Aug. 3, 1937. A. E. HANSEN 2,088,648

MANUAL LOADING HOIST FOR TRUCKS

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Fig. 1

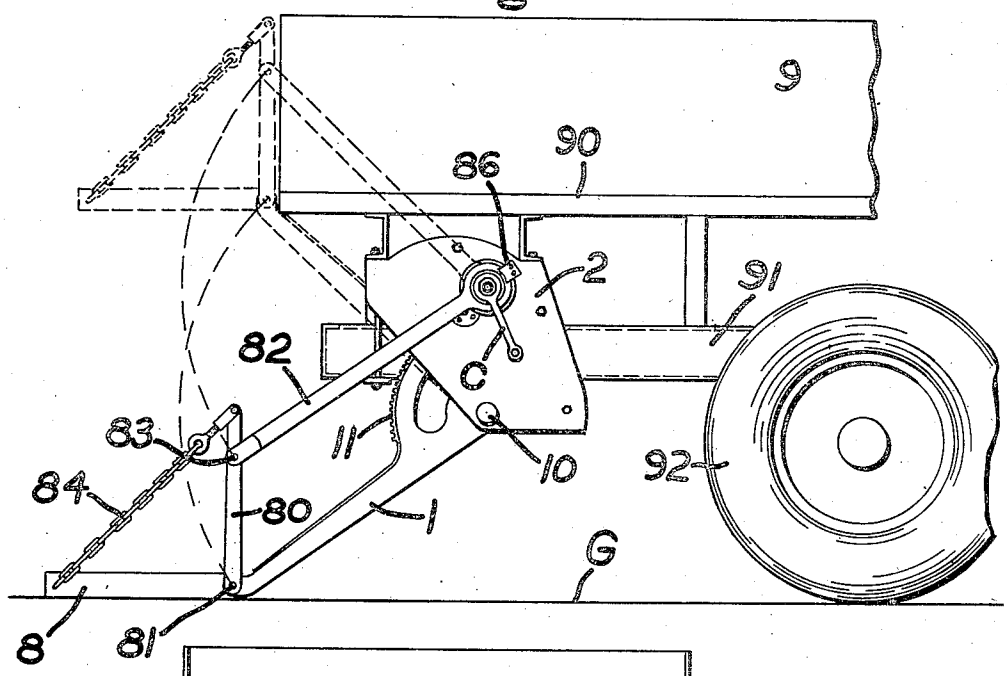
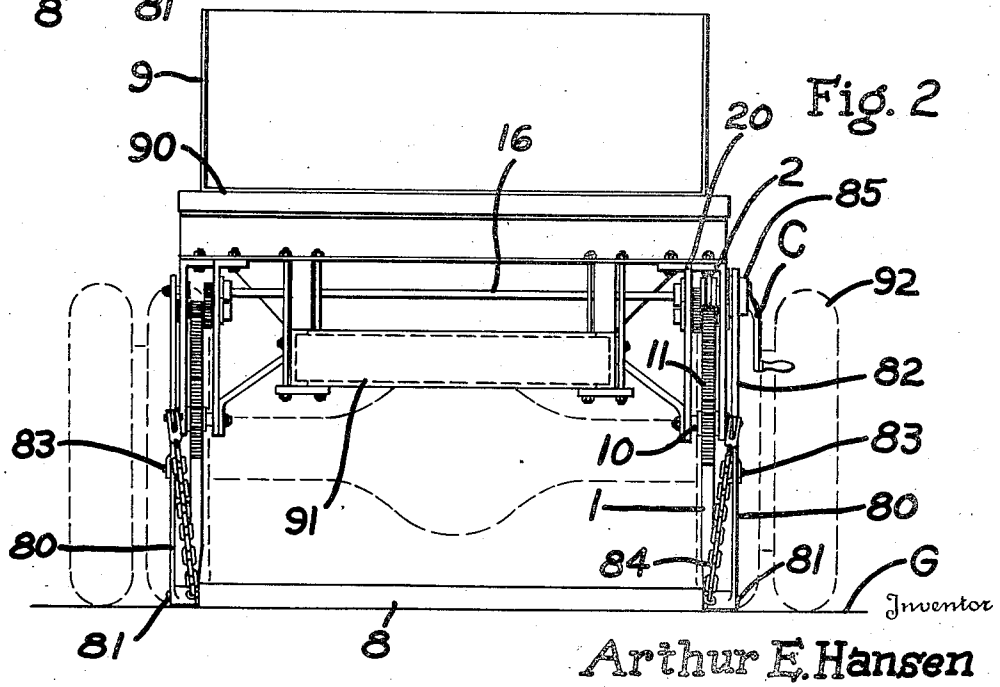


