No. 757,290. PATENTED APR. 12, 1904.

L. S. FLECKENSTEIN.

CRANE.

APPLICATION FILED DEC. 7, 1903.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

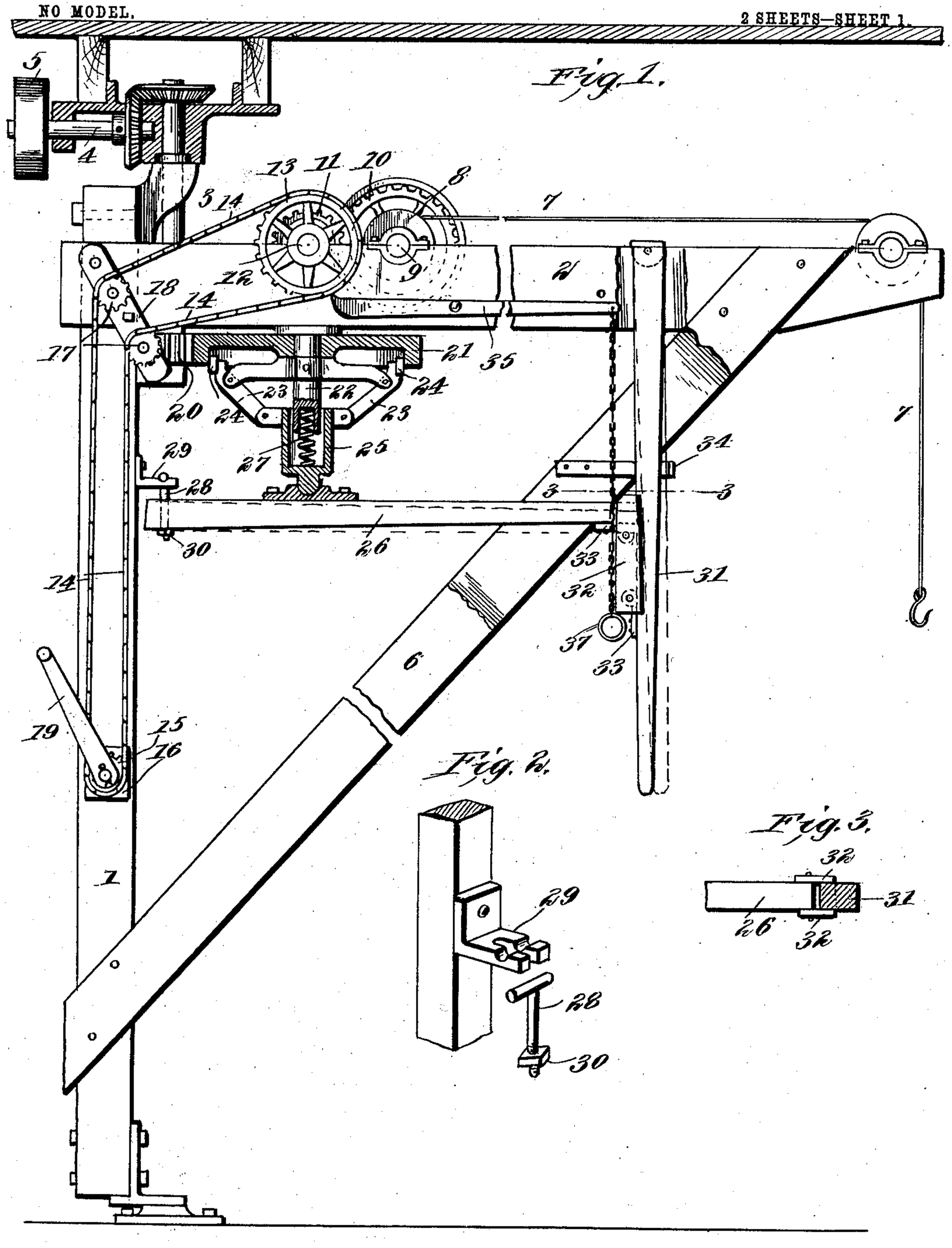

Fig. 2.

Fig. 3.

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 4.

