(No Model.) 2 Sheets—Sheet 1.

L. E. PINKHAM.

HOISTING APPARATUS.

No. 461,142. Patented Oct. 13, 1891.

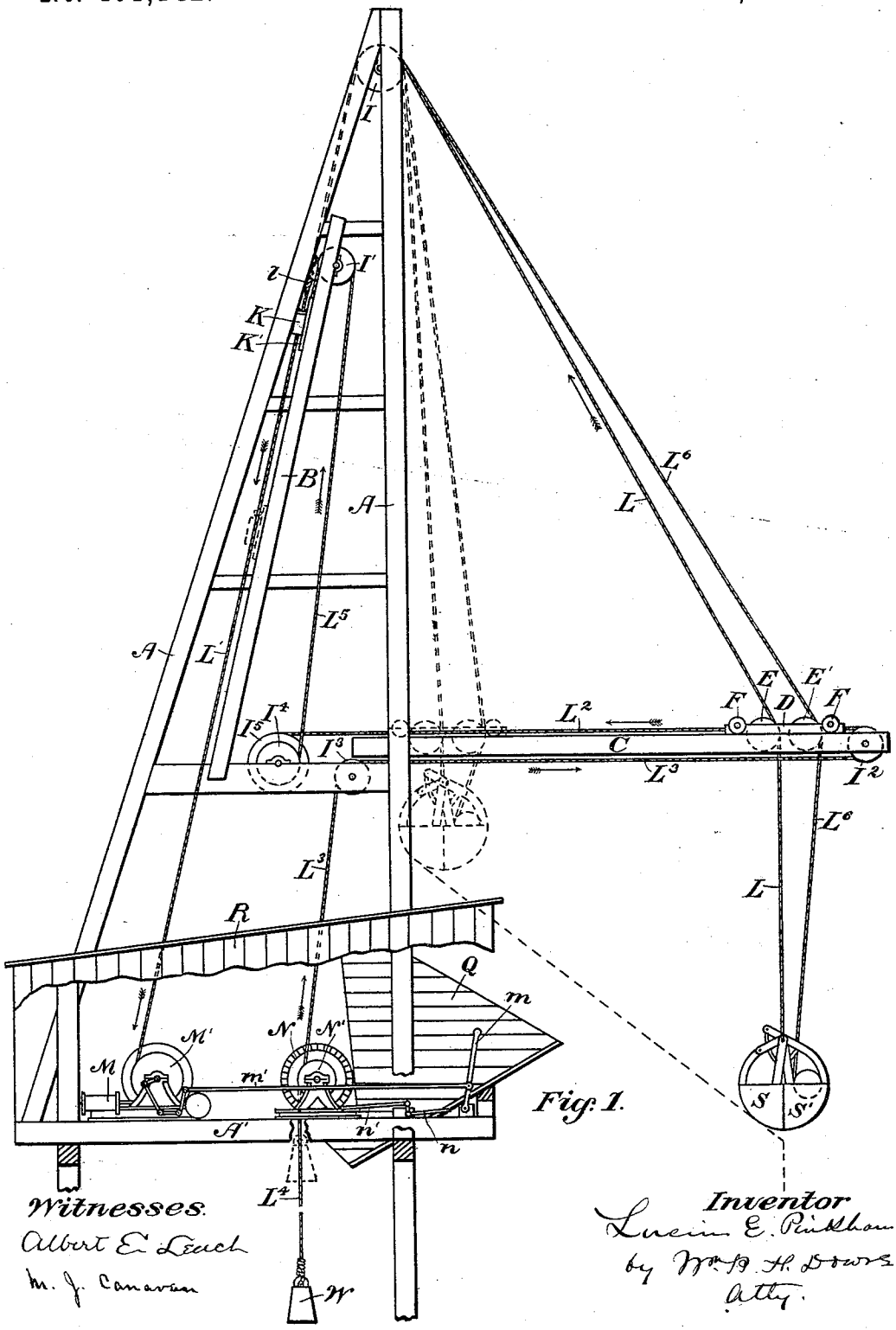

Fig. 1.

Witnesses.
Albert E. Leach
M. J. Canavan

Inventor
Lucien E. Pinkham
by Wm. H. Dowes
Atty.

(No Model.) 2 Sheets—Sheet 2.