Fig. 2



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Fig. 3

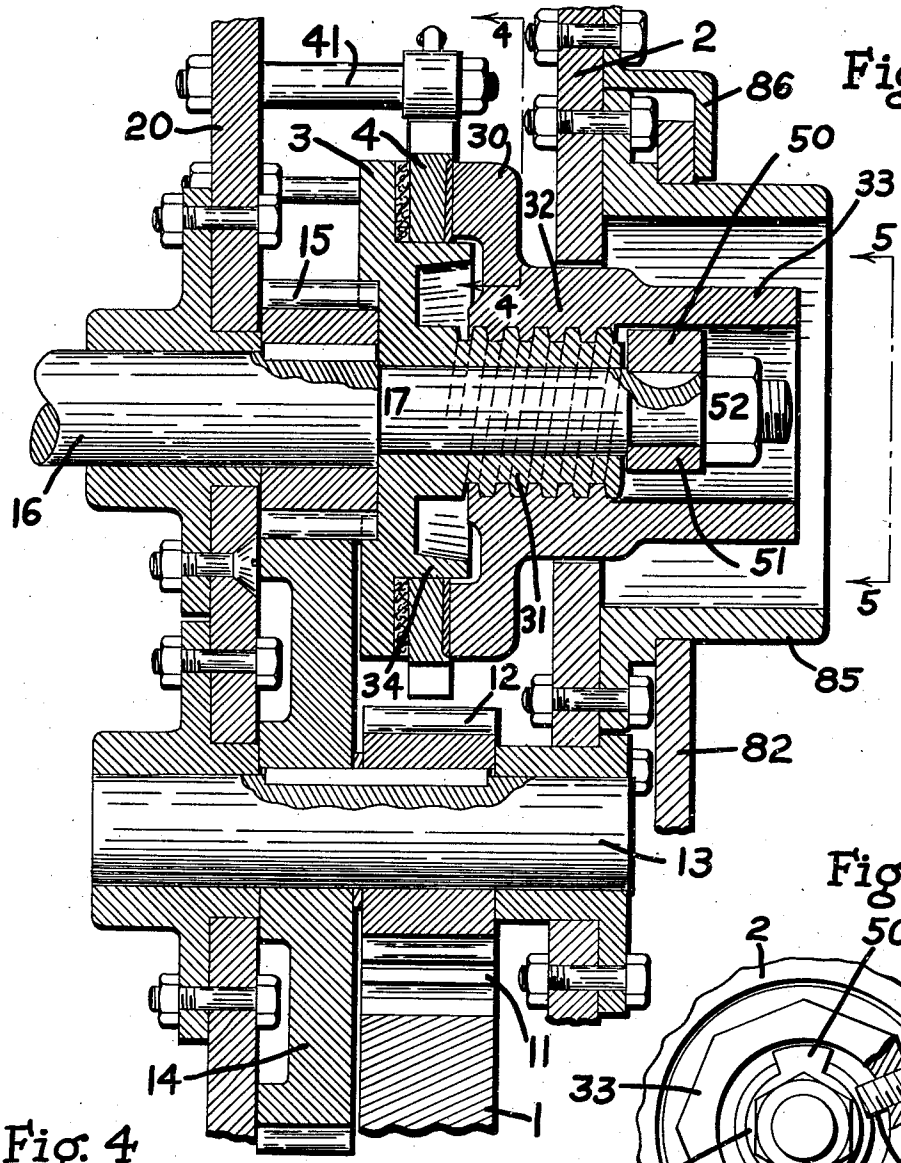


Fig. 4

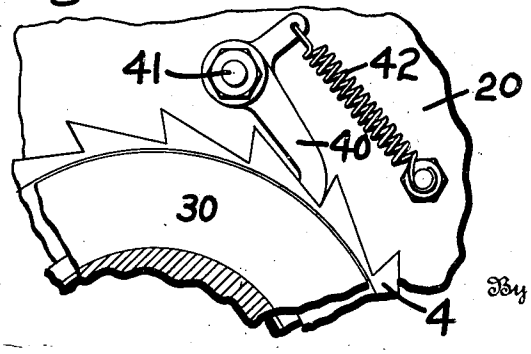
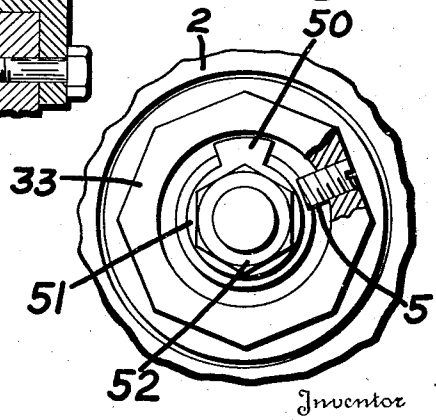


Fig. 5



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UNITED STATES PATENT OFFICE

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MANUAL LOADING HOIST FOR TRUCKS

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Application August 4, 1936, Serial No. 94,153

3 Claims. (Cl. 214—77)

My invention relates to load hoists for use on trucks, to lift heavy loads from ground level up to the level of the floor of the truck, and to lower such loads. My present invention is an improvement upon my Patent No. 1,929,112.

In that patent I disclosed such a hoist which was both power operated and manually operated. In the power operated unit the load is always under control through the hydraulic unit employed. Power units as disclosed in my previous patent are entirely dependable and satisfactory, but require special installation, and the cost of the hydraulic unit is comparatively large. It is therefore necessary to provide such a hoist with manual operating means for certain installations where it is impracticable to install power means, either because of the first cost or because of the difficulty of installing the power unit.

In the manually operated form it was intended that the load should be controlled through a ratchet and brake. In practice, however, it was found that operators would become careless, the brake would be imperfectly set, and when the ratchet dog was thrown out the load would begin to drop and could not be caught by the brake. Furthermore, the crank handle employed to lift the load would sometimes be left in place, and when the load started to lower, would begin to rotate rapidly and would