May 1, 1951 R. E. SHIPMAN ET AL 2,551,174

PORTABLE HOIST

Filed Oct. 26, 1945 3 Sheets-Sheet 1

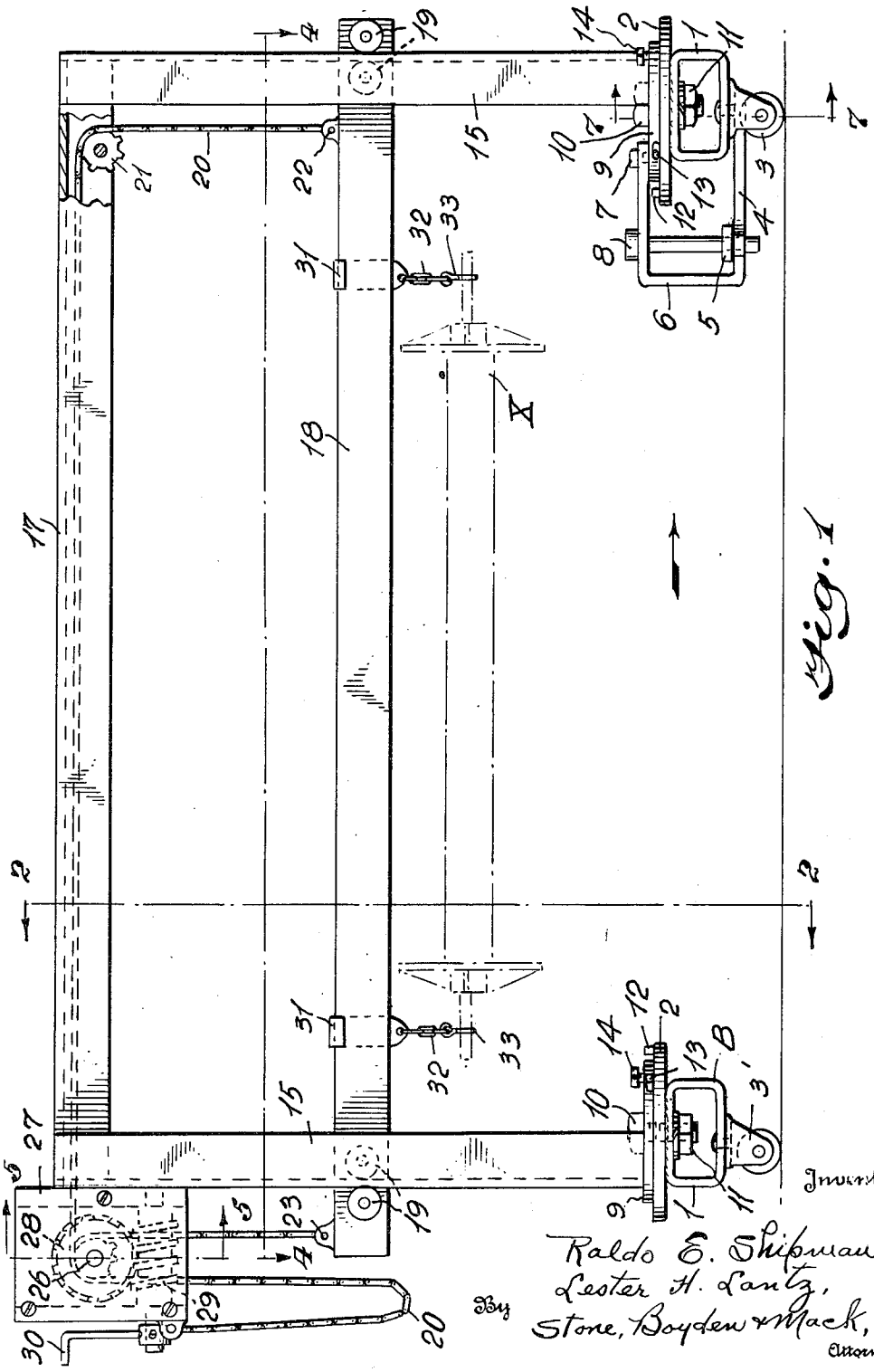


Fig. 1

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Filed Oct. 26, 1945 3 Sheets-Sheet 2

