

(No Model.)

3 Sheets—Sheet 1.

J. R. MORGAN.

BRAKE FOR DRUMS OF OVERHEAD TRAVELING CRANES.

No. 483,467.

Patented Sept. 27, 1892.

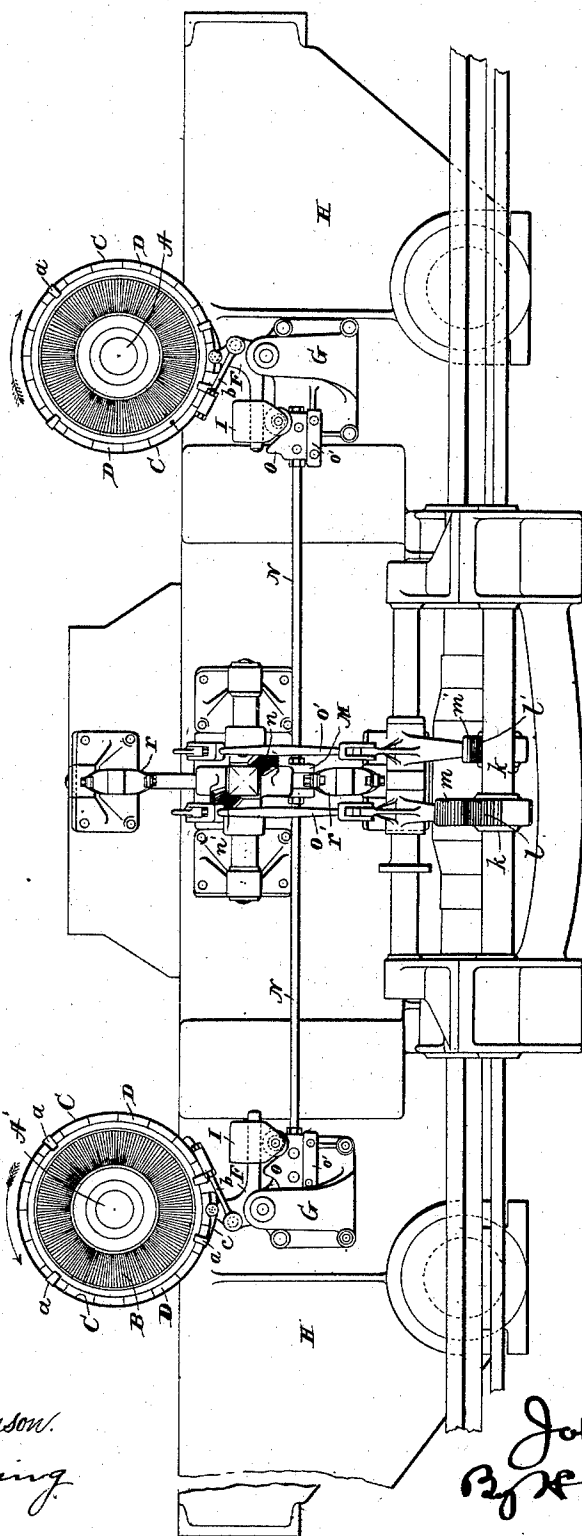


Fig. 1.

Witnesses:
Jas. C. Hutchinson.
G. F. Downing.

Inventor.
John R. Magee
By R. A. Seymour
Att'y.

(No Model.)

