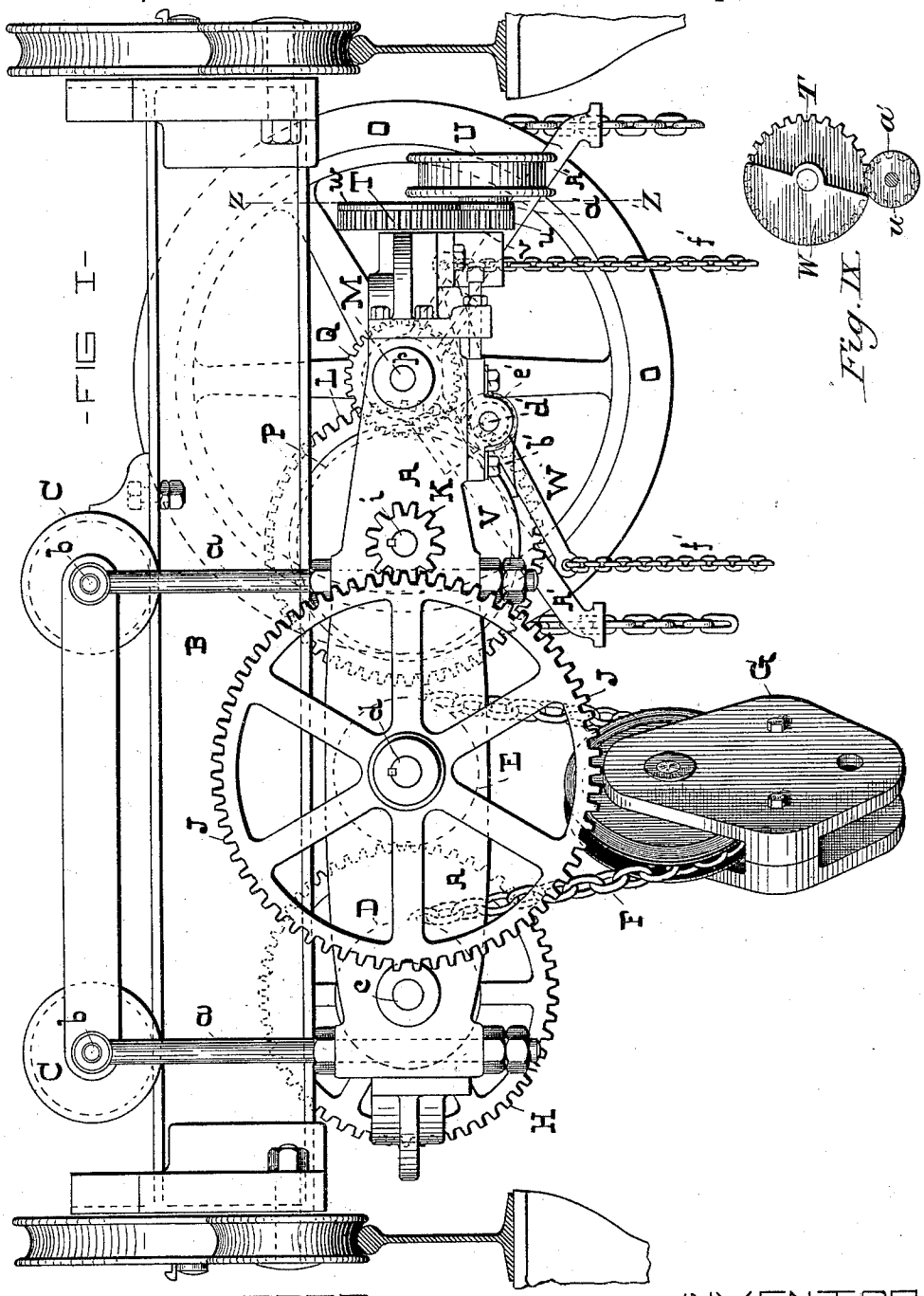
(No Model.) 3 Sheets—Sheet 1.

J. WALKER.

TRAVELING CRANE.

No. 401,613. Patented Apr. 16, 1889.