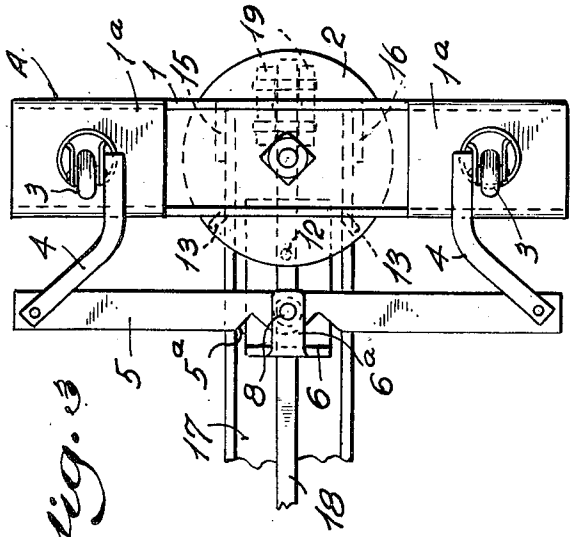


Fig. 3

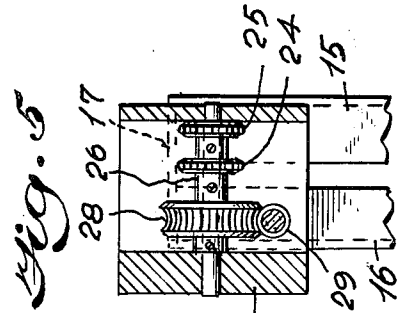


Fig. 5

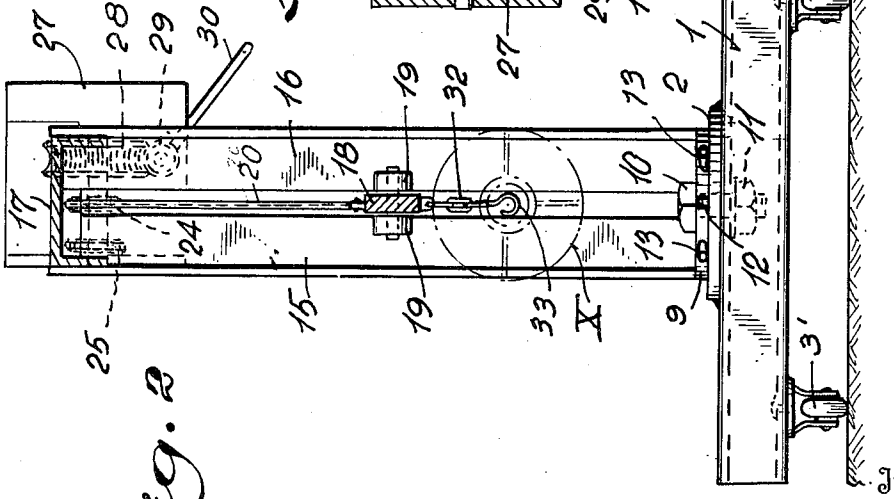


Fig. 2

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Filed Oct. 26, 1945 3 Sheets-Sheet 3