constitute a source of danger to the operator. It is absolutely essential that such a manual hoist have means incorporated in it to prevent the load running away and dropping, for not only is this dangerous to the operator, as pointed out above, but in most instances the load will be damaged or destroyed.

It is a general object of the present invention to provide manual means for hoisting and lowering such a load in conjunction with a truck body by means of which the load is at all times under perfect control, and can never drop accidentally, being always held automatically at any given elevation or position unless manually operated to raise or lower it, and being then automatically held in any new position.

A further object is to provide mechanism of the general character indicated, which shall be simple, which will make it possible to employ simple spur gears for power reduction in the hoist, and which can be readily applied as a unit to the truck body, and which will be capable of operation by unskilled operators or truck drivers, and which, moreover, will be rugged and dependable, and of low cost.

My invention comprises the novel parts, and the novel combination and arrangement thereof with respect to a truck body, as shown in the accompanying drawings, described in this specification, and as will be more particularly pointed out by the claims which terminate the same.

In the accompanying drawings I have shown my invention incorporated in a form which at present is preferred by me.

Figure 1 is a side elevation of the rear end of a truck, showing my invention incorporated therein.

Figure 2 is a rear elevation of such a truck, and of my hoist.

Figure 3 is an axial section through the hoist.

Figures 4 and 5 are respectively a detail section and a detail elevation on the respective lines 4—4 and 5—5 of Figure 3.

