D. L. MILLER.

HOIST.

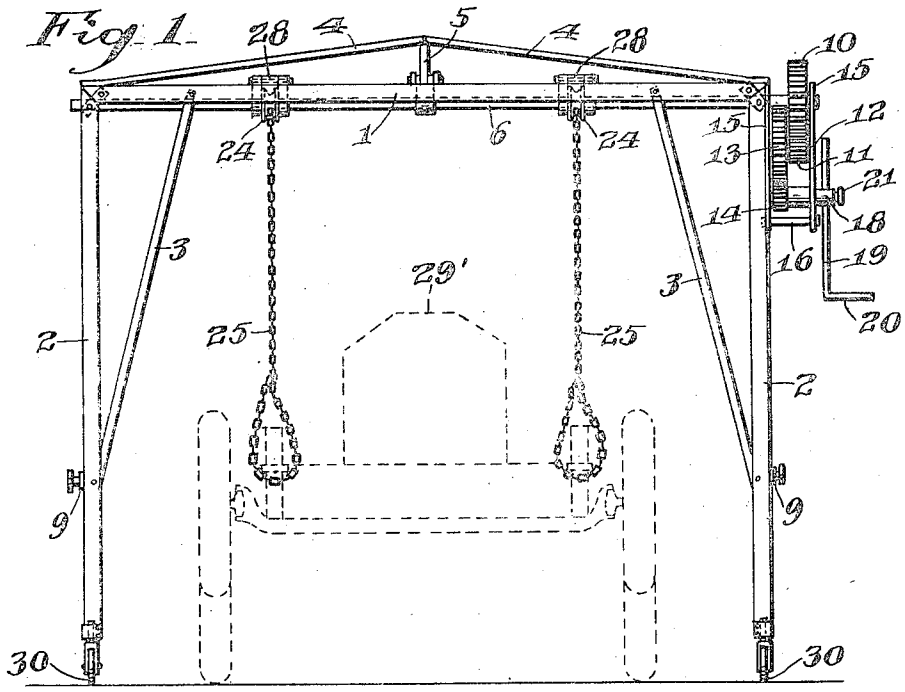
APPLICATION FILED NOV. 11, 1915.

1,204,470.

Patented Nov. 14, 1916.

2 SHEETS—SHEET 1.

Fig. 1.



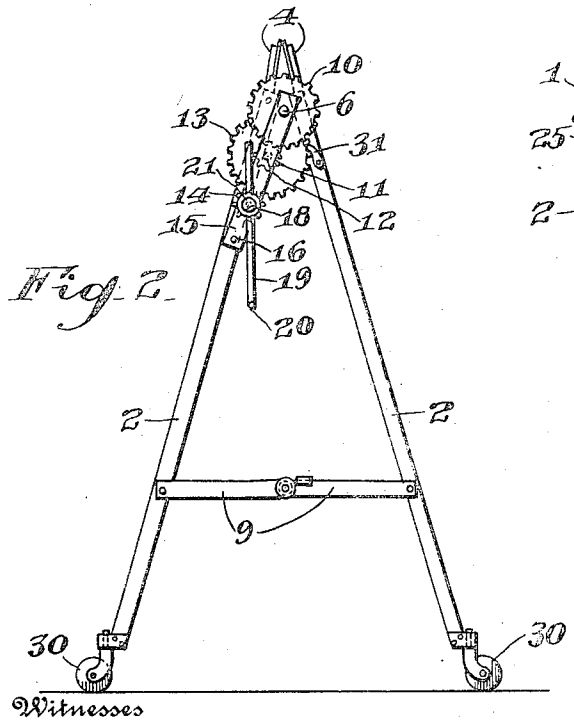


Fig. 2.

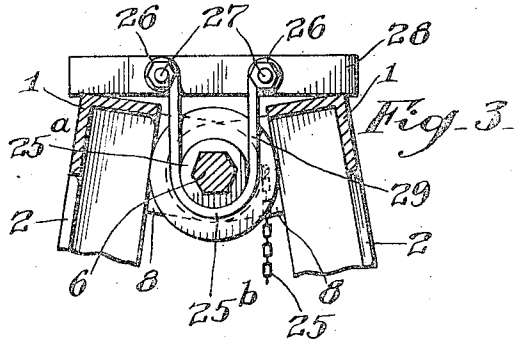
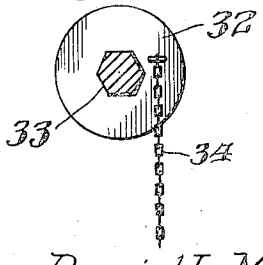


Fig. 3.