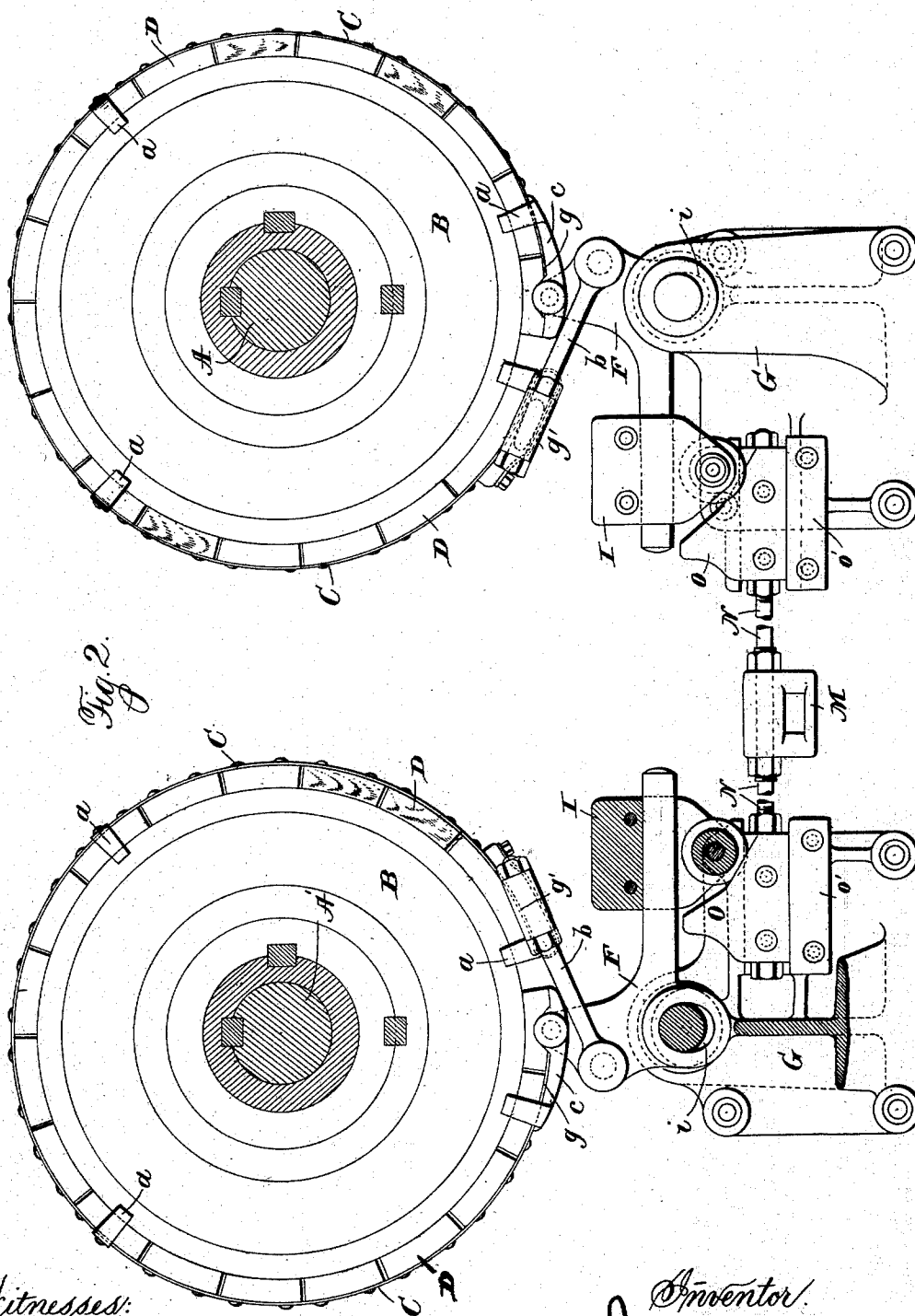
3 Sheets—Sheet 2.

J. R. MORGAN.

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No. 483,467.

Patented Sept. 27, 1892.



Witnesses:
Jas. C. Hutchinson
& F. Downing

Inventor.
John R. Morgan.
By H. A. Symmes
Atty.

(No Model.)