-FIG. I-

-FIG. II-

WITNESSES-

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R. Lawrence Smith

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by G. H. & W. J. Howard,

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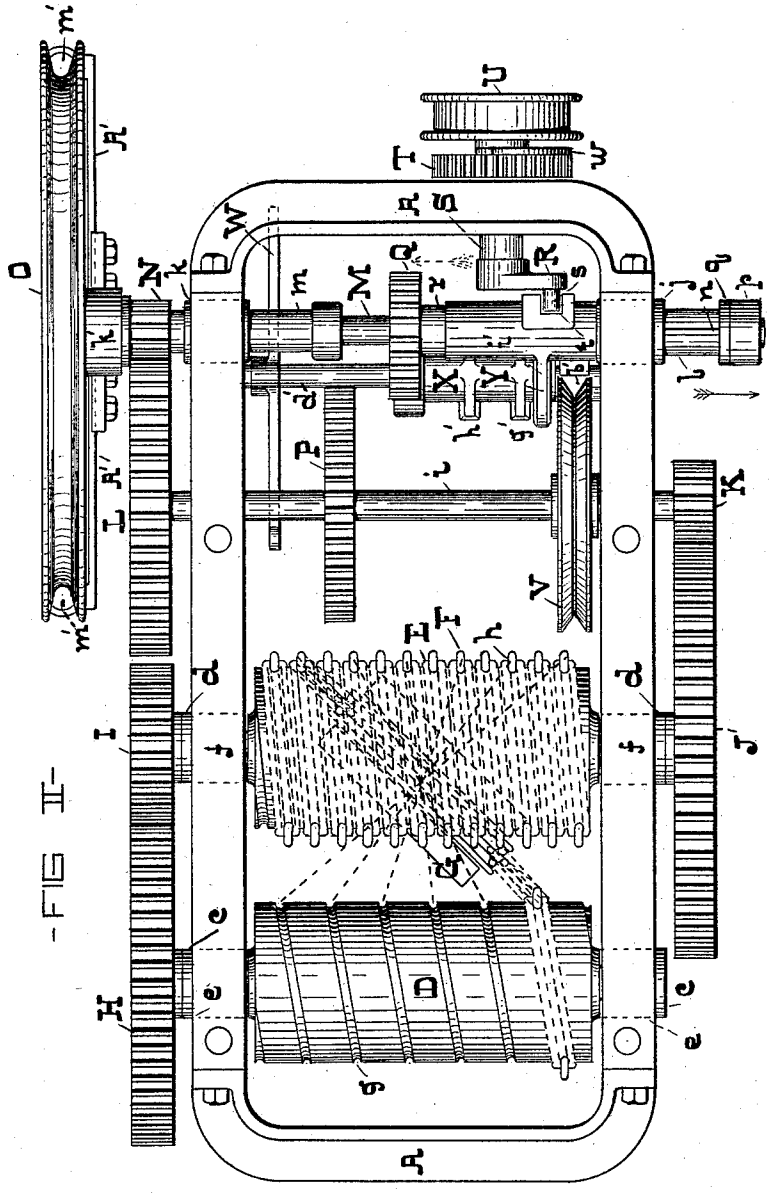
(No Model.) 3 Sheets—Sheet 2.

J. WALKER.

TRAVELING CRANE.

No. 401,613. Patented Apr. 16, 1889.



-FIG II-

WITNESSES-

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(No Model.) 3 Sheets—Sheet 3.

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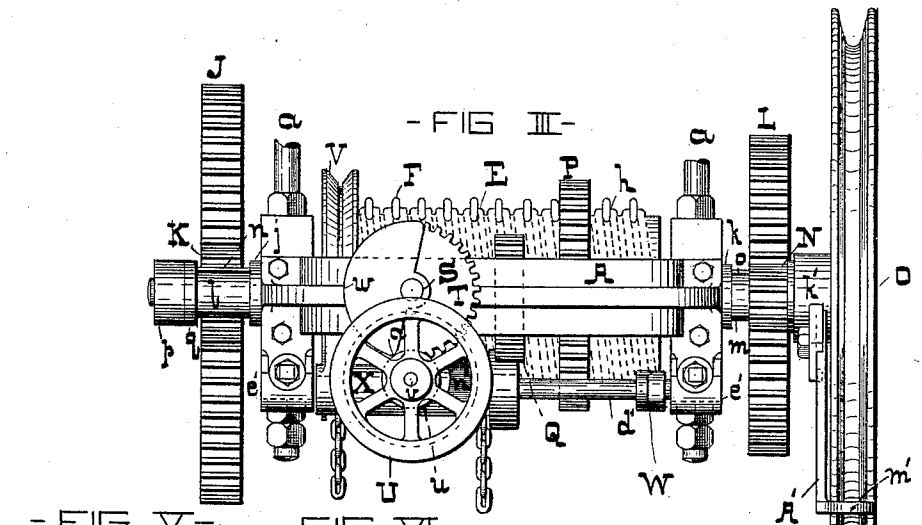
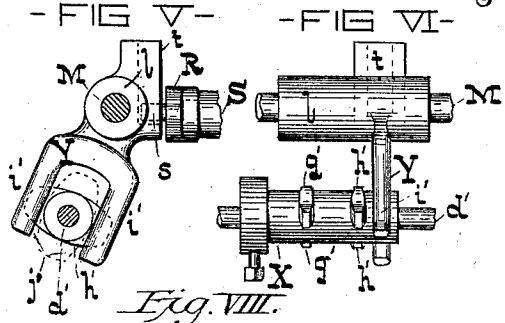
TRAVELING CRANE.