Fig. 4.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 5.

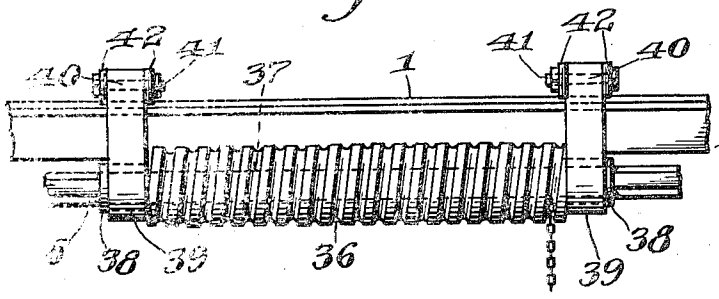


Fig. 6.

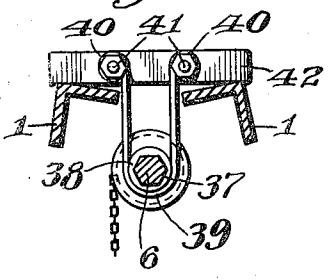


Fig. 7.

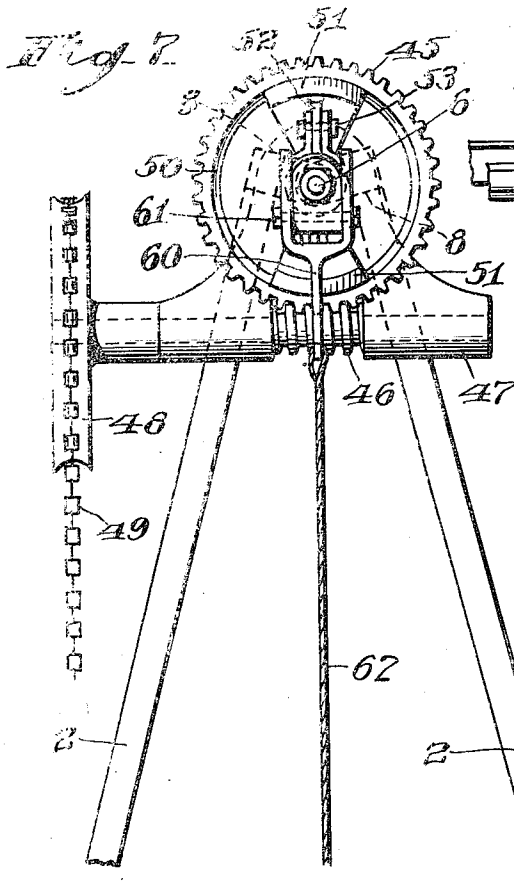
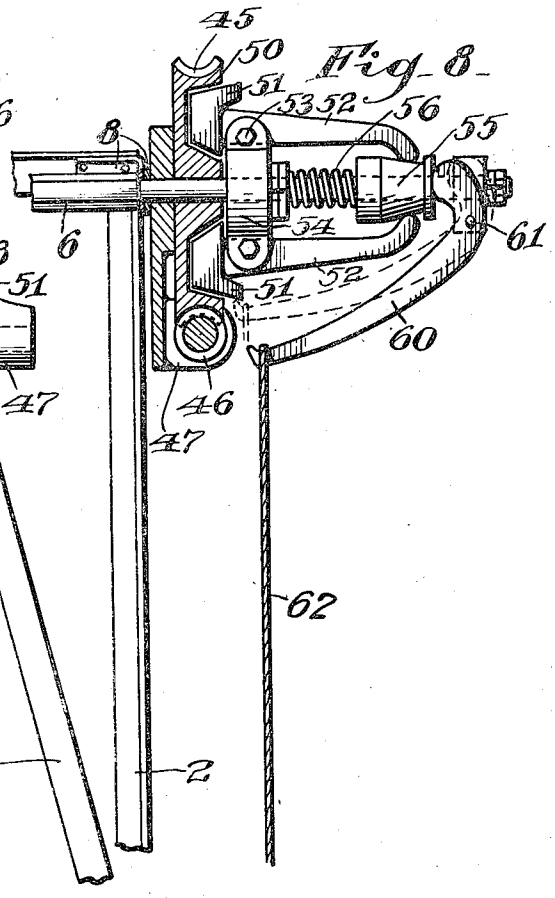


Fig. 8.