3 Sheets—Sheet 3.

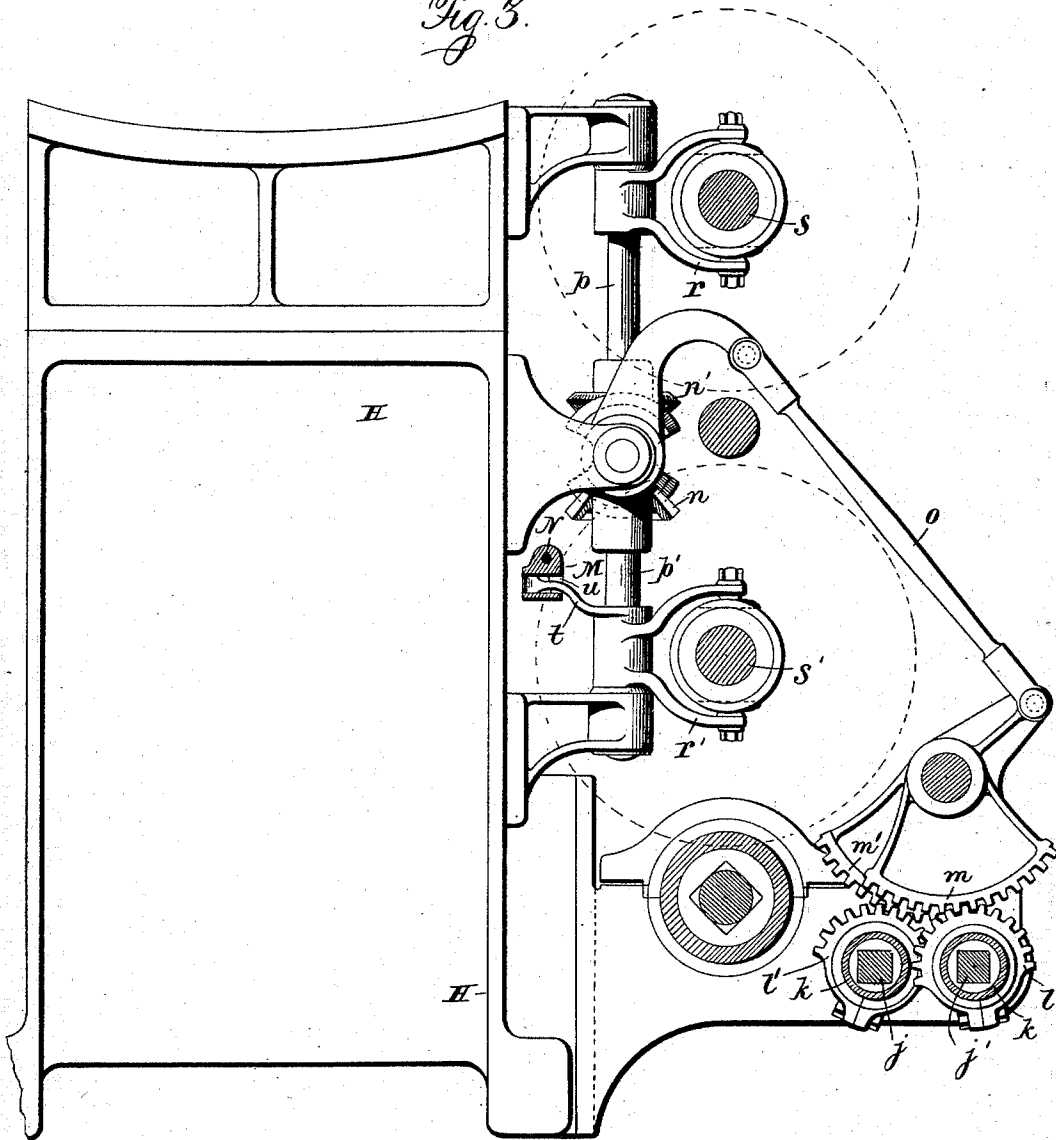
J. R. MORGAN.

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Fig. 3.



Witnesses:
Jas. C. Hutchinson
G. F. Downing

Inventor.
John R. Morgan.
By H. A. Simpson
Att'y.

UNITED STATES PATENT OFFICE.