The truck body is illustrated at 9 with its floor level at 90. It is suitably supported upon the chassis 91 of the truck, the rear wheel 92 of which is shown resting upon the ground at G. A platform 8 is supported at the swinging end of a lifting arm 1 pivotally mounted at 10 upon the truck body or chassis or preferably upon a framework composed of spaced plates 2 and 20 which house the hoist unit, and which are intended to be secured to the chassis or to the truck body, or both. The platform 8 is raised as the lifting arm 1 swings upwardly from the ground level G to the level of the floor 90 of the truck body. It is suitably maintained upright while hoisting, as for example by an upright arm 80, the platform 8 and arm 80 being pivotally mounted at 81 upon the swinging end of the hoisting arm 1, and by a parallel arm 82 which is pivoted at 83 to the upright arm 80, and at the axis of the hand crank C, as will be made clear hereafter. A chain 84 from the upright arm 80 to the platform 8 supports the outer end of the platform and permits the latter to be swung upward as an endgate when at the level of the floor 90. However, in so far as my hoist unit is concerned, the platform may be of any type and may be otherwise supported and guided for movement between its elevated and its lowered position; the present invention resides in the manual operating means for installation upon a truck, to operate any suitable load elevator.

Formed on the lifting arm 1 or secured thereto is a spur gear segment 11. With this is meshed a spur pinion 12 carried upon a shaft 13 supported between the plates 2 and 20, and also carrying a spur gear 14 with which is meshed a spur pinion 15 upon a shaft 16 journaled in one of the plates, preferably the inner plate 20. The shaft 16 may extend across to the opposite side of the truck

where the spur gear train described is preferably duplicated. Such a gear train is reversible, under the weight of the platform and any load thereon, hence it must have some means to prevent reversing, yet it is simple, rugged, and inexpensive.

The shaft 16 is preferably somewhat reduced at its outer end, as indicated at 17, and upon this extension, but splined upon the gear 15 or otherwise secured to rotate therewith, is a clutch element 3. A complemental clutch element 30 cooperates with the clutch element 3, but instead of the two clutch elements engaging each other they are arranged to clamp between them a ratchet wheel 4. To effect this clamping action the clutch elements are formed one with a screw element 31, the other with a nut element 32 threaded on the screw element 31, and the clutch element 30 is formed with a hand crank connection 33, whereon the hand crank C may be secured, permanently or temporarily. The crank connection 33 is preferably polygonal in shape, as indicated in Figure 5, whereby a removable hand crank may fit thereon. When the crank is turned it will tend to turn this clutch element 30 and the nut 32 formed therewith, relatively to the clutch element 3 and its screw 31.

When the hand crank connection 33 is turned in a direction to hoist the platform 8 the effect of the interengaged nut 32 and screw 31 is to draw the two clutch elements 3 and 30 towards each other. The ratchet wheel 4, supported upon and rotative about an annular flange 34 of the clutch element 3, is thus clamped between the two clutch elements, and when tightly clamped rotates with them. A ratchet dog 40 upon a pivot 41 fixed to one of the plates, and held in engagement at all times by a spring 42, permits the ratchet wheel to turn in this direction, but prevents reverse movement of the ratchet wheel, and consequently of the clutch elements and of the gear train while the clutch elements grip the ratchet wheel. Should the operator let go of the crank, the weight of the platform and its load, if any, will tend to reverse the spur gear train, and to rotate the clutch element 3 in a reverse direction, but the weight of the crank handle, and indeed the resistance of the parts, is ample to effect sufficient relative movement between the screw 31 and nut 32 to again clamp the ratchet wheel between the clutch elements 3 and 30, and to hold the load in its position, especially as the speed of rotation of the gear 15, thus reversed, is high as compared to the speed of rotation of the crank connection 33.

When it is desired to lower the load the crank handle is turned in the reverse direction, tending to unscrew the nut 32 from the screw 31, and to separate the clutch elements 3 and 30. The load, however, tends to rotate the clutch element 3 faster than the clutch element 30 is turned, yet there is sufficient unscrewing action to release the clutch elements from the ratchet wheel 4, which is now held against rotation by the dog 40, and to permit this reverse movement, yet the load can never get away from the operator, for if it should tend to turn faster it will cause the clutch element 3 to move toward and overtake the clutch element 30, and again to clamp the ratchet wheel 4, which is held in position by the dog 40, and thus the load would be held in its position.

In order to insure that the clutch element 3 will follow the clutch element 30 I may provide a lug, as for example the set screw 5, projecting inwardly from the crank connection 33 or otherwise associated with the clutch element 30, and engageable with a lug 50 carried by a washer 51 keyed to the shaft 16 or an extension thereof, and held in place by the nut 52. If after reverse movement of the crank connection 33, sufficient to engage the lug 5 with the lug 50, the clutch element 3 has not followed the movement of the clutch element 30, the engagement of the lugs will insure that the clutch element 3 is moved to follow up the clutch element 30, and in a direction to clamp the ratchet wheel 4.

