

(No Model.)

3 Sheets—Sheet 1.

C. W. HUNT.
ELEVATING APPARATUS.

No. 527,496.

Patented Oct. 16, 1894.

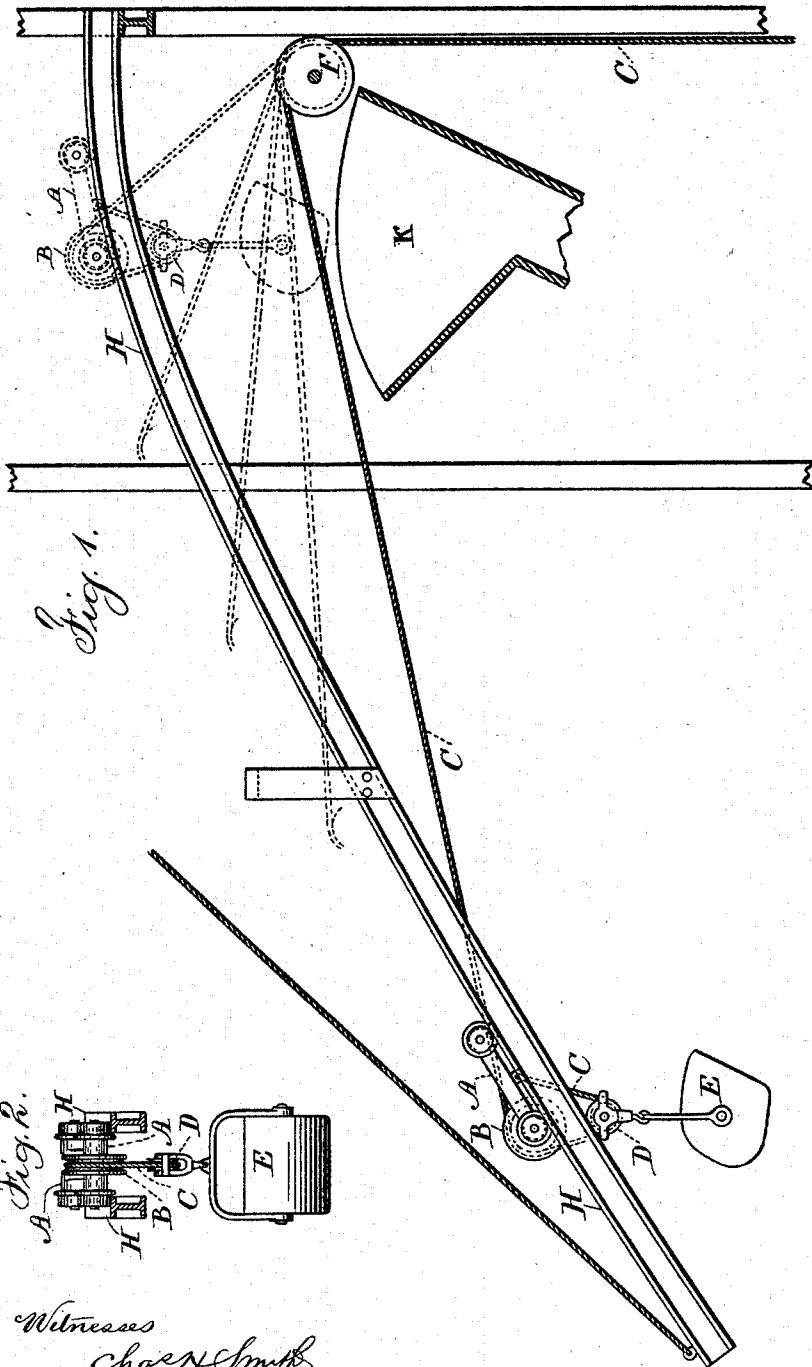


Fig. 1.

Fig. 2.

Witnesses
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Inventor
Charles W. Hunt
per *Samuel W. Lovell*
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(No Model.)