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UNITED STATES PATENT OFFICE.

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HOIST.

1,204,470. Specification of Letters Patent. Patented Nov. 14, 1916.

Application filed November 11, 1915. Serial No. 60,818.

To all whom it may concern:

Be it known that I, DANIEL L. MILLER, a citizen of the United States, and a resident of Monroeton, county of Bradford, and State of Pennsylvania, have invented certain new and useful Improvements in Hoists, of which the following is a full, clear, and exact description.

The object of the present invention is therefore to provide a strong, efficient, yet relatively inexpensive hoist, which can be transported as may be desired to any part of the shop, and which is equally adapted to raise both light and very heavy objects, this also being attended by the least degree of effort and by offering the least amount of obstruction to the work being carried on.

Another object is to provide such a hoist having its elemental parts so constructed that it can be collapsed and stored in the least possible amount of space; to provide a hoist that can be readily transformed into a work bench; to provide a hoist that can be rolled into position directly above an automobile, or other machine, to raise the same or parts thereof; to provide means for manually operating such a device, together with an improved clutch to permit the said means to be readily thrown into and out of operative engagement with the remaining parts of the mechanism; and to provide numerous other details and modifications thereof, as fully brought out in the following description, when read in conjunction with the accompanying drawings in which—

Figure 1 is a front elevation of the preferred form of the device; Fig. 2 is a side elevation of the same; Fig. 3 is an enlarged detail of the adjustable hoisting elements thereof; Fig. 4 shows a modification of the same; Fig. 5 is a front elevation of a modified form of hoisting drum; Fig. 6 is an end view of the same; Fig. 7 is a side elevation of a modified form of hoisting mechanism; Fig. 8 is a vertical longitudinal section of the same.

Referring to the drawings, in the preferred embodiment of the invention two angular frames are constructed of angle irons and comprise horizontal members 1, secured to the ends of which are vertical supporting members 2, braced to the former by suitable rods 3. The rigidity of the first-named members is maintained by angular tension braces 4, secured at their ends directly to the ends of the former and at their centers to the said members by compression braces 5. The two frames thus formed may be pivotally connected in any desired manner, as for instance by the polygonal shaft 6 passing through apertured plates 8, secured to the respective frame members, as shown best in Fig. 7. With this arrangement, the said frames may be brought together without altering the relative position of the said shaft with respect thereto, but are normally spaced apart by pivotally connected link members 9, upon which planks may be laid to form a work-bench.

Upon one end portion of the shaft 6 is secured a gear wheel 10 with which meshes a relatively smaller pinion 11, carried by a pin or trunnion 12 and secured to a large gear 13, which in turn is rotated by the small pinion 14, said gears and pinions being supported by spaced parallel plates or the like 15, held in fixed relation by space bars 16. Through the shaft 18, upon which is mounted the pinion 14, an adjustable crank passes, comprising a shank 19 and a handle portion 20, the same being maintained in any desired position by means of a set screw 21.

Slidably mounted upon the shaft 6 are a plurality of pulleys or drums 24 to which chains or cables 25 are secured, while the internal bore of each of the said pulleys conforms to the polygonal shape of the said shaft and is slidable thereover. For a simple construction, centrally disposed longitudinal extensions 25^a of said pulleys are slidably mounted in downwardly depending loops 25^b of bands 29, the upper end portions 26 of which are bent around pins or bolts 27, extending laterally from the sides of suitable blocks 28, which in turn are supported by the oppositely disposed parallel members 1 of the above-mentioned frames. The hoist in the form described can readily be placed in position as above an automobile 29′ by means of the swivel casters 30, after which the free ends of the chains 25 are securely attached to the body to be lifted, as suggested by the illustration, whereupon the crank 20 is actuated, thus turning the polygonal shaft through the medium of the chain of gears, and in this manner revolving the respective drums 24 which directly wind the said chains or cables and raise the desired body, the same being maintained in this position by a pawl or dog 31 coöperating with the teeth of the gear 13.