JOHN R. MORGAN, OF ALLIANCE, OHIO, ASSIGNOR OF THREE-FOURTHS TO
THOMAS R. MORGAN, SR., THOMAS R. MORGAN, JR., AND WILLIAM H.
MORGAN, ALL OF SAME PLACE.

BRAKE FOR DRUMS OF OVERHEAD TRAVELING CRANES.

SPECIFICATION forming part of Letters Patent No. 483,467, dated September 27, 1892.

Application filed July 6, 1891. Serial No. 398,633. (No model.)

To all whom it may concern:

Be it known that I, JOHN R. MORGAN, of Alliance, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Brakes or Sustaining Devices for Drums of Overhead Traveling Cranes; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to an improvement in brakes or sustaining devices for the drums of overhead traveling cranes.

In cranes constructed to lift heavy loads the instant the power lifting the load is withdrawn the tendency of the load is to suddenly drop back, which is extremely detrimental to the gearing.

The object of this invention is to positively sustain and absorb gradually the shock imparted to the gearing.

In one class of cranes motion is transmitted to the bridge, trolley, and winding-drum by a rotating angular shaft located adjacent to one of the trackways and parallel therewith. This rotating shaft passes through a sleeve or sleeves shaped to fit the shaft, so as to revolve therewith, but free to slide thereon as the bridge moves, the said sleeve being supported in bearings on the bridge and provided with pinions for transmitting the rotary motion of the angular shaft to the driving-wheels of the bridge, trolley, and winding-drum or drums. In other cranes the bridge, trolley, and winding drum or drums are actuated by a motor carried on the bridge or by motors carried on the bridge and on the trolley. With all these cranes, however, just the instant the power lifting the load is withdrawn the load tends to drop back, and the object of this invention is to provide devices actuated by the devices which control the movements of the drums, whereby the instant the power is withdrawn the brakes or sustaining devices are applied and remain on until the parts are again put in motion for either elevating or lowering the load.

In the accompanying drawings, Figure 1 is

a view in side elevation of a trolley and the parts thereof, which are essential to an understanding of this invention. Fig. 2 is an enlarged view of the brake-drums and brake-operating mechanism, and Fig. 3 is a view in section through Fig. 1.

In overhead cranes motion, as a rule, is transmitted to the parts to be driven through a series of shafts. It is not necessary for an understanding of the present invention to disclose the driving mechanism, but it will be sufficient to simply disclose and refer to the shaft of the train of gearing to which my brake mechanism is applied.

A represents the shaft, which first receives motion for driving the drum, this shaft A and shaft A' being geared up to move in unison. This particular arrangement is designed for two winding-drums. Hence when only one drum is used, one of said shafts should be dispensed with.

The shafts A and A' are each provided with a brake-wheel B, keyed thereto, around which are placed the metal straps C, provided on their inner faces with blocks D, adapted to rest in contact with the periphery of the wheels and be drawn in close contact with said wheels when it is desired to prevent the rotation of the winding-drum. The straps are each provided with a series of clips a, which latter are attached to the straps and overlap the brake-wheels and prevent lateral displacement of the brake-straps. One end of each strap is pivotally connected to the shorter arm of a bell-crank lever F by shoes c, the opposite ends of said straps being connected through the intervention of rods b to the shorter arm of said bell-crank at a point near the axis of the bell-crank levers or at a point between said axis and the point of attachment of the other end of the strap. The bell-crank levers F are journaled in brackets G, secured to the side of the trolley H, and each carries a weight I on its long arm, the tendency of which is to hold the brake-band in closed or locked position. It will be observed that when levers F are moved the two ends of the straps are moved in the same direction, one end of each, however, moving more

rapidly than the other end. When the longer arms of the bell-crank levers *F* are elevated, the brake bands or straps are loosened and the brake-wheels have free play.