A guard 85 may be employed to surround the axial portion of the crank C, and this may serve as a pivot support for the arm 82, previously described. This arm may be suitably held upon the guard 85, as for example by the retainer flange 86 (see Figure 3), which is secured to the outer plate 2.

The entire device is compact, the spur gears are the cheapest and simplest form of gearing to employ, and the entire device may be manufactured and installed as a unit, with little or no fitting to the truck.

What I claim as my invention is:

1. In combination with a truck body hoist having lifting means to elevate a loading platform from ground level to the level of the truck body floor, a driven shaft coupled to such lifting means, a driving shaft, a hand crank therefor, an end of one of said shafts being hollow and the other shaft having an end telescopically received therein, a female thread formed in said hollow shaft end, a male thread cooperating with said female thread and formed on the end of said telescopically received shaft end, a friction plate rigidly fixed to said driven shaft and facing said driving shaft, a second friction plate spaced from and facing said first friction plate and rigidly fixed to said driving shaft, a ratchet wheel interposed between said two friction plates and mutually clamped thereby, through the action of said threads by rotation of said driving shaft in the hoisting direction or by rotation of said driven shaft in the lowering direction, for rotation with said shafts in the hoisting direction, and releasable by rotation of said driving shaft in the lowering direction, and a dog engaging said ratchet wheel to resist its rotation in the lowering direction under the influence of the tendency of the driven shaft to be rotated in the lowering direction by the load on said lifting means, after rotation of the driven shaft in the lowering direction has effected clamping of the ratchet wheel between said two friction plates.

2. In combination with a truck body hoist having lifting means to elevate a loading platform from ground level to the level of the truck body floor, a driven shaft coupled to such lifting means, a driving shaft, a hand crank therefor, an end of one of said shafts being hollow and the other shaft having an end telescopically received therein, a female thread formed in said hollow shaft end, a male thread cooperating with said female thread and formed on the end of said telescopically received shaft end, a friction plate rigidly fixed to said driven shaft and facing said driving shaft, a second friction plate spaced from and facing said first clutch plate and rigidly fixed to said driving shaft, a ratchet wheel interposed between said two friction plates and mutually clamped thereby, through the action of said threads by rotation of said driving shaft in the hoisting direction or by rotation of said driven shaft in the lowering direction, for rotation with said shafts in the hoisting direction, and releasable by rotation of said driving shaft in the

lowering direction, a dog engaging said ratchet wheel to resist its rotation in the lowering direction under the influence of the tendency of the driven shaft to be rotated in the lowering direction by the load on said lifting means, after rotation of the driven shaft in the lowering direction has effected clamping of the ratchet wheel between said two friction plates, an abutment projecting radially outward from said telescoping shaft end, and a second abutment projecting radially inward from said hollow shaft and engageable with said first abutment upon less than a complete revolution of the driving shaft with respect to the driven shaft in a lowering direction, to effect positive conjoint lowering rotation of said two shafts while the ratchet wheel remains held from such rotation by the dog engaged therewith.

3. In combination with a truck body hoist having lifting means to swing a loading platform from ground level to the level of the truck body floor, two parallel arms pivotally connected each by one end to such lifting means, a pivot connecting the other end of said lower arm to the truck body, a gear segment formed on the upper side of said lower arm and concentric with said lower arm truck body pivot, a pinion coupled with said gear segment, a journal on the truck body for said pinion, pivot means concentric with and surrounding said pinion journal connecting the other end of said upper arm to the truck body, a hoisting and lowering hand crank, a driving member operated thereby and disposed in alignment with said pinion journal, clutch means between said driving member and said pinion operable to transmit lowering and hoisting rotation of said driving member, respectively, to said pinion, a ratchet wheel rotatable only in the hoisting direction, and brake means secured to said pinion and pressed into braking engagement with said ratchet wheel by slight lowering rotation of said pinion, unaccompanied by corresponding lowering rotation of said driving member, to frictionally hold said pinion against further lowering rotation, and released by lowering rotation of said driving member corresponding to lowering rotation of said driven member.

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