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2,347,822

HOIST

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3 Sheets-Sheet 2

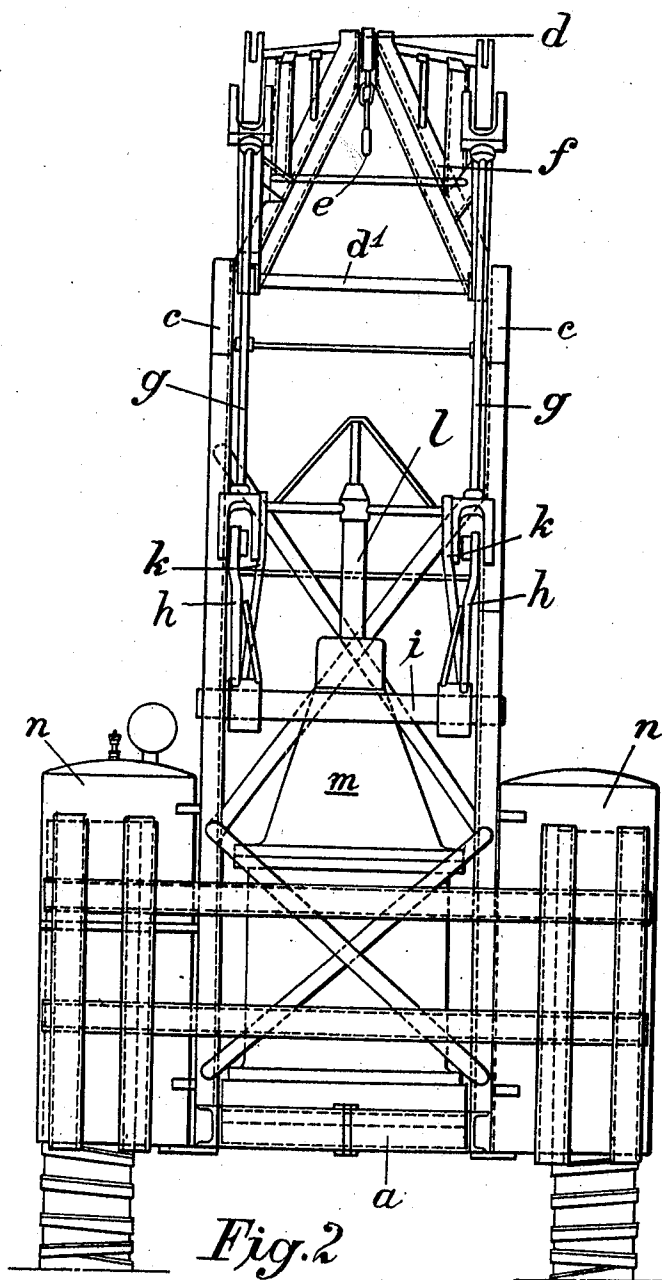


Fig. 2

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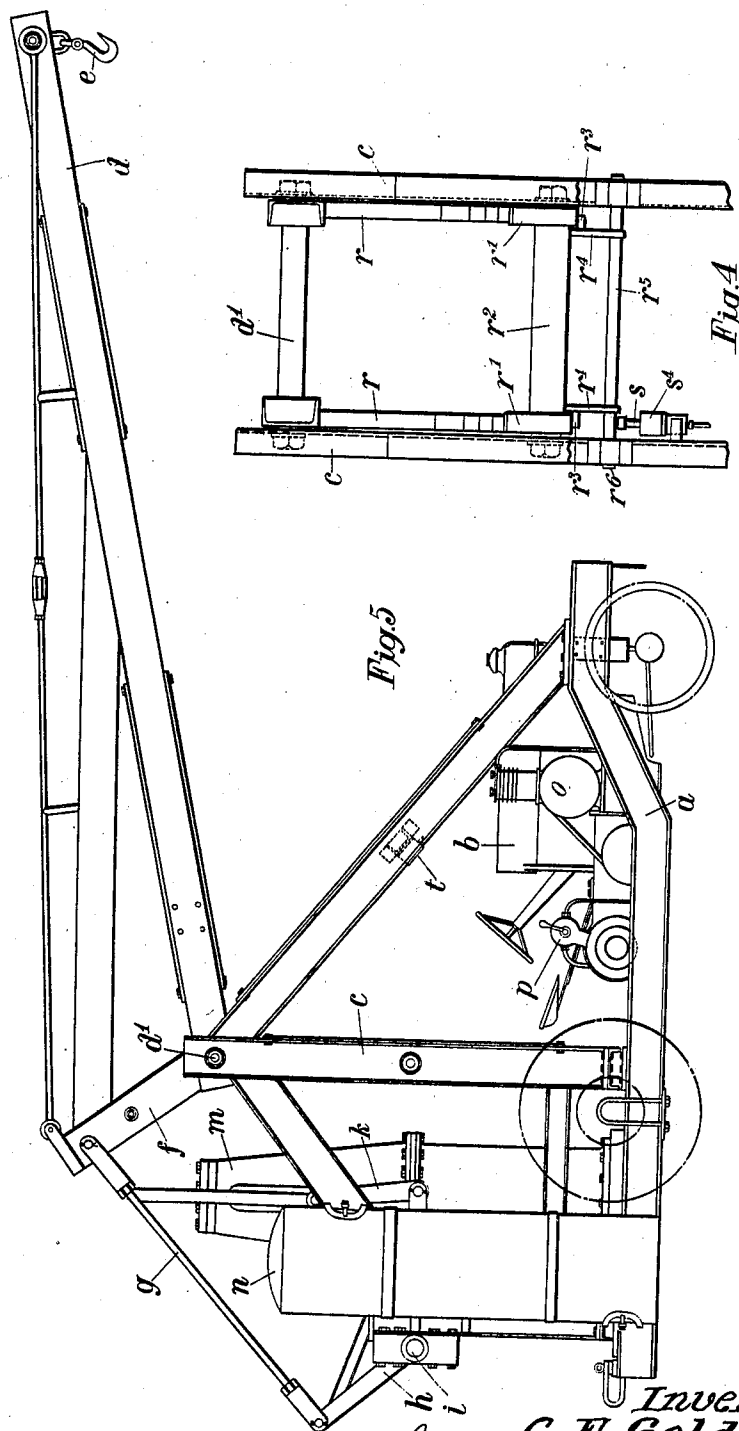
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## UNITED STATES PATENT OFFICE

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## HOIST

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In Great Britain March 3, 1942

4 Claims. (Cl. 212—8)

This invention has for its object to provide an improved mobile or static crane or hoist particularly designed for loading and unloading goods, packing cases, machinery parts and other articles and capable of a variety of uses in which the speeding up of the handling of goods is a desideratum.

The invention consists in a hoist comprising a framework, a crane arm or jib pivoted thereon, a fluid pressure operated piston, and linkage connecting the piston and jib for the purpose of raising and lowering the latter by movement of the piston.

The invention also consists in a portable hoist comprising a vehicle, a crane arm or jib pivoted to a framework thereon, a fluid pressure operated hoist on the vehicle, and linkage coupling the hoist and the jib for the purpose of raising and lowering the latter.

Further features of the invention will be apparent from the description given hereafter.

The accompanying drawings illustrate two modes of carrying out the invention.

Figure 1 is a side elevation (in part diagrammatic) of one form of portable hoist in accordance with the invention.

Figure 2 is a rear elevation.

Figure 3 is a view of a detail on a larger scale.

Figure 4 is an end view of a part of Figure 1 on a somewhat larger scale, and