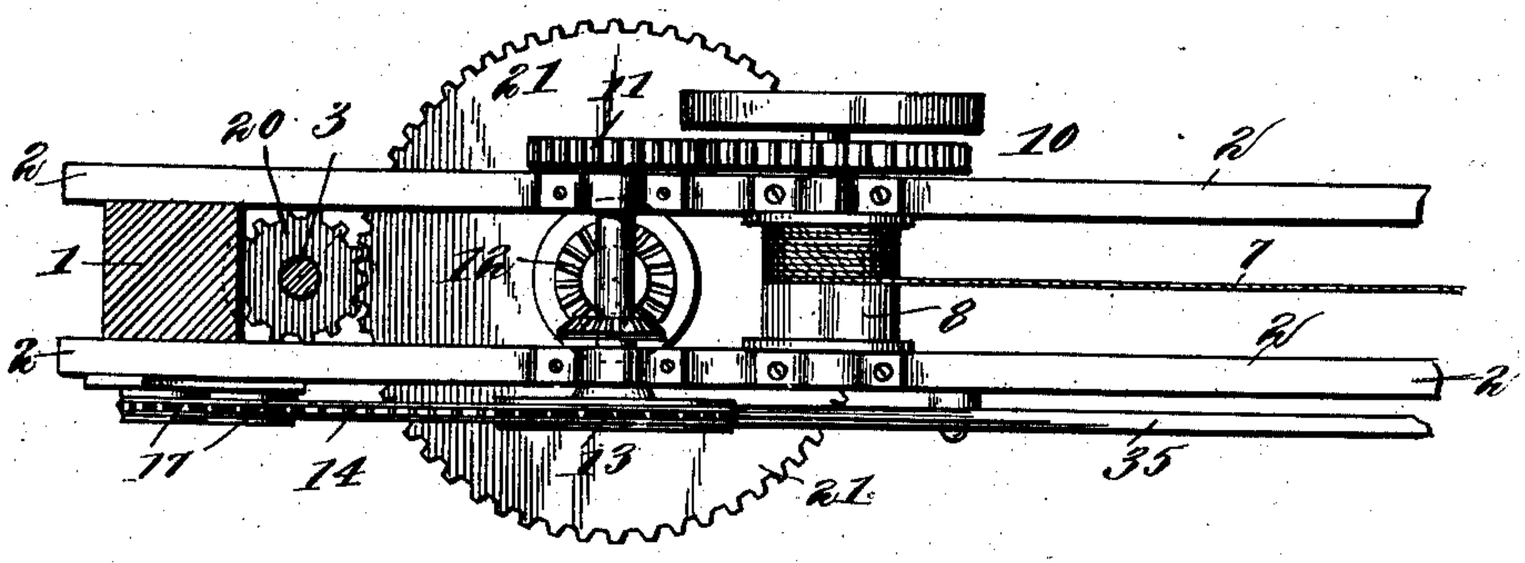
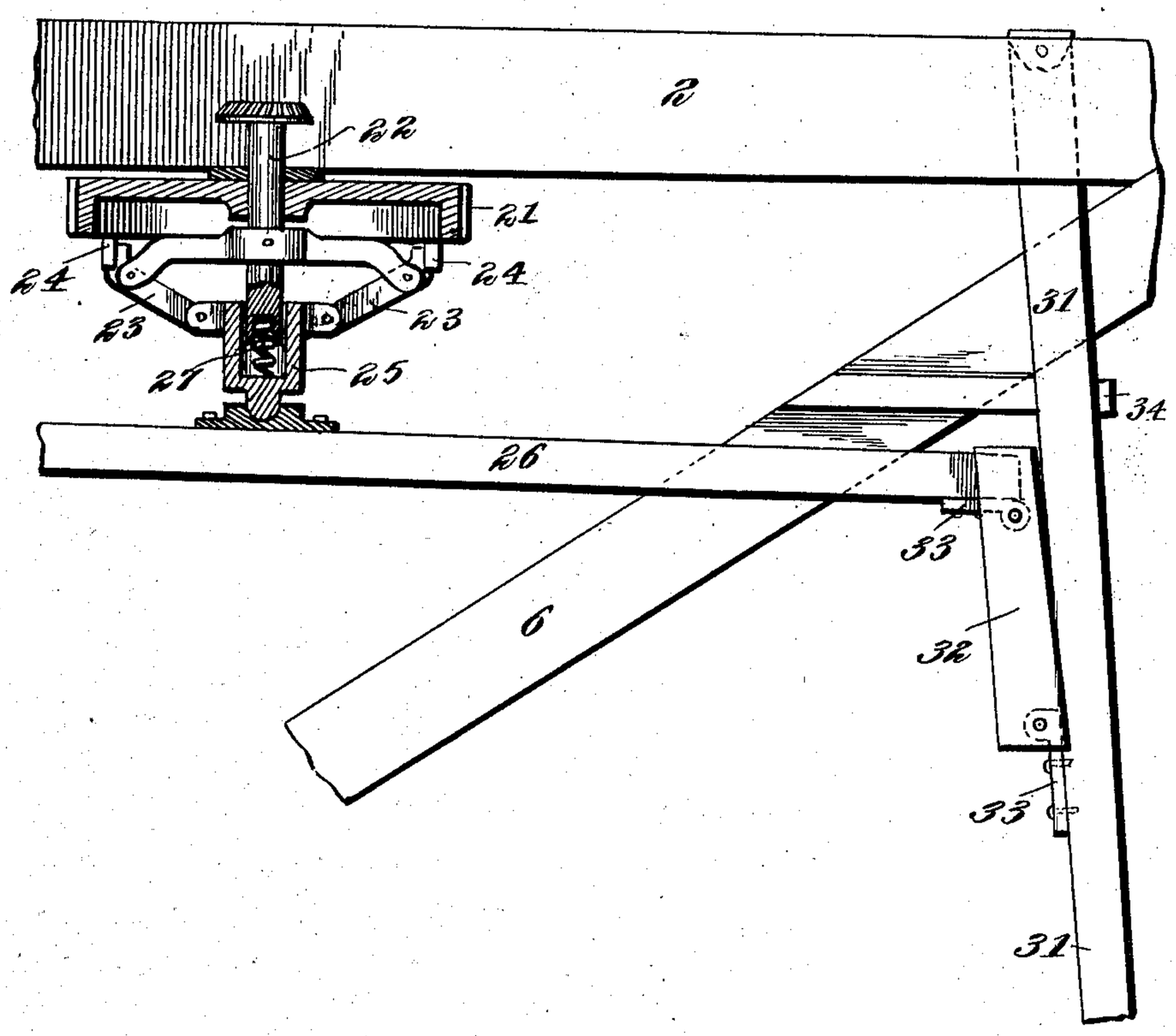