No. 401,613. Patented Apr. 16, 1889.





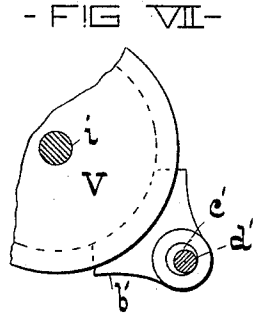
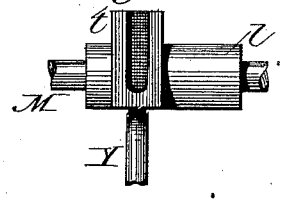
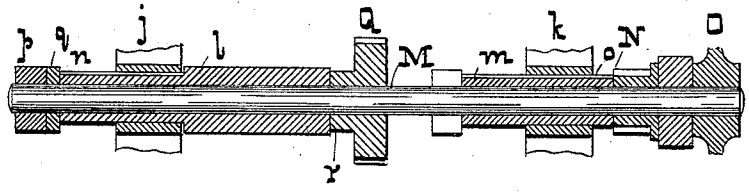


Fig. VIII.





-WITNESSES-

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UNITED STATES PATENT OFFICE.

JOHN WALKER, OF CLEVELAND, OHIO.

TRAVELING CRANE.

SPECIFICATION forming part of Letters Patent No. 401,613, dated April 16, 1889.

Application filed May 24, 1888. Serial No. 274,940. (No model.)

To all whom it may concern:

Be it known that I, JOHN WALKER, of the city of Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain Improvements in Traveling Cranes, of which the following is a specification.

This invention relates specifically to certain improvements in the trolley of the crane, as will hereinafter fully appear.

In the description of the said invention which follows reference is made to the accompanying drawings, forming a part hereof, and in which—

Figure I is an exterior side view of the improved trolley, shown as supported by the bridge, which is provided with rollers at its ends adapted to run on the rails extending along the sides of the building. Fig. II is a top view of the trolley alone. Fig. III is an end view of Fig. II. Figs. IV to VII, inclusive, are details of the invention, as hereinafter described. Fig. VIII is a reverse view of one of the elements of Fig. VI. Fig. IX is a section of a part of the invention, taken on the dotted lines *z z*.

Similar letters of reference indicate similar parts in all the figures.

A is the carriage or main frame of the trolley, consisting in the present case of a framework of rectangular form with rounded corners, as seen from the top. (See Fig. II.) This carriage is suspended from a bridge, B, by means of rods *a*, extending from the axle-bars *b*, carrying the truck-wheels C, which rest and are adapted to run on the upper side of the bridge, as shown in Fig. I.

D and E are winding-drums placed side by side within the carriage A, with their gudgeons *c* and *d* resting in bearing-boxes *e* and *f* in the sides of the carriage. The drums D and E have spiral chain-grooves *g* and *h*, and the pitch of the spiral groove in the drum D is double that of the similar groove in the drum E, for a purpose hereinafter described.

F is the lifting-chain, one end of which is attached to the drum D and the other to the drum E, and suspended from the loop formed in the chain between the said drums is the pulley-block G, to which the hoisting-hook (not shown) is secured. On one of the gudgeons, *c*, of the drum D is fastened the gear H, and on the corresponding gudgeon, *d*, of the drum E is the pinion I, which meshes with the gear H. The other gudgeon, *d*, of the drum E is provided with a gear, J, in mesh with a pinion, K, on the shaft *i*, and at the other end of this shaft is a gear, L, which is driven from the hoisting-shaft M through the medium of the pinion N.

