

May 12, 1942.

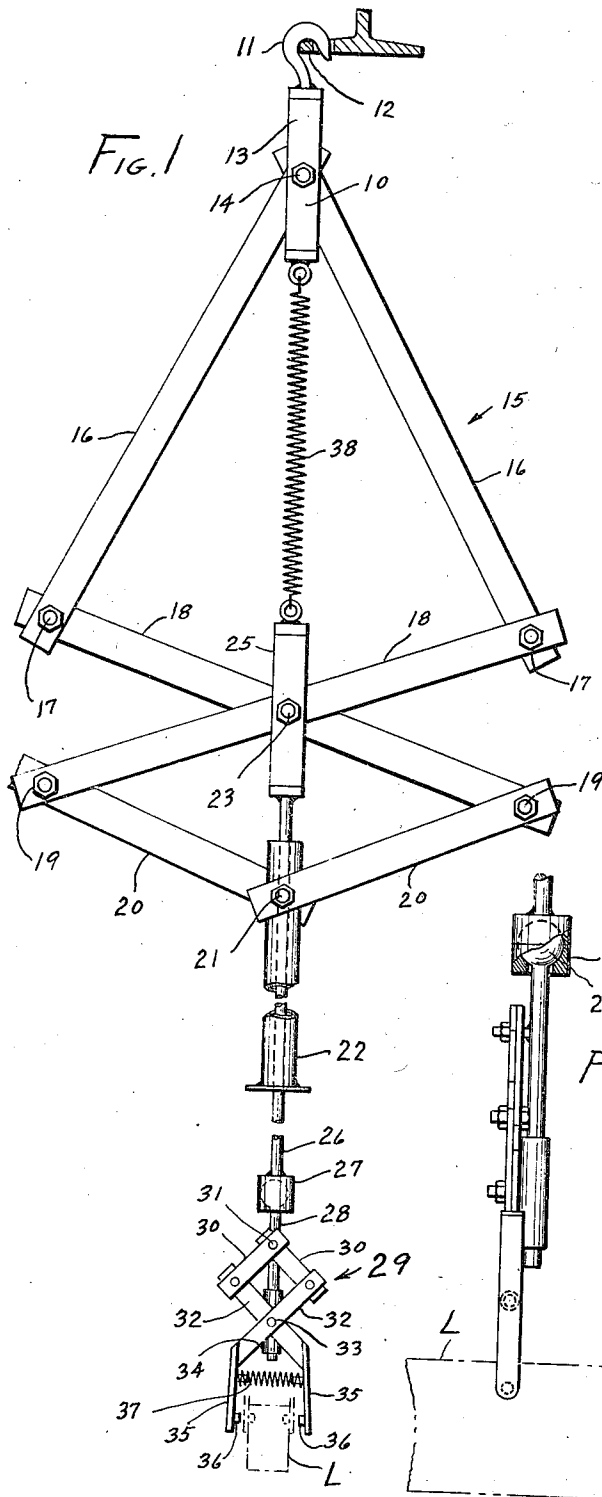
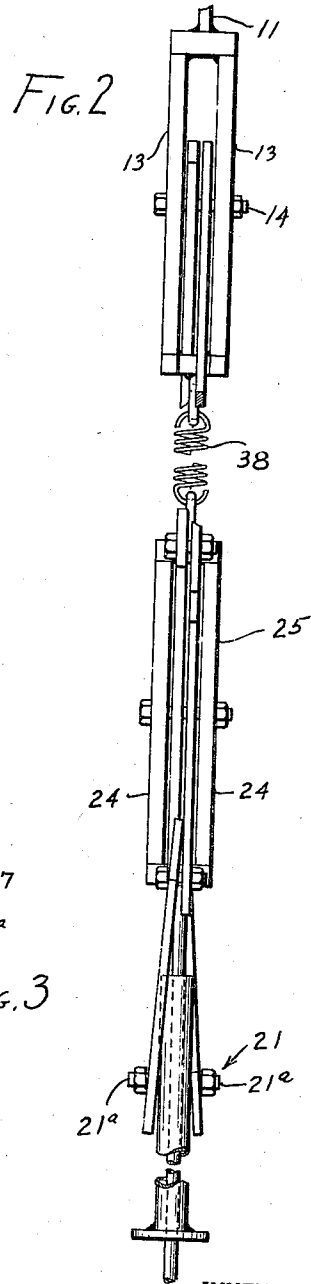
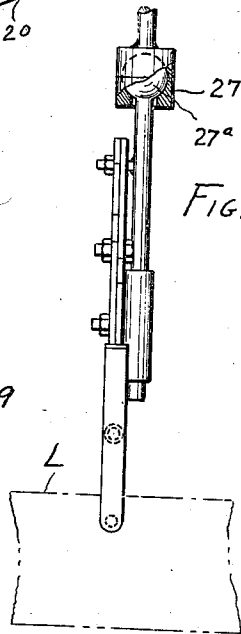
D. G. REMPEL