Fig. 5.



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UNITED STATES PATENT OFFICE.

LEONARD S. FLECKENSTEIN, OF EASTON, MARYLAND.

CRANE.

SPECIFICATION forming part of Letters Patent No. 757,290, dated April 12, 1904.

Application filed December 7, 1903. Serial No. 184,121. (No model.)

To all whom it may concern:

Be it known that I, LEONARD S. FLECKENSTEIN, a citizen of the United States, residing at Easton, in the county of Talbot and State of Maryland, have made certain new Improvements in Cranes, of which the following is a specification.

My invention is an improvement in that class of cranes which are adapted to rotate around the central axis and are provided with means for throwing constantly-running power mechanism into and out of action. It is more particularly an improvement upon the crane for which I have received Letters Patent No. 728,095, dated May 12, 1903. The improvement pertains particularly to the friction-clutch by which the power mechanism is engaged with or disengaged from the hoisting mechanism, also to the means for engaging and disengaging the said clutch and the arrangement of the winch or drum with certain connected parts forming the hoisting mechanism.

The details of construction, arrangement, and operation of parts are as hereinafter described, reference being had to the accompanying drawings, in which—

Figure 1 is in part a side elevation and in part a vertical section of my improved crane. Fig. 2 is a detail perspective view of the pivot and fulcrum of the lever by which the friction-clutch is thrown into and out of action. Fig. 3 is a cross-section on the line 3 3 of Fig. 1. Fig. 4 is mainly a plan view of the crane. Fig. 5 is a view illustrating the operation of the friction-clutch and showing it disengaged.

The vertical post 1 has eccentric pivots or bearings, one of which is a shaft 3, which is constantly driven from a horizontal shaft 4, provided with a driving-pulley 5. The jib or horizontal boom 2 is composed of parallel bars separated from each other, as shown in Fig. 4, and supported by braces 6, arranged diagonally. These parts are substantially such as are employed in my patented crane before referred to.