Figure 5 is a view similar to Figure 1 showing in a further form of hoist in accordance with the invention.

In carrying my invention into effect in one convenient manner when producing a portable or mobile hoist and as illustrated in Figures 1 to 4, I construct upon the chassis *a* of a tractor *b* a framework of channel iron or other light but strong elements or units, the framework comprising two uprights *c* near the front end of the chassis to which is pivoted a crane arm or jib *d* formed of channel iron with suitable bracing rods or of other convenient construction and having at its outer end a hook *e* or other means by which the articles to be handled may be suspended from the jib. The pivoted shaft *d'* of the jib is provided with two members *f*, extending radially therefrom, and each of which is connected by a link *g* to a lever *h* mounted upon a transverse shaft *i* pivoted in the framework near the rear end of the chassis and the said shaft is connected by swinging links *k* to the piston rod *l* of a piston operating within a cylinder *m* to which compressed air is supplied for the purpose of operating the piston. The compressed air for

operating the hoist is contained in a reservoir (or reservoirs) *n* charged by a suitable compressor *o* driven upon the tractor and from the reservoir the compressed air is led by piping (not shown) to a contact valve *p* located conveniently for operation by the driver and adapted to control the supply of compressed air to and from the cylinder. The arrangement is such that power from the pneumatic hoist is transmitted to the crane arm for the purpose of raising and lowering the same as desired by way of the swinging links, rocking shaft lever and link or rod arrangement above referred to.