2,282,608

HOIST

Filed April 17, 1940

2 Sheets-Sheet 1



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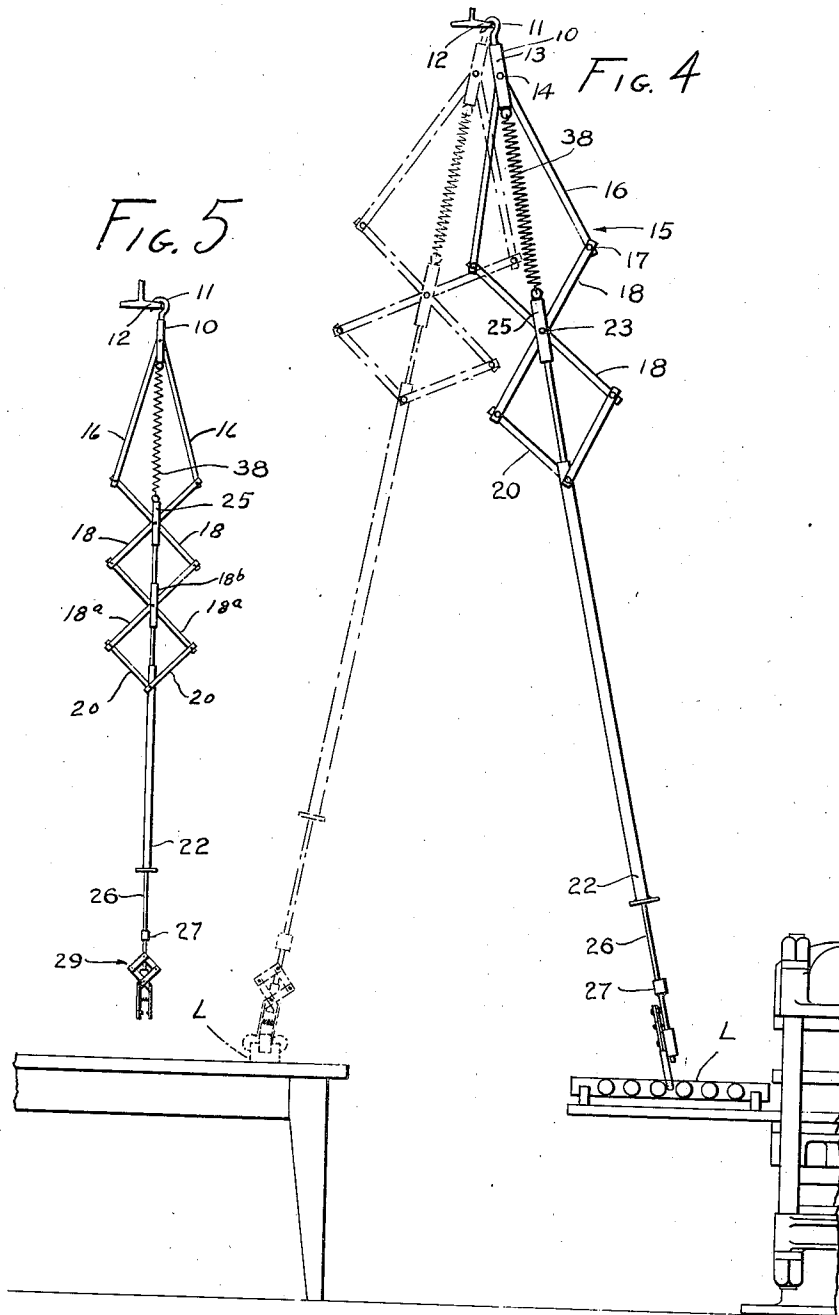
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HOIST