In my present invention the hoisting-chain 7 is wound upon a winch or drum 8, which is arranged horizontally instead of vertically, as in my previous invention. Experiments have demonstrated that when the winch or drum is arranged vertically the hoisting-chain tends to ride down thereon and overlap, whereas by arranging it horizontally this objection is avoided. The shaft 9 of the drum (see Fig. 1) is provided at one end with a spur-gear 10, which meshes with a smaller gear 11, keyed upon the parallel and contiguous shaft 12, which carries at its opposite end a larger sprocket-wheel 13. An endless chain 14 runs on the latter and also on a small sprocket 15, which is mounted upon a stub-axle projecting from a metal plate 16, secured to the pivot-post 1. Intermediate of the gears 13 and 15 the chain runs over guide-pulleys 17, which are mounted on stub-axles projecting from a plate 18, which is bolted to the crane at the intersection of the post and jib. A hand-lever 19 is applied to or preferably cast integrally with the gear 15, and by rotating the same it is obvious that the chain 14 may be driven for winding the hoisting-chain 7 on the drum 8. By this means hand-power may be applied whenever desired in place of mechanical power applied through the medium of the shafts 3 and 4.

The lower end of the vertical shaft 3 is provided with a pinion 20, which meshes with a large spur-gear 21, mounted loose on the vertical shaft 22. The latter is geared with the horizontal shaft 12 directly above it, as will be understood by reference to Fig. 4. The said gear 21 is chambered underneath to provide an internal friction-rim. This rim forms part of a friction-clutch whose other members are levers 23, provided with shoes or wear-pieces 24, which are secured to their upper ends and adapted to engage the friction-rim of the gear 21. The levers 23 are pivoted at the ends of a spider or multiple-armed carrier, which is fixed to the shaft 22, and therefore revolves with it. The lower ends of the levers 23 are pivotally connected with a hollow step 25, whose lower end is pivotally supported upon a vertically-movable lever 26 and whose recess or chamber receives the lower end of the shaft 22, as shown in Fig. 1. The lower end of the said shaft is recessed to adapt it to receive a spiral spring 27, which

rests upon the floor or bottom of the chamber of the step 25. It will now be understood that when the lever 26 is raised, as shown in Fig. 1, the lower ends of the levers 23 will be raised, with the effect of throwing out their upper arms, which carry the shoes 24, so that the latter will be brought into frictional engagement with the rim of the gear 21 and that when the pressure is sufficient the gear will become locked with the shaft 22 through the medium of the spider 24, and consequently the shaft will be driven by the constantly rotating vertical shaft 3, and thus rotation will be imparted to the winch 8 as required for winding on the hoisting-chain. On the other hand, if the lever 26 be lowered, as indicated in Fig. 5, the levers 23 will be swung on their fulcra, with the effect of throwing their upper arms out of engagement with the friction-rim of the gear 21, and thus the latter will be allowed to rotate free with the driving-shaft 3 without affecting the hoisting mechanism. The levers 23 are thus, in effect, toggle-levers, the power and the frictional engagement increasing rapidly as the lower ends of the levers are carried upward by hoisting the step 25. Further, it will be seen that but a very slight up-and-down movement of the lever 26 is required to carry the levers into and out of engagement with the rim of the gear 21. It is also apparent that the shoes 24 have no wedging action with the friction-rim and cannot stick or adhere, so as to hinder disengagement from the rim, as would be the case if a continuous or annular friction-surface were substituted for the shoes. In brief, the mechanism here described and illustrated is thoroughly effective and may be easily engaged and disengaged. The function of the spring 27 is merely to aid gravity in throwing the step 25 down when upward pressure on the lever 26 is relieved.

The means for supporting and adjusting the lever 26 are as follows: Its fulcrum is a T-bolt 28, (see Figs. 1 and 2,) which is supported by means of a right-angular bracket 29, secured to the post 1. The body of the bolt 28 is received by a slot in the horizontal arm of the bracket, and the said rim is also provided with a groove to receive the head of the bolt. A nut 30 is applied to the lower end of the latter for use in adjusting the lever 26 to exactly the required height. The outer end of the lever 26 is connected with a vertical hand-lever 31 by means of a link 32, which (see Fig. 3) is formed of two parallel plates and joint-pieces 33, that connect them with the levers 26 and 31, as shown. The hand-lever 31 is pivoted to the boom 2 and is made of such thickness that it is adapted to fit between the plates 32, constituting the link proper. When the lever 31 is vertical, as shown in Fig. 1, the horizontal lever 26 is supported in due position to engage the friction-clutch, as there shown, since the link 32 thus assumes such position that it locks the lever 26. In other words, when the link 32 is vertical the downward pressure applied by the lever 26 cannot cause outward movement of the pendent lever 31, and consequently the latter serves as a support for the former. When the lever 31 is thrown to the right, as shown in Fig. 5, the link 32 assumes a slight angle and the lever 26 is depressed sufficiently to disengage the clutch. Such outward movement of the lever 31 is limited by a stop 34, consisting of a bent arm secured to the diagonal brace 6. Thus by a slight and easy movement of the pendent hand-lever 31 the clutch may be readily engaged and disengaged, as required in the operation of the crane.