If necessary or desirable the framework may be extended rearwardly of the pneumatic hoist so as to take a counterpoise should this be found necessary or desirable, or as shown in the drawings, the pneumatic cylinder and reservoirs may supply the necessary counterweight.

While the invention of a mobile hoist has been described as applied to a tractor which is very convenient for the purpose of transporting loads suspended upon the crane arm it will be understood that the hoist may be applied to a truck or any other type of vehicle and the compressor for supplying the hoist may be driven by electric motor, petrol engine, or other convenient prime mover, or, alternatively, the receiver for supplying the pneumatic hoist may be charged periodically with compressed air from an outside source, for example, the pipe system of a factory.

It is preferred to provide the hoist with a suitable safety arrangement in order to prevent the fall of the crane arm in the event of an air pipe breaking or of any other accident leading to a fall in pressure in the system, the safety arrangement also being useful where it may be desired, for example, to retain the crane arm in its elevated position overnight or for any continuous period. In the particular example illustrated this object is achieved by providing upon the crane arm two quadrant shaped ratchets *r* each of which is associated with a pawl *r'* mounted upon a transverse shaft *r<sup>2</sup>* carried in the vertical members *c*. The free ends of the pawls are actuated by pins *r<sup>3</sup>* on fingers *r<sup>4</sup>* connected by a cross member *r<sup>5</sup>* and pivoted to the framework by a cross shaft *r<sup>6</sup>*. Acting upon the cross member *r<sup>5</sup>* is the piston rod *s* of a piston *s'* arranged in a cylinder *s<sup>2</sup>* connected to the reservoir supplying compressed air to the pneumatic hoist, the piston being controlled by a spring *s<sup>3</sup>*, the tension of which may be variable by movement of a cap member *s<sup>4</sup>* in relation to the cylinder *s<sup>2</sup>*. The arrangement is such that when the pressure ob-

tains in the system the pawls  $r'$  are maintained out of engagement with the quadrants  $r$  and the crane arm is freely movable as required. Should, however, the pressure fall for any reason the spring  $s^3$  comes into operation to lower the members  $r^4$  so that the pawls (which are suitably counterweighted) move into engagement with the quadrants  $r$  and prevent downward movement of the crane arm. In some cases the pawls may be operable by hand or foot mechanism instead of automatically by the air pressure as above described. Moreover, instead of applying the safety device to the spindle  $d'$  it may, if desired, be applied to the shaft  $i$ .

Figure 5 shows a modified construction in accordance with the invention and as similar parts to those shown in Figure 1 are marked with similar reference characters it is thought that any detailed description will be unnecessary. There are, however, shown in this figure two gauges  $t$  arranged upon the framework, namely, a weight gauge which may be connected with the pneumatic cylinder  $m$  (it being evident that the pressure within the cylinder may be a measure of the weight supported by the crane arm) and a pressure gauge connected with the reservoir  $m$ .

It will be understood that a hoist such as is above described avoids the necessity for any winding gear, winding cables, gear wheels and brakes such as are normally to be found in cranes and hoists as hitherto constructed, and while the invention has been particularly described in relation to a mobile unit, the principles of the invention may be equally applied to a static crane with slewing jib or otherwise for warehouse, factory or other purposes. For example, instead of mounting the jib and its fluid pressure operating mechanism upon a vehicle, it may be mounted on

a turntable, or may be otherwise arranged to enable the jib to be slewed as or if required.

The invention is not limited to any particular construction of framework nor to any particular arrangement of pneumatic or hydraulic cylinder for operating the crane connected therewith by suitable intervening linkage as such details may be varied according to the nature of the unit employed, the precise purpose for which the hoist is to be used or any practical requirements that may have to be fulfilled.

I claim:

1. A portable hoist comprising a vehicle, a channel iron framework on the chassis thereof comprising two uprights, a jib arm pivoted in said uprights, members extending radially from the pivotal spindle of the jib arm, links connecting said members with levers mounted upon a spindle also carried by the framework on the vehicle and floating links connecting said spindle with the piston rod of a fluid pressure actuated piston operating in a cylinder.

2. A portable hoist according to claim 1 comprising a reservoir supplying compressed air to the cylinder and a compressor driven by the prime mover of the vehicle for supplying compressed air to said reservoir.

3. A portable hoist according to claim 1 having safety means for preventing the fall of the crane arm in the event of a fall in pressure occurring in the fluid pressure system.

4. A portable hoist according to claim 1 having safety means for preventing the fall of the crane arm in the event of a fall in pressure occurring in the fluid pressure system, said means being actuated automatically on such fall of pressure.

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