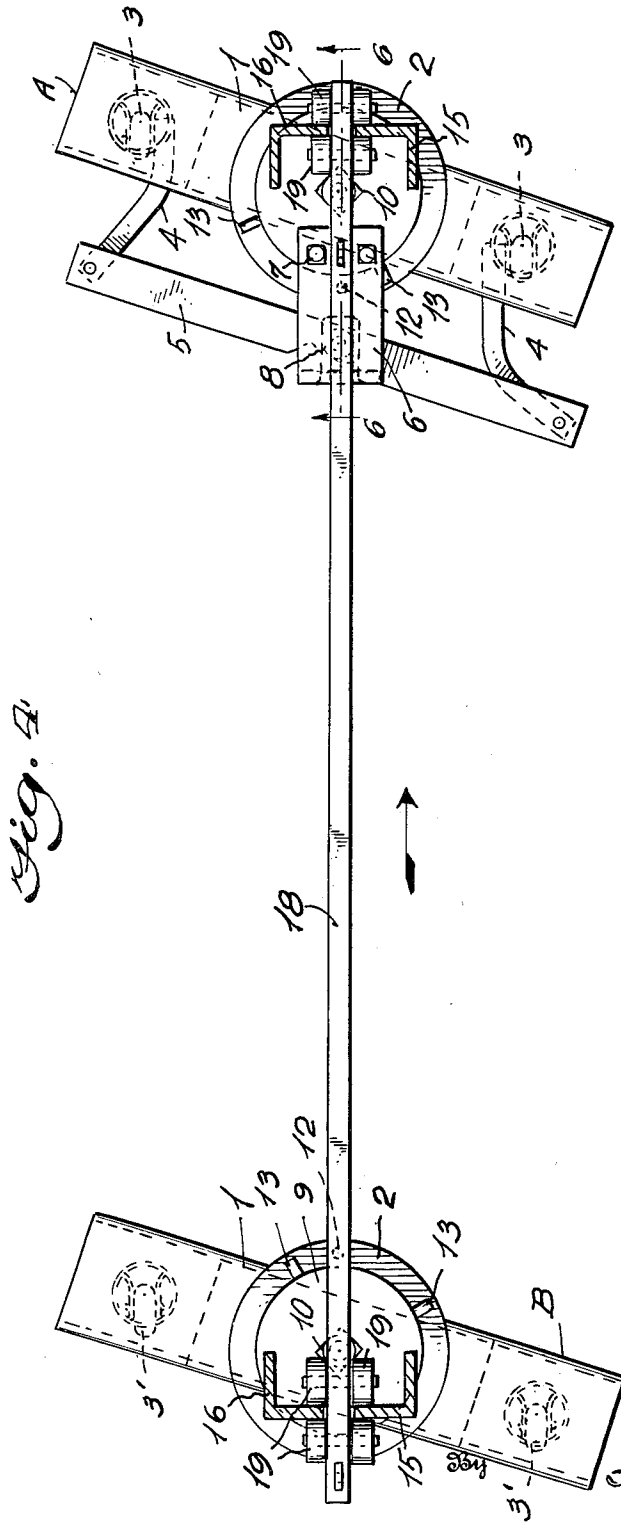


Fig. 4

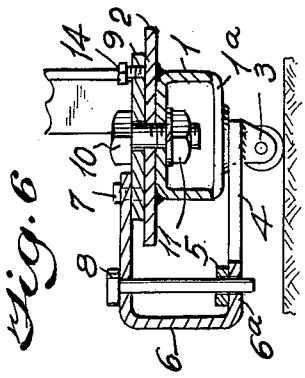


Fig. 6

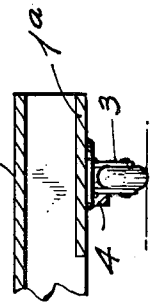


Fig. 7

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UNITED STATES PATENT OFFICE

2,551,174

PORTABLE HOIST

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Application October 26, 1945, Serial No. 624,742

5 Claims. (Cl. 254—144)

1

This invention relates to hoists or lifting devices, and more particularly to portable devices of this type capable of being moved around over the floor of a plant or factory into any desired position.

While capable of other uses, our invention is particularly designed for the lifting and transporting of heavy warp beams, and for placing such beams in position on textile machines such as looms or twister frames. Our invention is also well adapted for use in positioning heavy rolls of paper on printing presses.

One object of the invention is to devise a portable hoist so constructed that it may readily traverse the narrow aisles between rows of machines, while at the same time having sufficient stability to prevent danger of overturning.

Another object is to device a hoist of this character which may be moved into and out of position and readily manipulated by one man.

Still another object is to provide a hoist of this nature in which the frame is relatively light, but in which a part of the lifting mechanism itself is so designed as to brace and reinforce the frame so as to prevent buckling or distortion thereof.

Other objects and advantages of the invention will appear from the following description.

In order that the invention may be readily understood, reference is had to the accompanying drawings, forming part of this specification, and in which:

Fig. 1 is a side elevation of our complete hoist as it appears when in operative position;

Fig. 2 is a transverse section substantially on the line 2—2 of Fig. 1, looking in the direction of the arrows;

Fig. 3 is an inverted plan view of the forward end of the hoist, looking from below;

Fig. 4 is a sectional plan view of the complete hoist taken substantially on the line 4—4 of Fig. 1, looking in the direction of the arrows, the supporting trucks being illustrated in a different angular position from that shown in the other views;

Fig. 5 is a transverse section substantially on the line 5—5 of Fig. 1, looking in the direction of the arrows;

Fig. 6 is a fragmentary vertical section through the forward portion of the hoist, as indicated by the line 6—6 of Fig. 4, but with the truck in the same position as shown in Fig. 1; and

Fig. 7 is a fragmentary vertical section substantially on the line 7—7 of Fig. 1, looking in the direction of the arrows.