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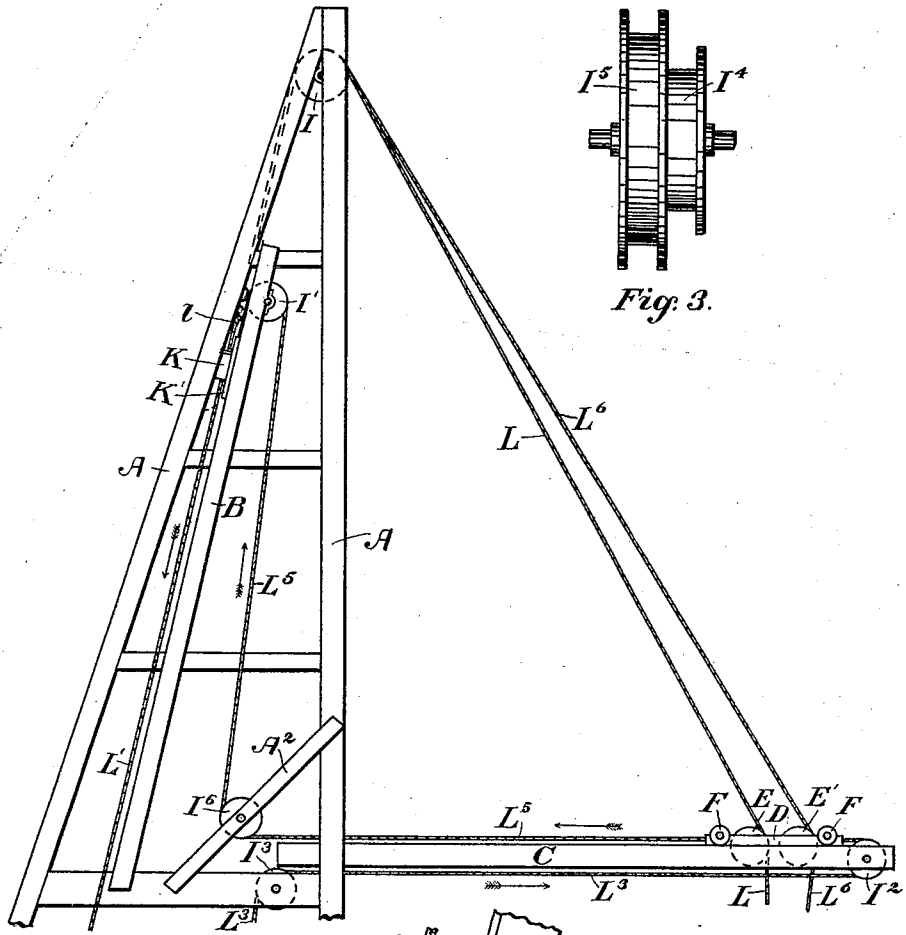

Fig. 2.

Fig. 3.

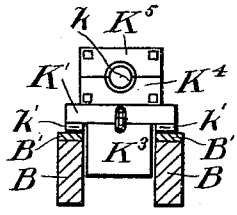

Fig. 5.

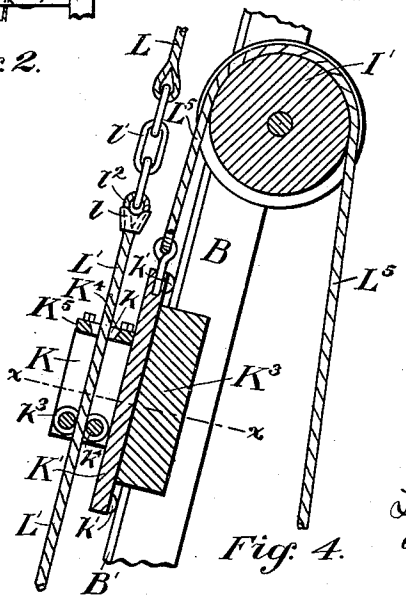

Fig. 4.

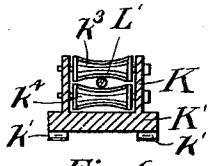

Fig. 6.

Witnesses
Albert E. Leech
M. J. Canavan

Inventor
Lucius E. Pinkham
by Wm. B. A. Bowie
Atty

UNITED STATES PATENT OFFICE.

LUCIUS E. PINKHAM, OF NEWTON, MASSACHUSETTS.

HOISTING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 461,142, dated October 13, 1891.