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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

2,282,608

HOIST

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10 Claims. (Cl. 254-122)

This invention relates to a hoist, and particularly relates to a manually operable hoist.

A purpose of the invention is to provide a simple, and relatively inexpensive hoist for facilitating the handling of loads.

Another purpose of the invention is to provide a hoist of the character described, which is manually operable with a minimum of effort to move a load from one position to another.

These and other objects of the invention will be manifest from the following brief description and the accompanying drawings.

Of the accompanying drawings:

Figure 1 is a side elevation, partly broken away, of a hoist embodying the invention.

Figure 2 is an edge view thereof, as viewed from the right of Figure 1, but on a larger scale, and partly broken away.

Figure 3 is an enlarged detail view of a load-engaging tongs at the lower end of the hoist, as viewed from the right of Figure 1.

Figure 4 is an assembly view, on a smaller scale, illustrating the hoist shown in Figure 1, in use for moving a load from one piece of equipment to another.

Figure 5 is a view similar to Figure 1, on a reduced scale, illustrating a modified form of the invention.

Referring to Figures 1 to 4, the numeral 10 designates an apertured block having a hook 11 on the upper end thereof adapted to hook over a suitable, relatively fixed, supporting beam at 12, it being understood, however, that hook 11 may be connected to movable means, such as an overhead crane, (not shown). Extending between the spaced walls 13, 13, of block 10, may be a pin 14, on which is pivoted an extensible supporting device 15 formed of jointed bars. The device 15 may comprise a pair of downwardly diverging arms 16, 16, pivoted at the upper end thereof on pin 14; a pair of arms 18, 18, having the upper ends thereof pivoted at 17, 17, to the lower ends of arms 16, arms 18 being pivotally connected at the central portions thereof to form a jointed cross; and a pair of relatively short arms 20, 20, having the upper ends thereof pivoted at 19, 19, to the lower ends of arms 18, the lower ends of arms 20 being pivotally connected to oppositely disposed studs 21, 21 fixed on the upper end of a tubular sleeve 22, which extends downwardly a suitable distance to be within grasping reach of an operator of the hoist. This jointed arrangement of the arms 16, 18 and 20, forms a supporting device which is expansible

and collapsible relative to the fixed pivot 14, in the manner of lazy-tongs.

The pivot for the central jointed connection of the arms 18, 18, may comprise a pin 23, extending between spaced walls 24, 24, of an apertured block 25, the arms 18 being received through the apertures of the block, between said walls. Integral with the block 25 may be a rod 26, extending downwardly and slidably through the sleeve 22.

On the lower end of the rod 26 may be a socket 27 for a ball-joint connection 27^a, with the upper end of a rod 28 having a grasping device on the lower end thereof, indicated generally at 29. This grasping device may comprise a pair of arms 30, 30, pivoted at one end to rod 28 and having pivoted at the other end thereof a pair of arms 32, 32, pivotally connected in crossed relation at 33 to a sleeve 34, slidable on rod 28. Downward extensions on the arms 32 provide spaced jaws 35, 35, which may have oppositely disposed pins 36, 36, on the inner faces thereof, for engaging in suitable recesses in opposite sides of work L to be lifted or moved. A compression spring 37 is provided, normally to urge the jaws 35 apart, the arrangement of the mechanism 29 being such that when the jaws 35 are urged together to engage the pins 36 in openings in the load L, a load maintained on the pin 36 will retain the jointed arms 30 and 32, in extended condition with the jaws 35 clampingly engaging said load.