I show in Fig. 1 a lever-pawl 35 for locking the hoisting mechanism when desired, so as to hold any object which may be elevated by the chain 7 suspended at any desired height. The same consists of a lever pivoted and arranged horizontally, one end being adapted to engage the sprocket 13, and from the other end depends a chain having a handle 37.

When the hand mechanism is not required, the chain 14 is unshipped from the sprocket 13 and allowed to hang on the rollers 17, or it may be completely removed from the latter and also from the gear 15.

By means of the construction and arrangement of parts before described I provide a crane which is light, yet strong, is easily operated, very efficient in action, and whose hoisting mechanism may be thrown into and out of gear by slight manual exertion.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a crane of the type specified, the combination with hoisting mechanism and a vertical shaft which is operatively connected therewith, and a driving-gear mounted loose on said shaft and provided with a friction-rim, of a series of movable friction devices, and means for carrying said devices into and out of engagement with the gear, substantially as described.

2. In a crane of the type specified, the combination with hoisting mechanism and a vertical shaft which is operatively connected therewith, and a driving-gear mounted loose on the shaft and provided with a friction-rim, of a series of levers and a carrier fixed to the shaft and to which the said levers are pivoted, and means connected with the inner ends of the levers whereby they may be adjusted vertically for engaging the friction devices or disengaging the same, substantially as described.

3. The combination with hoisting mechanism, and a vertical shaft operatively connected therewith, of a gear mounted loose on said shaft and provided with a friction-surface, a

series of independent friction devices adapted for engagement with such gear at different points, a carrier for said devices which is fixed on the shaft and revolves with it, and means for operating said devices for throwing them into and out of engagement with the friction-surface, substantially as described.

4. The combination with the hoisting mechanism, and a vertical shaft operatively connected therewith, of a gear which is mounted loose on said shaft, means for constantly driving said gear, friction devices adapted to engage the rim of said gear at different points, the same consisting of levers pivoted in such manner that their outer ends engage the gear, a frame constituting a carrier and fulcrum for said levers, and secured to the shaft so as to revolve with it, a step with which the inner ends of the levers are connected, and a vertically-movable support upon which said step is pivotally mounted in the manner shown and described.

5. The combination with hoisting mechanism, a vertical shaft which is operatively connected therewith, a gear mounted loose on said shaft, and means for driving the same, of friction-levers adapted to engage the rim of said gear, and a frame constituting a carrier and fulcrum for the levers, the same being secured to the shaft so as to revolve with it, a hollow step with which the inner ends of the levers are pivotally connected, a spring arranged in said step and interposed between it and the shaft, so as to exert downward pressure, and a vertically-movable support upon which the step rests, substantially as described.

6. In a crane of the type specified, the combination with hoisting mechanism, driving mechanism and clutch mechanism adapted to engage the latter, of a lever pivoted on the post of the crane and serving by vertical movement to adjust the clutch for engagement and disengagement, a hand-lever pivoted at its upper end, and a link connecting the same with the aforesaid horizontal lever, so that by shifting the vertical lever the horizontal lever is raised and lowered substantially as described.

7. The combination with hoisting mechanism, power mechanism for driving it, and a friction-clutch for engaging the two mechanisms when desired, of a horizontal pivoted lever supporting certain members of the friction-clutch, a pivoted and pendent hand-lever, and a link connecting the two levers and adapted to swing vertically, the arrangement being as described, whereby, when the pendent lever is in vertical position, the horizontal lever is supported and locked in position to hold the friction-clutch in engagement, substantially as described.

8. In a crane of the type specified, the combination with the boom and a winding-drum mounted thereon, of a shaft arranged parallel to the drum and geared therewith, and also provided with a sprocket-wheel, an endless chain mounted on said sprocket, a hand-lever and a sprocket pivoted on the post of the crane, and intermediate pulleys arranged at the junction of the boom and post, whereon the chain is adapted to run in the manner shown and described.

LEONARD S. FLECKENSTEIN.

Witnesses:
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JOHN B. FAIRBANK.