Application filed November 11, 1890. Serial No. 371,011. (No model.)

To all whom it may concern:

Be it known that I, LUCIUS E. PINKHAM, a citizen of the United States, residing in Newton, in the county of Middlesex and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Hoisting Apparatus, of which the following is a full specification.

My invention consists of certain improved features of construction in apparatus for hoisting coal and like material, especially in apparatus of the class wherein the coal contained in bulk in the hold of a vessel or otherwise is automatically shoveled into a bucket, which bucket is raised vertically for some distance, is then carried inward while being raised to a point directly over the point of delivery, and finally dumped into a suitable chute or other receptacle.

The object of my invention is to provide ready means for controlling the movement of the bucket or shovel containing the load inward as well as upward, the construction and arrangement being as hereinafter fully described in detail.

In the accompanying drawings, Figure 1 is a side elevation of an apparatus embodying the features of my invention, certain of the parts being broken away to more completely illustrate its mode of operation. Fig. 2 is a similar view of the upper portion of the apparatus, showing how the speed of the shovel inward may be varied. Fig. 3 is a view of one of the drums on an enlarged scale. Fig. 4 shows in section the sliding frame and adjacent parts for drawing the shovel inward while being raised. Fig. 5 is a front view of the sliding frame; and Fig. 6 is a transverse section in the plane of $x\,x$, Fig. 4, through the sliding frame.

A is the upright frame-work supporting the working parts of the apparatus.

A′ is a platform, some distance up, on which is placed the engine M and other controlling mechanism, this being preferably contained in the house or shed R, built on said platform and in which the operator is stationed.

D is a trolley, movable horizontally in and out over the boom C, which is supported by the frame-work. This trolley is of any suitable construction and is guided to move on any desired kind of track, the wheels or rollers F F moving on said track. The boom C is preferably a split boom similar in transverse section to the guides B B shown in Fig. 5, to be described hereinafter. Its particular form is, however, immaterial, it being only necessary that the trolley be guided to move in and out readily.

The trolley has journaled therein the sheave-pulley E, over which moves the wire rope or chain L, to the end of which is attached the loading and dumping bucket or shovel S S′. This rope L passes over the sheave-pulley I, journaled in suitable bearings near the top of the frame-work A, the rope L′, which is secured to the rope L by links l', (see Fig. 4,) forming practically a continuation of said rope L. The rope L′ passes downward and is secured to the engine-drum M′, around which it is wound. m is a handle-lever, which, through the rod m' and suitable mechanism, starts, stops, and reverses the drum M′. The trolley being in any given position on the boom C, the shovel L may be raised and lowered in the ordinary manner by causing the engine-drum M′ to move in one direction or the other through the handle-lever m.

At the outer end of the boom C is journaled the pulley I^2, over which moves the rope L^3, one end of which is secured to the trolley. This rope L^3 passes from the pulley I^2 over a pulley I^3 in the frame-work, and thence to a drum N′, to which it is secured. This drum N′ is on the axle of a friction-drum N, of ordinary construction, controlled by a brake, the brake being tightened or loosened by means of a foot-lever n, connected by the rod n' with suitable operating mechanism.

W is a weight hung from one end of the rope L^4, the other end of which is connected with the drum N′, the weight W being sufficient, when the friction-brake is loose, to carry the trolley D when the shovel is empty to the outer end of the boom C. The construction, in other words, is such that when the shovel is empty and the foot of the operator is off the lever n the brake is loosened, and through the influence of the weight W, which turns the drum N′ and winds up the rope L^3 thereon, the trolley D is carried outward on the boom C to the extreme position shown in Fig. 1 by the full lines. In this position the

shovel is directly over the hatchway of the vessel or whatever receptacle contains the coal to be unloaded. When once in this position, the trolley will remain there, even though the shovel be loaded with coal, by keeping the foot upon the lever *n*, thus tightening the brake *n* and preventing the turning of the drum N′.

The rope L′ passes through a sliding frame K and is provided at its end with a stop *l*, which is tapered and adapted to engage with a correspondingly-tapered hole *k* in the front side of said frame. The rope L′, as here shown, terminates in the eye-splice l^2, against which is held the stop *l* in the manner shown in Fig. 4. The rope L has also an eye-splice at its end, which is connected with the eye-splice l^2 by one or more links *l′*.