In Fig. 4 a slight modification of the winding mechanism is shown, wherein a disk 32, provided with a central polygonal aperture 33 to conform to the shape of the shaft 6, has secured to it one end of the chain 34. The said disk is slidably adjustable upon the shaft, and as the latter is revolved the chain or cable winds directly thereupon.

In Fig. 5 is shown still another modification of the winding mechanism wherein a relatively heavier spirally grooved drum 36 is provided axially with a polygonal aperture 37 and adapted to slide upon the said shaft 6, while said drum is rotatably supported by means of axial integral extensions 38 resting slidably within loops 39 of straps having their uppermost portions 40 bent to surround pins or bolts 41, extending between plates 42, which in turn are slidably supported by and extend across the oppositely positioned parallel members 1 of the main frames. With this construction, the said drum can be readily shifted to any given position upon the shaft 6, and by turning the latter the former revolves and winds up the said chain within the spiral groove.

In the arrangements above described the raising of a body by the hoist is accomplished by manually operating the crank described, and to lower the body thus raised the crank must be revolved in the opposite direction after first disengaging the pawl 31.

To take care of the ready elevation of bodies of unusually heavy weight, a modification of the device as shown in Figs. 7 and 8 is provided in which is employed the principle of worm gearing. This being a slow method of raising a body coincident with the ability to raise a much heavier body, provision has been made for rapidly lowering the latter, without having to reverse the entire operation of the elevating mechanism. In detail, the construction comprises a worm wheel 45 mounted loosely upon the shaft 6, while the former is driven by a worm 46, rotatably supported by a casting 47 and in turn driven by a peripherally recessed wheel 48, over which runs an endless chain or rope 49. The wheel 45 is recessed at 50 and in cooperation therewith is a plurality of clutch members 51, carried by levers 52, pivotally supported at 53 by a collar 54 fixed to the shaft 6. Also carried by said shaft is a slidably mounted cone member 55, normally pressed outwardly by a coil spring 56 and operative to expand the adjacent ends of the levers 52 to grip the wheel 45. Thus, the mechanism is normally in such position that the operation of the wheel 48 rotates the shaft 6 as above described, but provision is made to permit an elevated body to settle, or to otherwise unwind the chains or cables 25, without having to revolve the wheel 48 and this is accomplished by forcing the frusto-conical member 55 against the tension of the spring 56 by means of levers 60, pivotally mounted at 61 and actuated either directly or by a cord 62. Thus, with the clutch mechanism released, it is readily possible to revolve the shaft freely without having to operate the chain-driven wheel 48.

While one embodiment of the invention has been described in detail, the alteration of many of the details of construction and operation may be made and still maintain the device within the scope of the invention as covered by the appended claims. Instead of the worm 46 meshing directly with the gear 45, additional trains of gears may be interposed therebetween. Furthermore, arrangements may be made to collapse the supporting frames further than has been described, and too of no less importance, the pivotally connected members 9 with the platform formed by the planks as described, afford a work bench directly beneath a lightweight, combined hoist and crane.

Having thus described my invention, what I claim and desire to protect by Letters Patent of the United States is:—

1. A hoist comprising a pair of frames respectively consisting of upright members connected at their upper ends by substantially horizontal members, a yoke slidably supported by said last-named members, and a shaft pivotally connecting said frames and supported intermediate its ends by said yoke.

2. A hoist comprising a pair of frames respectively consisting of upright members connected at their upper ends by substantially horizontal members, a yoke slidably supported by said last-named members, a pulley revolubly carried by said yoke and provided with an aperture, and a shaft pivotally connecting said frames and partially supported by said pulley and yoke.

3. A hoist comprising a pair of frames respectively consisting of upright members connected at their upper ends by substantially horizontal members, a yoke slidably supported by said last-named members, a pulley revolubly carried by said yoke and provided with a polygonal aperture, a shaft pivotally connecting said frames and provided with a polygonal section coöperating with the walls of said aperture, and means carried by said frames for revolving said shaft.

In witness whereof, I have hereunto set my hand this eighth day of November, 1915.

DANIEL L. MILLER.

Witnesses:

MATHIAS LARRABEE,

FLORENCE MILLER.