5 To apply the brakes, it is necessary to force the longer arms of the levers downwardly. This movement moves the ends of the straps in the direction indicated by the arrows, and, as the ends *g*, attached to the outer or upper
10 ends of the shorter arms of the bell-cranks, move faster than the rods *b*, it follows that pressure on the wheels is first applied by the ends *g* and then by the ends *g'*, the straps embracing the wheels throughout the greater
15 part of their circumference and absolutely preventing any slipping of the brake-wheels while the brakes are on. The bores in the hubs of the bell-crank levers are slightly elongated or larger than the bearings carry-
20 ing same, as shown at *i*, so as to permit the lever to follow up the wheels as the arms carrying the bands move in the arcs of circles. It is evident that as soon as the band is ap-
25 plied to the brake-wheels the wheels tend to draw the lever in the direction of the rotation of the wheel. Hence by providing the levers with elongated slots *i* the levers are permitted a limited movement toward the wheels and the brakes are as a result applied gradually.
30 In order that the brakes may clutch the wheels and be released therefrom at proper times, it is necessary to connect the long arms of the bell-crank levers with the start-
35 ing and stopping mechanism of the drums, so that as the drums are started the brakes will be released and as they come to a stop the brakes will be applied.

Fig. 3 shows the mechanism for starting and stopping the drums, reversing the motions,
40 and for actuating the brake mechanism.

It is of course understood that the trolley moves back and forth on a traveling bridge, and that the operator, who controls not only the movements of the bridge, but also the
45 trolley and the moving parts on the trolley, is located in a cage or cabin depending from the bridge near one end thereof. It therefore becomes necessary to provide means for controlling the trolley and parts thereof irre-
50 spective of the position of the trolley. This is accomplished by providing a series of angular shafts *j j'*, which latter are journaled in bearings running lengthwise the bridge, and are connected to levers located in the cage or
55 cabin in which the operator is located.

Carried by the trolley and embracing the angular shafts are sleeves *k*, carrying the seg-
60 mental pinions *ll'*, which latter mesh with seg- mental pinions *m m'*. These segmental pin- ions *m m'* are connected to the segmental miter-wheels *n n'* by the pitman *oo'*, the said miter-wheels being geared with correspond-
65 ing wheels fixed on the vertical shafts *p p'*. Thus it will be seen that when either shaft *j* or *j'* is rocked the segmental pinion is also rocked and the motion thereof transmitted to the shaft *p* or shaft *p'*, as the case may be.

The sleeves, with the segmental pinions there-
on, being free to move longitudinally on the shafts as the trolley is moved, but held
70 against rotation independent of said shafts, it follows that no matter where the trolley is when either angular shaft is turned the mo-
tion thereof is transmitted to the part or the trolley which is actuated by said shaft. The
75 shaft *p* carries a yoke or fork for actuating the speed-clutches on shaft *s*, whereby the speed of the drums is controlled, while the other shaft *p'* is provided with a yoke or fork
80 *r'* for actuating the reversing-clutches on shaft *s'*.

Connected with the fork or yoke *r'* is an arm *t*, which latter enters slot *u* in block *M* on rod *N*. This rod is provided on its opposite
85 ends with the inclined planes *O*, which latter are mounted in bearings *o'*, formed on brack-
ets *G*, carrying bell-crank levers *F*. This rod *N* is adapted to move longitudinally and carry with it the inclined planes *O*. These
90 inclined planes rest under the weights on the longer arms of the bell-crank levers and op-
erate to elevate or lower and release or ap-
ply the brake-bands, as previously described, the direction of movement of the weight de-
95 pending on the direction of movement of the rod *N*.