The hoisting-wheel (designated by O) is on the shaft M and of ordinary construction. The shaft *i* can, however, be driven by the gear and pinion, (respectively denoted by P and Q,) the former being on the shaft *i* and the latter on the shaft M; but to admit of the meshing of these two wheels the shaft M has to be moved endwise in the carriage, as hereinafter described.

It will be seen from the relative diameters of the gears L and P and the pinions N and Q that when the shaft M is in the position shown in the drawings, Fig. II, the speed of the shaft *i* will be only one-half of that obtained when the gear P is in mesh with the pinion Q, the speed of the hoisting-wheel being constant. By this arrangement the crane is adapted to heavy and light lifts.

Referring to Fig. IV, it will be seen that the shaft M does not run directly in the bearing-boxes *j* and *k* in the carriage, but in sleeves *l* and *m*, which have feathers *n* and *o* to prevent their turning in the said carriage. A collar and washer, *p* and *q*, at the end of the shaft M serve to communicate movement from the sleeve *l* to the shaft in the direction of the arrow in full lines, and the movement in a contrary direction (indicated by the arrow in dotted lines) is effected by the end of the sleeve *l* coming in contact with the hub *r* of the pinion Q. It will be observed that Fig. IV is a sectional view of these parts. The movement of the sleeve *l* to effect the longitudinal motion of the shaft M, and through it to change the different relative positions of the pinions Q and N with the gears P and L described, is obtained through the medium of a crank, R, on a shaft, S, adapted to turn in the carriage A, and a crank-pin, *s*, resting in a vertical slot, *t*, in the said sleeve. On the end of the shaft S is a gear-wheel, T, which is driven by means of the pinion *u* on a shaft, *v*, underneath the said shaft. This shaft *v* is

furnished with a pulley, U, which is revolved by means of an endless chain or rope from the floor of the building.

In order that the movement of the gear T may be limited to a half-revolution, which alone is necessary for the crank-pin *s* to carry the sleeve *l* from the position shown in Fig. II to one in which the pinion Q is brought in gear with the wheel P, I provide the outer face of the gear T with a semicircular plate, *w*, the periphery of which corresponds with that of the said gear, (see Figs. III and IX,) and the pinion *u* with a circular plate, *a'*. The edge of the circular plate *a'* overlaps the portion of the gear T which is unprovided with the plate *w*, and as the crank-pin *s* reaches its extreme position in either direction one corner of the semicircular plate *w* strikes the periphery of the circular plate *a'* of the pinion *u* and its movement is stopped.

It will be observed that when the crank-pin *s* is directly over the crank-shaft neither of the pinions Q or N is operative. Consequently the drums are disconnected from the hoisting-wheel and the load may be lowered.

By reference to Fig. I it will be seen that the lifting-chain F leads from the same side of both drums. Consequently a load on the lifting-chain, provided the said drums were not connected by gearing, would have the tendency to unwind the said chain from both drums at the same time; but in view of the connecting gear and pinion H and I the unwinding of the chain from one drum causes it to be wound on the other, and as the drum D moves at only one-half the speed of the one E the chain unwinds from the latter and is wound on the former. It requires, however, a considerable load to effect this result, and for light lifts no brake mechanism is required to hold the load.

The brake, which is necessary for heavy lifts, consists of a shoe, *b'*, which is applied to the brake-wheel V on the shaft *i*. This brake-shoe is on an eccentric, *c'*, forming a part of the shaft *d'*, hung in bearing-boxes *e'* underneath the carriage. (See Fig. I) Near to one end of the shaft *d'* is secured a double arm, W, to which is attached the brake-chain *f'*.

X is a collar fastened to the shaft *d'*, having wards *g'* and *h'*. (See particularly Figs. V and VI, which are details of the parts now being described and their connections.)

Referring again to Fig. II, it will be seen that the sleeve *l* carries a double claw, Y, the two parts *i'* of which are on the two sides of the collar X, and the space between the said parts *j'* is less than the distance from tip to tip of the wards when measured diametrically of the shaft *d'*. (See Figs. V and VI.)

When the wards are in the position shown by their full delineation in Fig. V, any lateral movement of the sleeve *l* through the medium of the crank R is prevented. Consequently the shifting of the shaft M to change the relative positions of the pinions Q and N with reference to the gears P and L cannot be accomplished until the wards are changed so as to occupy the position shown by their dotted delineation, Fig. V.