3 Sheets—Sheet 2.

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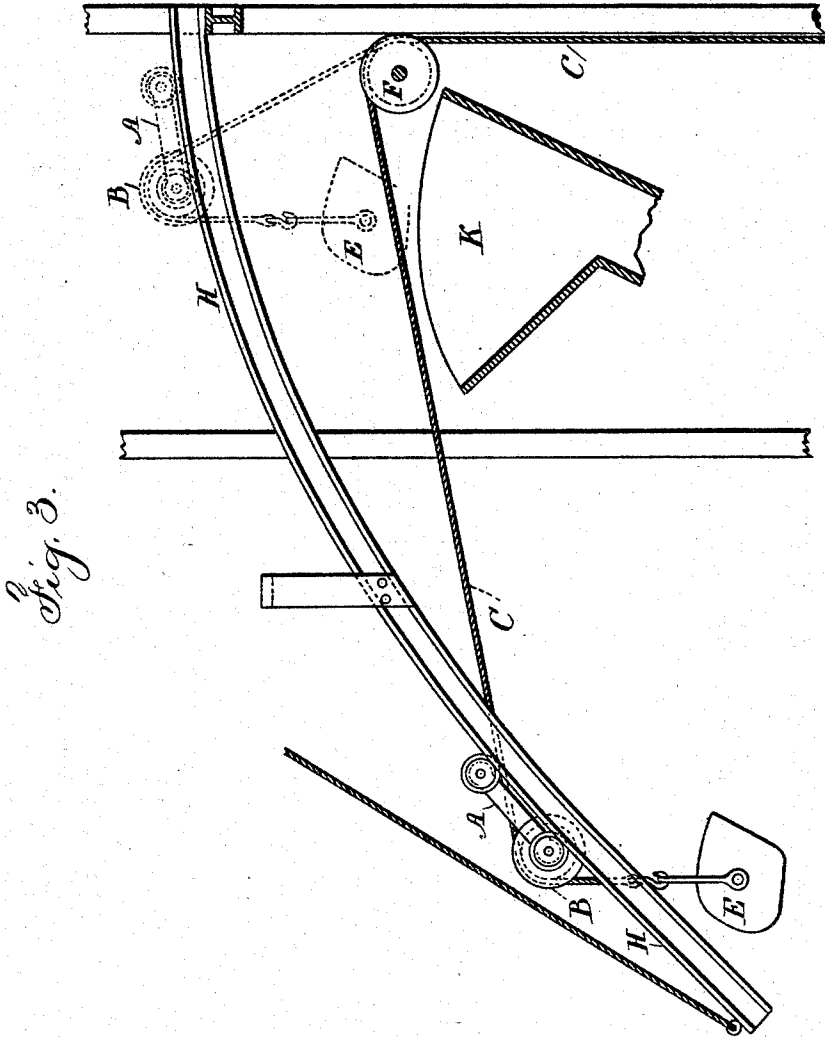


Fig. 3.

Witnesses

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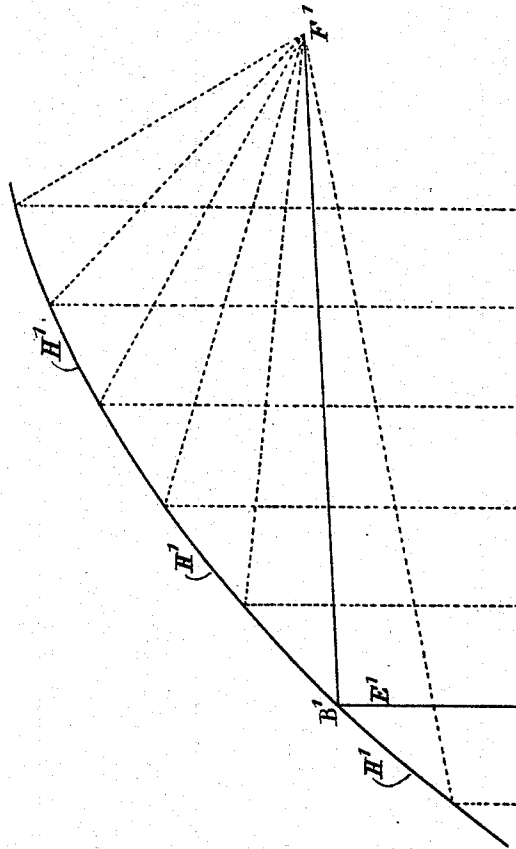
3 Sheets—Sheet 3.

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Fig 4



Witnesses

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UNITED STATES PATENT OFFICE.

CHARLES W. HUNT, OF WEST NEW BRIGHTON, NEW YORK.

ELEVATING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 527,496, dated October 16, 1894.

Application filed May 15, 1893. Serial No. 474,211. (No model.)

To all whom it may concern:

Be it known that I, CHARLES W. HUNT, a citizen of the United States, residing at West New Brighton, in the county of Richmond and State of New York, have invented an Improvement in Elevating Apparatus, of which the following is a specification.