A tension spring 38 may be arranged between the relatively fixed block 10 and the vertically shiftable block 25 to counteract the weight of the load L carried thereby. In cases where the load L is substantially the same for periods of time, for example, the spring 38 may be of sufficient tension to support the whole load, so that the loads may be moved with a minimum of effort.

In the operation of the hoist to lift a load L, as for example to move it from the full-line position to the chain-dotted line position shown in Figure 4, the load is clampingly engaged in the clamping device 29, as previously described. To lift the load L, the operator, while using one hand to steady it, grasps the sleeve 22 with the other hand, and urges it upwardly until the load L is at the desired height when it may easily be swung in an arc from the support 12, as shown in Figure 4. Due to the jointed construction of the supporting device 15, for each unit of distance that the sleeve 22 is moved upwardly, the block 25, and hence the load L will be moved a pro-

portionately shorter distance. The velocity ratio, or ratio of displacement, between the sleeve 22 and the load L is inversely proportionate to the power applied to move the sleeve 22 upwardly and the load carried by block 25, and therefore results in a mechanical advantage, which, in the case of the structure shown in Figure 4, amounts to somewhat more than a 2 to 1 advantage, independently of the effect of spring 38. Velocity ratio, as utilized herein, may be defined as the ratio of the distance that the power moves to the distance that the load moves on account of the movement of the power. The mechanical advantage of the hoist may be altered by changing the proportions of the various arms or bars so as to alter the velocity ratio between the sleeve 22 and the block 25.

Figure 5 illustrates a modified form of the invention, the essential difference between this structure and the structure shown in Figure 4 residing in the addition of another pair of cross-jointed arms 18^a, 18^b, parts which are similar to the structure previously described being given like numerals. The jointed arms 18^a are pivoted at the central portions thereof to a sleeve 18^b which is slidable on the shaft 26, relatively of the block 25 and the sleeve 22. Upward movement of the sleeve 22 relative to the fixed block 10 imparts movement to sleeve 18^b and block 25, respectively, with increasing velocity, thereby increasing the mechanical advantage for lifting the load L carried by block 25 to a relatively greater degree than was obtained by means of the construction shown in Figures 1 to 4.

Thus it will be seen that the mechanical advantage may also be increased to any desired extent by addition of the desired number of cross-jointed arms pivoted on sleeves relatively slidable on shaft 26.

Modifications of the invention may be resorted to without departing from the spirit thereof or the scope of the appended claims.

What is claimed is:

1. A hoist comprising a relatively fixed member, an extensible support connected to said member, an element, load-engaging means on said element, and a member shiftable on said element, portions of said support being spaced in the direction of extensibility of said support and being shiftable from and toward said fixed member to produce a velocity ratio between said portions with respect to said fixed member as the support is collapsed or extended, said element and said shiftable member each being connected to one of said portions to be relatively shiftable therewith, whereby said shiftable member is shiftable relatively of said fixed member to move said element with a mechanical advantage.

2. A device for moving a load comprising a relatively fixed member, an extensible member connected to said fixed member, an element load-engaging means on said element, and a member shiftable on said element, portions of said extensible member being shiftable from and toward said fixed member to produce a velocity ratio between said portions with respect to said fixed member as said extensible member is collapsed or extended, said element and said shiftable member each being connected to one of said portions to be relatively shiftable therewith, whereby said shiftable member is shiftable relatively of said fixed member to move said element with a mechanical advantage.