The frame K is adapted to slide in any desired manner over the guides B B. Each of the said guides is preferably provided with a metal track B′, and the base K′ of the frame has feet or lugs *k′*, which slide freely over them. The block K^3 serves to keep the frame centered. The front plates K^4 K^5 are bolted or screwed to the side pieces of the frame, the hole *k* lying, preferably, half in each of the said pieces K^4 K^5. At the back of the frame K are the rollers k^3 k^4, between which the rope L′ moves when the frame is stationary.

L^5 is a rope or chain one end of which is connected to the sliding frame. This rope passes over the sheave-pulley I′, and, as shown in Fig. 1, the other end is fastened to the portion I^4 of the two-speed drum I^4 I^5. To the part I^5, of larger diameter, is secured one end of the rope L^2, the other end of which is connected to trolley D.

The shovel shown in the drawings is of the kind wherein the two halves S S′ may be opened apart to close together again in the coal or other material to be hoisted, thus gathering a shovelfull of coal together therein. It may in like manner be opened apart when it is desired to dump the same out of the shovel. The particular form of bucket or shovel employed, however, is immaterial and forms no part of my invention. A simple bucket loaded by hand may be substituted for the shovel herein shown.

The rope L^6 shown in the drawings is for the purpose of opening and closing the shovel S S′ in loading and unloading. This rope is connected at one end with suitable opening and closing mechanism in the shovel itself, thence passes over a pulley E′ in the trolley, then over a pulley in line with the pulley I, and down back of the rope L′ to a drum (not shown) operated by the engine in such a manner that when the rope L^6 is pulled taut the shovel S S′ is closed together and when slackened up the two parts S S′ are opened apart.

The operator stands where he can with his foot press upon the lever *n* and with his hand manipulate the engine-lever *m*.

Q is a chute into which the coal is to be discharged.

In order to more clearly illustrate the operation of the apparatus, start with the shovel or bucket S S′ perfectly empty. The weight W is sufficient in this case to keep the trolley at the outer end of the boom C. The shovel may be lowered and raised (as high as the position shown in Fig. 1) at will by running the engine-drum M′ in one direction or the other. The stop *l* on the lifting-rope L′, when the shovel is lowered down, is nowhere near the sliding frame K. When, however, the bucket or shovel S S′ is raised to the point indicated by the full lines in Fig. 1, the stop *l* entering the tapered opening *k* in the front of the frame K and the rope L′ continuing to be wound upon the drum M′, the said frame K will be pulled downward along the track B B, and by means of the ropes L^5 and L^2 the trolley D will be carried in over the boom C, and at the same time the shovel S S′ will be raised, so as to bring the said shovel to a point over the delivery-chute Q, in the position indicated by dotted lines in Fig. 1. During the inward motion of the trolley the foot of the operator is off the lever *n*. When the trolley and shovel are in the position indicated by the dotted lines in Fig. 1, the operator reverses the engine and lowers the bucket as far as he desires, keeping his foot pressed upon the lever *n* during this operation, which by tightening the friction-brake prevents the weight W from acting to move the trolley outward during the unwinding of the rope L′ from the drum M′. By the reverse of these operations the bucket is raised, the trolley carried outward, and the bucket again lowered.

The speed with which the shovel is moved inward while being raised depends on the relative sizes of the two parts I^4 I^5 of the expanding-drum. As shown in Fig. 1, the drum I^4 is two-thirds the size of the drum I^5, in which case the speed of the shovel inward is to its speed upward as three is to two. By varying the relative sizes of the two drums I^4 I^5, the relative speeds of the shovel inward and upward may be varied. If it is desired to bring the shovel in at the same speed as it is raised, the expanding-drum I^4 I^5 may be dispensed with altogether and in its place a plain sheave-pulley I^6 substituted, as shown in Fig. 2. In this case the rope L^5 passes under this pulley and continues as far as the trolley D.