In Letters Patent Nos. 351,445, 351,446 and 361,418, granted to me, an elevating apparatus is represented in which a carriage is placed upon an incline and a hoisting rope passes over the carriage and down to the article to be elevated, and when the hoisting rope is drawn upon the article is raised vertically or nearly so and when it reaches the traveling carriage the carriage is drawn bodily up the incline to the place of delivery. In hoisting apparatus of this character the inclination of the track or incline has usually been slightly more than forty-five degrees to the horizon with a single hoist and thirty degrees with a double fall or tackle, so that the power required to pull the carriage and the article up the incline may be slightly more than the power required to draw the article up vertically, otherwise the carriage would be drawn up the incline or partially so before the article was drawn up to it. In consequence of these conditions difficulty has arisen in discharging coal and similar friable substances, because the hopper or chute into which the material has been delivered from the elevating bucket has been at a considerable distance below the place at which the contents of the bucket were discharged. This has been necessary because the bucket had to be above one edge of the hopper and such bucket continued its movement at more than forty-five degrees to the horizon and by the time it arrived at the place of discharge it was necessarily above the hopper as great a distance as the travel of such bucket after it passed over the edge of such hopper.

In some instances the bucket has been raised up to the desired height and then drawn inwardly upon a level or nearly level track, but this has necessitated two distinct operations, and sometimes different engines have been employed, the one to elevate the bucket and the other to move the truck along upon the nearly level track. This not only increases the duty of the attendant but it also

involves increased expense in running the machinery, because where distinct operations have to be performed more or less time is consumed and additional appliances are necessary for the additional operation.

In my present invention I make use of a parabolic track extending upwardly and backwardly to the point of delivery, and the pulley for the hoisting rope is located with reference to the focus of the parabola in the manner hereinafter indicated, so that but one operation has to be performed in hoisting the weight and in drawing it in to the place of delivery, and the parabolic track does not require to be elevated above the place of delivery so much as is indispensable when an inclined track is made use of.

In describing a parabola it is presumed that the angles between lines passing from the focus of the parabola outwardly will be the same at both sides of the point of contact, and when referring to a parabolic reflector the angle of incidence is equal to the angle of reflection. I apply substantially this feature to the parabolic track made use of by me; that is to say, in hoisting an article the suspended weight hangs vertical and the rope or chain passing off to the hoisting pulley is at an angle corresponding or nearly so to the angle of the parabolic track to the vertical line to the suspended weight, the object of this arrangement being to equalize the forces existing in operating the elevator. Presuming now that the truck is at rest upon any portion of the parabolic track and the hoisting rope or chain is drawn upon, the weight raised acts vertically to pull the truck downwardly upon the track. The rope or chain passing from the truck to the hoisting drum tends to draw the truck up the track. If therefore the angles of incidence are equal the truck will remain stationary, but if the track is not sufficiently inclined the tension on the rope or chain will draw the truck up the track instead of elevating the weight vertically, and if the track is too much inclined, an unnecessary amount of power will be required in drawing the truck up the track after the weight has been elevated to the truck.

By my present improvement in which the track is a parabola and the hoisting drum is located at or near the focus of the parabola,

the weight of the truck tending to run down the incline of the parabola is usually sufficient to counteract any friction in the bearings of the hoisting pulley. Hence when the power is applied to raise the weight it is drawn up vertically, the truck standing still, and as soon as the weight is elevated and stops against the truck, the further pull upon the rope or chain draws the truck up the track by the employment of a continuous acting power until the truck arrives at the place where the weight is discharged, and during the movement the angle between the hoisting rope or chain and the track where the rope or chain leads off to the hoisting drum is nearly the same as the angle between the track and the vertical line in which the weight hangs. Hence I am enabled to lay out the track as a parabola and adapt the same on geometrical principles to the circumstances where the apparatus is to be employed, and latches for holding the truck are dispensed with and any mechanism for drawing the truck in by a separate operation after the weight has been elevated is dispensed with.

In the drawings, Figure 1 is a diagrammatic side elevation representing the improvement with the carriage in position for hoisting a load, in full lines, and in the position for discharging the load, in dotted lines. Fig. 2 is a cross section representing the carriage and the inclined track, and Fig. 3 is a diagram of a modification. Fig. 4 is a diagram illustrating the manner in which the parabola is laid out with reference to the position of the hoisting drum or pulley.

The carriage A is of any suitable character, preferably with four wheels to travel upon the track of the incline, and the sheave B over which the hoisting rope or chain C passes is upon this carriage and the hoisting rope may be provided with a hook or other connection at the lower end to which the weight is attached, as seen in Fig. 3, or such rope or chain may pass around the pulley D and the end of the rope be connected with the carriage A so as to have a double fall or tackle.