Shafts *S'*, (see Fig. 3,) as before stated, op-
erate the reversing-clutches. Now when the drum is revolving and hoisting the load the
100 long arm of lever *F* is raised and the bottom of weight *I* bears at the highest point of the incline *O*, carried by the rod *N*. While the parts are in these positions the hoist side of the reversing-clutch is locked and the two
105 main brake-wheels are free from the tension of the brake-bands. When it is desired to cease hoisting, the rod *N* must be moved to the left until the brake-lever assumes the po-
sition shown in Fig. 1. Now as the rod *N* is operated by means of connections with the
110 reversing-clutch, the said clutch must, when the inclines and weights are in the position shown in Fig. 1, be in their intermediate or non-operative position, or, in other words, the
115 hoisting and lowering sides of the reversing-clutches are entirely free and the brake-bands in maximum tension on brake-wheels and the load sustained. Consequently when it is de-
sired to lower the load or reverse the direc-
120 tion of drum or drums the rod *N* is moved farther to the left, in which direction it was moved to stop the drums. This also moves the operating-cone and partially locks the
lowering reversing-clutch, which imparts posi-
125 tive action to the drums to lower the load and simultaneously release the tension of brake-
bands on brake-wheels. The latter is due to friction acting on the differential centers of the short arm of the weighted lever connected
130 to each end of the brake-band. Consequently the counter-weight and lever are raised by the friction acting on brake-band entirely free of the incline. By moving rod *N* farther to the left the lowering reversing-clutch is posi-

tively locked and the speed of the descending load is under absolute control of motive power.

It will be readily understood that, instead of depending on the motive power to overcome the pressure of the brake-bands, inclines in all respects like inclines O can be provided and located on rod N to engage the weights when the rod N is moved to the left, as described. By connecting rod N to the reversing mechanism it will be seen at a glance that as the parts are shifted for reversing the direction of movement of the drums the brakes are applied and remain applied until released by the devices which actuate the reversing-gear.

It is evident that my mechanism could be applied to a trolley having but a single drum, and that numerous slight changes in construction and relative arrangement of the several parts might be resorted to without departing from the spirit and scope of my invention; Hence I would have it understood that I do not confine myself to the construction shown and described, but consider myself at liberty to make such changes as fairly fall within the spirit and scope of my invention.

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

1. In a brake, the combination, with a brake-wheel and a strap or band embracing the same, of a bell-crank lever provided at its elbow with a bore greater in diameter than the axis on which said lever is mounted, a cylindrical axle for said bore, a weight on one arm of said lever, and means connecting the two ends of the brake-strap to the other arm, substantially as set forth.

2. In a brake, the combination, with a brake-wheel and a strap or band embracing the same, of a bell-crank lever, means connecting the two ends of the strap or band to one arm of the bell-crank lever, a weight secured to the other arm of said lever, and a movable incline for elevating and lowering the weight.

3. In a brake, the combination, with a brake-wheel, a brake-strap embracing the same, and shoes attached to the inner faces of the strap or band and resting against the periphery of the wheel, of a bell-crank lever one arm of which is attached to both ends of the strap or band, a weight carried by the other arm of said bell-crank lever, and a movable incline elevating and lowering said weight, substantially as set forth.

4. In a brake, the combination, with a wheel and a band or strap surrounding the same, of a bell-crank lever one arm of which is connected to both ends of the strap or band, a weight on the other arm of said lever, a movable incline for elevating and lowering the weighted arm, and means actuated by the devices which actuate the reversing-clutches for moving or actuating the said incline and thereby elevating or lowering the weighted arm, substantially as set forth.

5. The combination, with two wheels and a band or strap surrounding each wheel, of a bell-crank lever for each strap, one arm of each lever being connected to both ends of its respective strap, a weight on the opposite end of each lever, and means common to both levers, whereby they are caused to act simultaneously, substantially as set forth.

6. The combination, with two wheels and a band or strap surrounding each wheel, of a bell-crank lever for each strap, one arm of each lever being connected to both ends of its respective strap, a weight on the other arm of each lever, inclines for elevating said weighted arm, and means connecting said inclines, whereby they are caused to move simultaneously, substantially as set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

JOHN R. MORGAN.

Witnesses:

FRANK E. DUSSEL,
H. W. HARRIS.