Referring to the drawings in detail, our improved hoist is supported on forward and rear wheeled trucks designated in their entirety by the reference characters A and B. Each of these trucks comprises a transversely extending frame member 1, shown as being of channel section at its middle portion, as illustrated in Fig. 6, but having the channel closed at each end by a bottom wall 1a, thus constituting a box section.

2

To the upper surface of each member 1 is welded, or otherwise rigidly secured, a swivel plate or turntable 2, of a diameter somewhat greater than the width of the member 1.

Each member 1 is supported on a pair of spaced swiveled caster wheels, designated 3 at the forward end, and 3' at the rear end of the hoist.

Secured to the casters 3, as by welding, are rearwardly extending arms 4, having their free ends connected by a bar 5.

A bracket 6 projects rearwardly from the forward truck, being secured, as by means of screws 7, to a second plate 9 resting freely upon the plate 2, and pivotally connected therewith by means of a bolt 10, having a nut 11 at its lower end. It will be noted that this nut is accessible through the open side of the channel member 1. The bracket 6, at its rear end, extends downwardly and thence forwardly, as indicated at 6a in Fig. 6, and a pin 8 extends vertically through a pair of aligned holes in the bracket and through a similar hole in the center of the bar 5. Thus, the bar 5 is freely pivoted about the pin 8.

The rear truck also is provided with the swivel plates 2 and 9, pivotally connected by a bolt 10, as above described. Both trucks can therefore swing about the bolts 10 to any desired angular position relative to the center line of the hoist and relative to each other. Stop pins 12 and 13, set into the plates 2 and 9 respectively, serve to limit the angle through which the trucks may swing, the maximum angle, in the particular construction shown, being about 45°. The trucks are illustrated in Fig. 4 as being turned through a smaller angle.

By reference to Fig. 3, it will be noted that notches 5a are cut in the rear edge of the bar 5 to afford clearance for the side edges of the bracket 6, when the bar 5 is swung to the maximum angle.

The purpose of swinging the trucks around the bolts 10 into an angular position, of, say, 45°, is to reduce the overall width of the hoist so that it may readily traverse the narrow aisles between rows of machines.

It will now be understood that the caster wheels 3' on the rear truck are free to swivel

through 360°, in the usual manner, but that the swiveling movement of the caster wheels 3 on the forward truck is limited by the arms 4 and tie bar 5. From an inspection of both Figs. 3 and 4, it will be seen that in either the normal or angular position of the forward truck, the caster wheels 3 lie in a plane parallel to each other and parallel with the center line of the hoist. Thus these caster wheels 3 are always maintained in planes parallel with the center line of the hoist, regardless of the angle to which the truck is swung. The trucks may be locked in any desired angular position, as by means of a set screw 14 passing through the plate 9 and bearing against the plate 2.

Rigidly secured, as by welding, to each plate 9, is a column shown as comprising a pair of angle members 15, 16, these constituting the ends or sides of the main frame of the hoist. These columns are rigidly united at their upper ends by a horizontal frame member 17, shown as in the nature of a channel. This top member and the two columns form an inverted U-shaped frame, which is disposed in a vertical plane, and which is of sufficient size to straddle the machines to be served.

It will be noted that the angle members 15 and 16 are spaced somewhat apart to provide a vertical opening or slot, and in this slot freely slide the ends of a horizontal lifting beam 18. As best shown in Figs. 1 and 4, the ends of the beam 18 carry pairs of rollers 19, these rollers being arranged to engage the flanges of the angle members 15 and 16 on both sides of the beam and on both the inner and outer sides of the columns. Thus, not only do these rollers serve to guide the beam in its vertical travel and thus prevent any swaying or swinging of the beam, but the beam itself serves to brace the columns and tie them together so as to hold them against any possible distortion or buckling. By employing this feature, the members 15 and 16, constituting the columns, can be made relatively light. While only a single roller on each side of each end of the beam and on each side of the column is illustrated, it will be understood that two or more such rollers may be disposed one above the other at each location, in case the beam 18 is of considerable depth.

The lifting beam 18 is supported and moved up and down by means of a pair of chains 20, attached to the beam adjacent each end, as indicated at 22, 23, the chain attached at the point 22 passing up over an idler sprocket 21, journalled in the top member 17, and thence extending along inside of this member to the rear end of the frame. At this rear end, the chains 20 pass over a pair of sprocket wheels 24, 25, secured to a shaft 26, journalled in a suitable gear box 27 and carrying a worm wheel 28. Meshing with this worm wheel is a worm 29, shown as provided with an operating handle 30, by means of which it may be turned. In practice, however, especially in the larger sizes of hoists, the worm 29 would be driven by a suitable electric motor.

