downward movement is limited by a plate 11 on its upper end which engages the cap 8. The mast 10 then projects downwardly sufficient so that its lower end is near the bed as the upper mast unit 3 is unfolded.

A relatively short hollow boom or arm 12 projects at right angles from the top of mast 10, being turnably mounted in connection therewith by a tubular shaft 13 depending into the mast 10 in turning relation as shown in Fig. 2; a thrust plate 14 on the arm about said shaft turnably engaging the plate 11.

A pulley 15 is mounted in the arm at its outer end, another pulley 16 is mounted therein just above the shaft 13, and another pulley 17 is mounted in the mast 10 at the bottom and projects from one side thereof as shown in Fig. 3. Another pulley 18 is mounted on one of the beams 3 near the top on the same side of the mast as that from which the pulley 17 projects. A cable 19 extends over the pulley 18 from behind the mast, then down about the pulley 17, then up through the mast 10 and shaft 13 to the pulley 16, and then along the arm 12 and about the pulley 15 to a termination in a lifting hook 20, immediately above which is a weight and stop block 21. The cable below the pulley 18 extends to a suitable winch 22 on the bed which, while here shown as being a hand-operated unit, may obviously be power actuated.

By reason of the above described construction and arrangement of parts it will be seen that if the extension mast 10 is held against vertical movement, the winding of the cable on the winch drum will raise the hook 20 and lift any load supported thereby. This load may be swung through a wide arc without moving the bed and without fouling the cable, due to the pivotal

mounting of the arm 12 and to the position of the pulley 16 relative to the center line of shaft 13.

If, however, the extension mast 10 is freed for vertical movement, a pull on the cable will lift said mast once the block 21 is in contact with the pulley 15. This is because the cable is then anchored at said pulley and the pull from the fixed pulley 18 is transmitted to the pulley below in a lifting direction, thus causing the extension mast to be raised. Lowering of the extension mast is similarly controlled by a gradual slackening of the cable, as will be evident.

In order to hold the extension mast at any one of a number of relatively fixed positions, I provide the following means:

Secured on and extending lengthwise of the extension mast on the side thereof opposite the pulley 17 is a rib 23 having a number of vertically spaced holes 24 therethrough. Fixed on the corresponding beam 3 just below the bearing 9 are ears 25 between which the rib passes (see Fig. 4). These ears are provided with alined holes adapted to register with any hole 24, so that a holding pin or bolt 26 may be passed through any such registering holes and thus hold the extension mast against vertical movement relative to the upper section of the relatively fixed mast unit.

The arm 12 may thus be held at various operating levels, from a lowest position adjacent the top of the fixed mast unit 3, to a high position a considerable distance above, as will be evident.

When it is desired to move the hoist through a doorway, the extension mast is lowered to its full limit, the bolts 6 are removed and the upper mast unit 3 is swung down to the rear. The arm 12 is then swung down so that it may rest on a support 27 on the bed adjacent its rear end, the mast section 3 and the extension mast 10 being then horizontal, as shown in Fig. 1.

It will be noted that the one cable serves both to raise the mast and to lift the load, and it is to be understood that the cable is of sufficient length that the hook 20 may be dropped to floor level irrespective of the height at which the mast and boom are set.

From the foregoing description, it will be readily seen that I have produced such a device as

substantially fulfills the objects of the invention as set forth herein.

While this specification sets forth in detail the present and preferred construction of the device, still in practice such deviations from such detail may be resorted to as do not form a departure from the spirit of the invention, as defined by the appended claims.

Having thus described my invention what I claim as new and useful and desire to secure by Letters Patent is:

1. A hoist comprising a relatively fixed up-standing mast unit, an extension mast slidably mounted on said unit for longitudinal movement relative thereto, a winch, a hoist cable extending from the winch to and having a portion normally depending from the upper end of the extension mast, means guiding the cable between the winch and extension mast so that if said extension mast is free for vertical movement and said cable portion is held against upward movement the extension mast will be raised by a pull on the cable at the winch and means to prevent movement of the extension mast and to releasably hold the same in any extended position; said last named means comprising a longitudinal rib projecting from one side of the extension mast and having a row of holes there-through, ears fixed on the adjacent side of the fixed mast unit and straddling the rib and a removable pin projecting through the ears and any one of said holes.

2. A hoist comprising a relatively fixed up-standing mast unit, an extension mast slidably mounted on said unit for longitudinal movement relative thereto, means to hold the extension mast in any extended position, an arm projecting from the upper end of the extension mast, the extension mast and arm being hollow, a tubular member on the arm turnably projecting into the upper end of the extension mast, a hoist cable extending upwardly through the extension mast from its lower end and thence through the member and arm to adjacent the outer end of the latter, a cable guide pulley in the arm above and alined with the member and another cable guide pulley in the arm adjacent its outer end.

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