It will be understood that in order to change the position of the wards, as described, the brake-shoe, which has a movement in common with them, must be applied to the brake-wheel, and the result is that before any alteration either to change the speed of the hoisting or to detach both the pinions Q and N from the gears, so as to lower the load, the brake must be applied. One great advantage to be derived from this arrangement is that no accident can possibly result from a load being dropped in throwing the pinions clear or loose from their gears, as before described.

It has been stated that the pitch of spiral groove of the drum D is twice that of the groove in the drum E. The object of this is to make the lifting-chain traverse the same distance on the two drums in the hoisting and lowering operations, and is necessary in view of the first drum revolving at only half the speed of the latter. With this arrangement the pulley-block, with its hook, remains in a central position under all conditions, as shown by the dotted intersecting lines in Fig. II.

A' A' are arms extending from the collar *k'*, placed loosely on the shaft M or on the hub of the hoisting-wheel O, if the said wheel has a hub which extends beyond its inner face. These arms have holes *m'*, which are of such distance apart as to admit of the hoisting-chain passing through them without deviation from a vertical line. The object of these arms is to keep the hoisting-chain from overriding the rim of the wheel O should the chain be pulled at an angle, instead of directly down.

In order to yieldingly retain the pinions Q and N out of contact with their gears P and L without preventing their movement in either direction when such movement is necessary, I provide the pulley U with a counterbalancing-weight, *n'*, opposite the crank-pin *s*. It will be observed that this precaution is only necessary when the brake-shoe is applied to the brake-wheel. At other times the wards *g'* and *h'* serve to prevent the movement of the crank through the medium of the claw Y, which is between them.

It will be understood that in constructing the hoisting-shaft to run in sleeves which have an endwise movement in common with the said shaft the bearings or journals of the said shaft are never exposed to the action of dust and longer bearings may be employed.

I claim as my invention—

1. In a crane, a frame, a pair of winding-drums connected by a lifting-chain arranged to wind or unwind at different speeds, and gearing to effect this movement, the said drums having chain-grooves of different pitches, whereby the pulley-block suspended by the said chain maintains a central position during the lifting and lowering operations, substantially as and for the purpose specified.

2. In a crane, a frame, a pair of winding-

drums of a common diameter having chain-grooves of different pitches, as described, combined with gearing whereby the said drums are revolved at different speeds, and a lifting-chain the ends of which are connected to the said drums, substantially as and for the purpose specified.

3. In a crane, a longitudinally-moving hoisting-shaft and sleeves in which the said shaft is confined endwise, and which are adapted to have a longitudinal motion only in the frame carrying the same, whereby the bearings or journals of the said shaft are protected from the action of dust, substantially as and for the purpose specified.

4. In a crane, a longitudinally-moving hoisting-shaft and sleeves in which the said shaft is confined endwise, and which are adapted to have a longitudinal motion only in the frame carrying the same, combined with a crank the pin of which rests in a groove in the said sleeve, whereby the said sleeve and its contained shaft may be moved endwise to change the speed of the hoisting mechanism or to detach the same, substantially as and for the purpose specified.

5. In a crane, a hoisting-shaft, a sleeve on the said shaft carrying a claw, and a crank adapted to move the said sleeve and shaft in an endwise direction to change the speed of the hoisting mechanism or detach the same, combined with a shaft carrying wards which in one position lock the said claw and in another release the same, and thereby allow of the endwise motion aforesaid, substantially as and for the purpose specified.

6. In a crane, a hoisting-shaft, a sleeve on the said shaft carrying a claw, and a crank adapted to move the said sleeve and shaft in an endwise direction to change the speed of the hoisting mechanism or detach the same, combined with a shaft carrying wards, by means of which the said claw may be locked and unlocked, and a brake-shoe adapted to control the rotation of a shaft comprised in the hoisting mechanism, whereby in the unlocking of the said claw the brake is applied, substantially as and for the purpose specified.

7. In a crane, the combination of the crank-shaft S, carrying the gear T, having the semi-circular flange w, the shaft v, carrying the pinion u, with the flange a' and the chain-pulley U, substantially as and for the purpose specified.

JOHN WALKER.

Witnesses:
W. H. BONE,
JOHN J. BEVER.