3. A hoist comprising a relatively fixed member, an extensible support connected to said

member, an element, load-engaging means on said element, a member shiftable on said element, portions of said support being shiftable from and toward said fixed member to produce a velocity ratio between said portions with respect to said fixed member as the support is collapsed or extended, said element and said shiftable member being connected to said portions to be relatively shiftable therewith, whereby said shiftable member is shiftable relatively of said fixed member to move said element with a mechanical advantage, and yieldable means between said fixed member and said element for yieldingly counteracting the load on said element.

4. A device for moving a load comprising a relatively fixed member, an extensible member connected to said fixed member, an element, load-engaging means on said element, a member shiftable on said element, portions of said extensible member being shiftable from and toward said fixed member to produce a velocity ratio between said portions with respect to said fixed member as said extensible member is collapsed or extended, said element and said shiftable member being connected to said portions to be relatively shiftable therewith, whereby said shiftable member is shiftable relatively of said fixed member to move said element with a mechanical advantage, and yieldable means between said fixed member and said element for yieldingly counteracting the load on said element.

5. A hoist comprising a relatively fixed member, an extensible support connected to said member, an element, load-engaging means on said element, and a plurality of members shiftable on said element, portions of said support being shiftable from and toward said fixed member to produce a velocity ratio between said portions with respect to said fixed member as the support is collapsed or extended, said element and said shiftable members each being connected to one of said portions to be relatively shiftable therewith whereby one or more of said shiftable members are shiftable relatively of said fixed member to move said element with a mechanical advantage.

6. A hoist comprising a relatively fixed member, an extensible support connected to said member, an element, load-engaging means on said element, a plurality of members shiftable on said element, portions of said support being shiftable from and toward said fixed member to produce a velocity ratio between said portions with respect to said fixed member as the support is collapsed or extended, said element and said shiftable members being connected to said portions to be relatively shiftable therewith whereby one or more of said shiftable members are shiftable relatively of said fixed member to move said element with a mechanical advantage, and yieldable means between said fixed member and said element for yieldingly counteracting the load on said element.

7. A hoist or like device comprising a relatively fixed member, an element, load-engaging means on said element, a member relatively shiftable on said element, and yieldable means depending from said relatively fixed member yieldingly to support said element and said shiftable member, said yieldable means providing a velocity ratio between said shiftable member and said element with respect to said fixed member, said shiftable member thereby being yieldingly shiftable toward and from said fixed member to move a load

on said element with a mechanical advantage.

8. A hoist or like device comprising a relatively fixed member, an element, load-engaging means on said element, a member relatively shiftable on said element, yieldable means depending from said relatively fixed member yieldingly to support said element and said shiftable member, said yieldable means providing a velocity ratio between said shiftable member and said element with respect to said fixed member, said shiftable member thereby being shiftable toward and from said fixed member to move a load on said element with a mechanical advantage, and yieldable means connected between said fixed member and said element for counteracting the load on said element.

9. A hoist comprising a relatively fixed member, an extensible support connected to said member, an element, load-engaging means on said element, and a member shiftable on said element, portions of said support being shiftable from and toward said fixed member to produce a velocity ratio between the same with respect to the fixed member as the support is collapsed or extended, said element and said shiftable

member each being connected to one of said portions to be relatively shiftable therewith whereby said shiftable member is shiftable relatively of said fixed member to move said element with a mechanical advantage, said extensible support comprising a system of jointed bars.

10. A hoist comprising a relatively fixed member, an extensible support connected to said member, an element, load-engaging means on said element, a member shiftable on said element, portions of said support being shiftable from and toward said fixed member to produce a velocity ratio between said portions with respect to the fixed member as the support is collapsed or extended, said element and said shiftable member being connected to said portions to be relatively shiftable therewith, whereby said shiftable member is shiftable relatively of said fixed member to move said element with a mechanical advantage, and yieldable means between said fixed member and said element for yieldingly counteracting the load on said element, said extensible support comprising a system of jointed bars.

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