I have represented a bucket E adapted to receive coal or other material. This bucket may be of any desired character or the apparatus may be used for raising any substances or articles.

I have shown an ordinary bucket on pivots at the ends of the bail and the same is partially rotated to discharge the contents, and a pin on the bucket coming into contact with a stop may be used for this purpose or any other well known device may be employed in discharging the bucket.

The hoisting rope or chain C passes over the stationary drum or pulley F to any suitable mechanism for actuating the said hoisting rope, and this pulley F is below the incline and at or near the focus of the parabola.

The incline H is generally made with two

tracks adapted to receive the wheels of the carriage, but such incline H may be made with a single track, the wheels of the truck or carriage being flanged to run upon the track and the pulley D for the hoisting rope coming beneath the track, as illustrated in Fig. 1.

In all instances the inclined track instead of being straight is curved and the angle of the track at the lower portion thereof is about thirty degrees to the horizon with a double fall, as in Fig. 1, and at about forty-five degrees with a single fall, Fig. 3, and the curvature brings the surface of the track more nearly horizontal at the upper portion of such track.

The mode of laying out the track as a parabola is illustrated in Fig. 4, in which F' represents the focus of the parabola, H' the parabolic curve of the track, and E' the vertical line and B' the junction of the vertical line to the line passing off to the focus of the parabola. The curve or inclination of the parabola at the different points thereof is such that the angles H' B' E' and H' B' F' are substantially equal, as shown by the full lines, and the opposite angles at each point of intersection throughout the parabola will be equal, as illustrated by the dotted lines. When this geometrical figure is transferred to my apparatus, the parabola H' corresponds substantially to the track H. E' represents the weight to be raised, B' the pulley over which the rope or chain passes, and F' the pulley or drum at or near the focus of the parabola. If the periphery of the pulley is below the focus of the parabola, the angle F' B' H' will be greater than the angle H' B' E', and the power to draw the truck up the parabolic track will be greater than the power required to raised the weight. Hence the tendency will be for the truck to run down the track and remain stationary while the weight is being raised and the angle between the rope as it passes from the pulley F' to the track, is such that the power exerted in drawing the carriage up the incline is at all places slightly greater than the power required in sustaining the weight that is raised by the rope or chain, and the total elevation of the article that is raised is less than has heretofore been necessary with a straight inclined track, and at K I have illustrated the position of a hopper in order to show that the bucket E as it is raised and drawn over the hopper is moving in almost a horizontal direction and thereby it is not elevated when the contents are discharged as high above the bottom of the hopper as it has heretofore been necessary to elevate such bucket, with an inclined track and one actuating device. Hence the contents of the bucket, such as coal, will not be broken as they are discharged as much as they have heretofore been, because such contents will not have to fall as great a distance into the hopper.

It is to be understood that in elevators of

the present character the angle of the different parts of the track to the elevating rope or chain is such that the truck will run down the incline by gravity with or without the weight that is raised, whenever the hoisting chain is slackened, so that the truck can be returned to the lower end of the track.

I do not claim a curved track nor the pulley for the hoisting rope or chain below the upper part of the track, as these have been used with the rope or chain connected directly to the truck, and the rope or chain has passed over the pulley below the upper part of an inclined track, but latches have been required for holding the truck while the weight has been raised or for holding the weight to the truck after it is raised or both.

It will be apparent that in carrying out in practice the theoretical principles before enunciated, the curvature may vary from a true parabola, especially where it may be desired to cause the inclination of the track to offer more or less resistance to the truck as it is drawn up. At the same time reference must be had to the forces exerted where a single

fall is employed, as in Fig. 1, or a double or multiple fall, as illustrated by Fig. 3.

I claim as my invention—

1. The combination with the hoisting rope or chain and a truck and pulley over which such rope or chain passes to the weight to be raised, of a track curved as a parabola, or approximately so, and a hoisting drum or pulley at or near the focus of the parabola, substantially as set forth.

2. The combination with the hoisting rope or chain, a truck and pulley over which such rope or chain passes and a pulley connected with the weight to be raised, the end of the rope or chain being connected with the truck, of a track curved as a parabola, or approximately so, and a hoisting drum or pulley near the focus of the parabola, substantially as set forth.

Signed by me this 8th day of May, 1893.

CHAS. W. HUNT.

Witnesses:

HAROLD SERRELL,
A. M. OLIVER.