Referring to Fig. 1, the warp beam or other roll to be lifted is indicated in broken lines at X, and is shown as having a shaft projecting from the ends thereof. Suitable clips or hangers 31 are engaged over and slidably mounted on the lifting beam 18, and chains 32, or the like, depend from these hangers and are provided at their lower ends with hooks 33 adapted to engage the projecting ends of the shaft of the roll or warp beam to be lifted.

In practice, the filled warp beams, or other articles to be handled, are stored at a certain point in the plant. When it is desired to transport one of these warp beams to a loom or other textile machine, the hoist is rolled into position so that the hooks 33 may be engaged over the ends of the warp beam shaft, the lifting beam 18 being lowered, as required, for this purpose. The lifting beam is then raised by means of the chains and sprockets above described, until the warp beam has been hoisted to the desired height. Thereupon, the hoist, carrying the filled warp beam, is rolled to the machine to be served. In rolling the hoist over the floor, the operator pushes against the column at the rear of the hoist, that is to say, at the left hand end, as shown in Fig. 1, which end is provided with the freely swiveled casters. By virtue of the fact that the casters at the forward end of the hoist are always maintained parallel with the center line of the hoist, that is to say, with the plane of the beam 18, the operator is enabled to easily manipulate and guide the hoist in the desired direction.

As above stated, when it is desired to traverse a narrow aisle or space between two machines, the trucks at the ends of the hoist are swung to angular positions, so as to reduce their overall width. After traversing the aisle, the trucks may be swung back into normal position so as to afford a wider base and greater lateral stability.

It will be understood that the frame of the hoist is so designed as to be capable of straddling the machine to be served, so that, by manipulating the hoist, the warp beam or other article may be delivered onto the machine in exactly the position required.

What we claim is:

1. A hoist comprising a pair of wheeled trucks, a column supported by and extending vertically from each truck, means rigidly uniting the tops of said columns, each column comprising a pair of spaced members, a horizontal lifting beam extending from one column to the other and having its ends projecting between said spaced members, rollers carried by said beam and engaging both the inner and outer faces of each of said spaced members, whereby said beam is guided by said rollers and said columns are tied together and braced by said beam, and means for raising and lowering said beam.

2. A hoist comprising a pair of wheeled trucks, a column supported by and extending vertically from each truck, means rigidly uniting the tops of said columns, a horizontal lifting beam extending between said columns and having its ends slidably engaging the same, and means for raising and lowering said beam, said means comprising a pair of chains connected to said beam, one adjacent each end, a pair of toothed sprocket wheels disposed side-by-side adjacent the upper end of one column, over which sprocket wheels said chains pass and with the teeth of which they engage, and means for driving said sprocket wheels in unison.

3. A hoist comprising a pair of wheeled trucks, a rigid frame disposed in a vertical plane and supported by said trucks, and a lifting beam carried by said frame, each of said trucks comprising a member extending transversely of said plane and connected at its center to said frame to swing about a vertical pivot, spaced caster wheels

swiveled on said member, means for locking said member in any desired angular position relative to said frame to which it may be swung, and additional means serving, when said locking means is released, to limit the angular swinging movement of said member.

4. A hoist comprising a pair of wheeled trucks, a rigid frame disposed in a vertical plane and supported by said trucks, and a lifting beam carried by said frame, each of said trucks comprising a member extending transversely of said plane and connected at its center to said frame to swing about a vertical pivot, spaced caster wheels swiveled on said member, the caster wheels of one truck being free to assume any angular position, and automatic means for maintaining the caster wheels of the other truck at all times in planes parallel with that of said frame as the transverse member of that truck is swung to various angles.

5. A hoist comprising a pair of wheeled trucks, a rigid frame disposed in a vertical plane and supported by said trucks, and a lifting beam carried by said frame, each of said trucks comprising a member extending transversely of said plane and connected at its center to said frame to swing about a vertical pivot, the supporting wheels of at least one truck being swiveled on said member, and automatic means for maintaining said swiveled wheels in planes parallel with that of said frame at all times as said transverse member is swung to various angular positions about said pivot.

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