The operation of my apparatus, as just described, is applicable to a case wherein the bucket, when raised or lowered, is empty or wherein the load contained in the shovel or bucket is very light. When the shovel or bucket is filled with a heavy load, as coal, and the trolley is at the outer end of the boom C, the weight of the shovel and the load being much greater than that of the weight W, unless the foot of the operator be kept down on the lever *n* the tendency of the shovel will be to drag the trolley inward while the said shovel is being raised. Starting in this case with the shovel empty, the trolley will,

as before, be carried outward to the end of the boom C. The foot of the operator is then pressed down on the presser-lever *n*, and the shovel is lowered and loaded up. The foot being still held down on the lever *n*, the shovel and the load are then raised by starting the engine and winding the rope L′ on the drum M′ to a point corresponding with that shown by the full lines in Fig. 1. The foot being then raised from the presser-lever, the effect of the load exceeding the weight W will be to move the trolley D inward for some distance until the weight W will exactly balance the weight of the shovel and the load. In this position, however, the shovel will not be in far enough to bring it over the chute. I therefore so arrange the parts that when the shovel and load have been carried inward as far as it will by the weight of the load the stop *l* on the rope L′ will come in contact with the front of the sliding frame K, and, pulling down said frame, will draw the trolley in as far as necessary, in the manner already described. The foot is then placed on the lever *n*, the engine-drum reversed, and the shovel and load lowered to be dumped, if desired, or dumped without lowering.

If desired, the ropes L′ and L may be made in one piece and a stop or enlargement of any kind placed thereon to engage with the sliding frame. I prefer to have these ropes, as shown, in two pieces, with the stop *l* at the end of one of them, the two being connected by one or more links, as shown, as this construction is more durable by reason of the fact that with the stop made in the middle of a wire rope it is more apt to cause the breaking of the strands in passing over the sheave-pulley. The ropes L L′, being connected together end to end, form virtually one continuous lifting and lowering rope.

I preferably so construct the sliding frame that the rope L′ may be removed therefrom without necessitating the removal of the sliding frame from the track and detaching the frame from the rope L^5. To this end the front of the frame is made in two pieces K^4 K^5, as above described, and the pin on which the upper roller k^3 revolves can easily be removed. It is therefore only necessary to detach the upper front plate K^5 and the upper roller k^3 to remove the rope L′ from the frame.

Though for convenience I show and describe a bucket or shovel as being operated by the apparatus to contain the load to be hoisted, I do not limit myself thereto, as in the hoisting of solid blocks and other such matter a simple hook may be substituted for the said shovel or bucket at the bottom of the lifting-rope, or the lifting and lowering rope may be passed directly around the load to be hoisted. Obviously whatever is used at the bottom of the lifting-rope to hold the load is an equivalent of said shovel or bucket.

I claim—

1. In a hoisting apparatus, a movable trolley, in combination with a counterbalanced loading and dumping bucket, flexible means secured to said bucket for lifting and lowering the same, passing through said trolley and suitably guided in the frame-work of the apparatus, a sliding frame movable over guideways, said frame being provided with an opening through which a portion of said flexible means passes, a stop engaging with said sliding frame, and suitably-guided ropes connecting said frame and trolley, whereby when the stop engages with the sliding frame the trolley is moved inward, substantially as described.

2. In a hoisting apparatus, the combination of a movable trolley D, lifting and lowering ropes L L′, passing through said trolley and suitably guided in the frame-work of the apparatus, a loading and dumping bucket secured to said rope L, a sliding frame K, movable over guideways, said frame being provided with an opening *k*, a stop *l*, engaging with said opening, a two-speed drum I^4 I^5, and suitably-guided ropes L^5 and L^2, connecting said frame and trolley, respectively, with said drum, whereby the bucket is drawn inward while being raised, substantially as described.

3. In a hoisting apparatus, the combination of a movable trolley, a sliding frame K, movable over suitable guideways, said frame being provided with the opening *k* and rope-guiding pulleys k^3 k^4, flexible means for connecting said trolley and frame, and flexible means connected with the bucket for lifting and lowering the same, passing through both the trolley and the frame, and provided with a stop *l*, engaging with the opening *k*, whereby when the stop engages with the opening the frame is pulled downward and the trolley inward, substantially as described.

4. In a hoisting apparatus, the combination of a rope L, connected with the load, a movable trolley, a sliding trolley-operating frame K, provided with an opening *k*, suitably-guided flexible means for connecting said trolley and frame, a rope L′, passing through said opening and provided with an eye-splice l^2, and a stop *l*, held on said eye-splice l^2 and engaging with said opening, the ropes L and L′ being linked together, all arranged and operating substantially as and for the purposes described.

In witness whereof I have hereunto set my hand.

LUCIUS E. PINKHAM.

Witnesses:

WM. B. H. DOWSE,

ALBERT E. LEACH.