

No. 817,747.

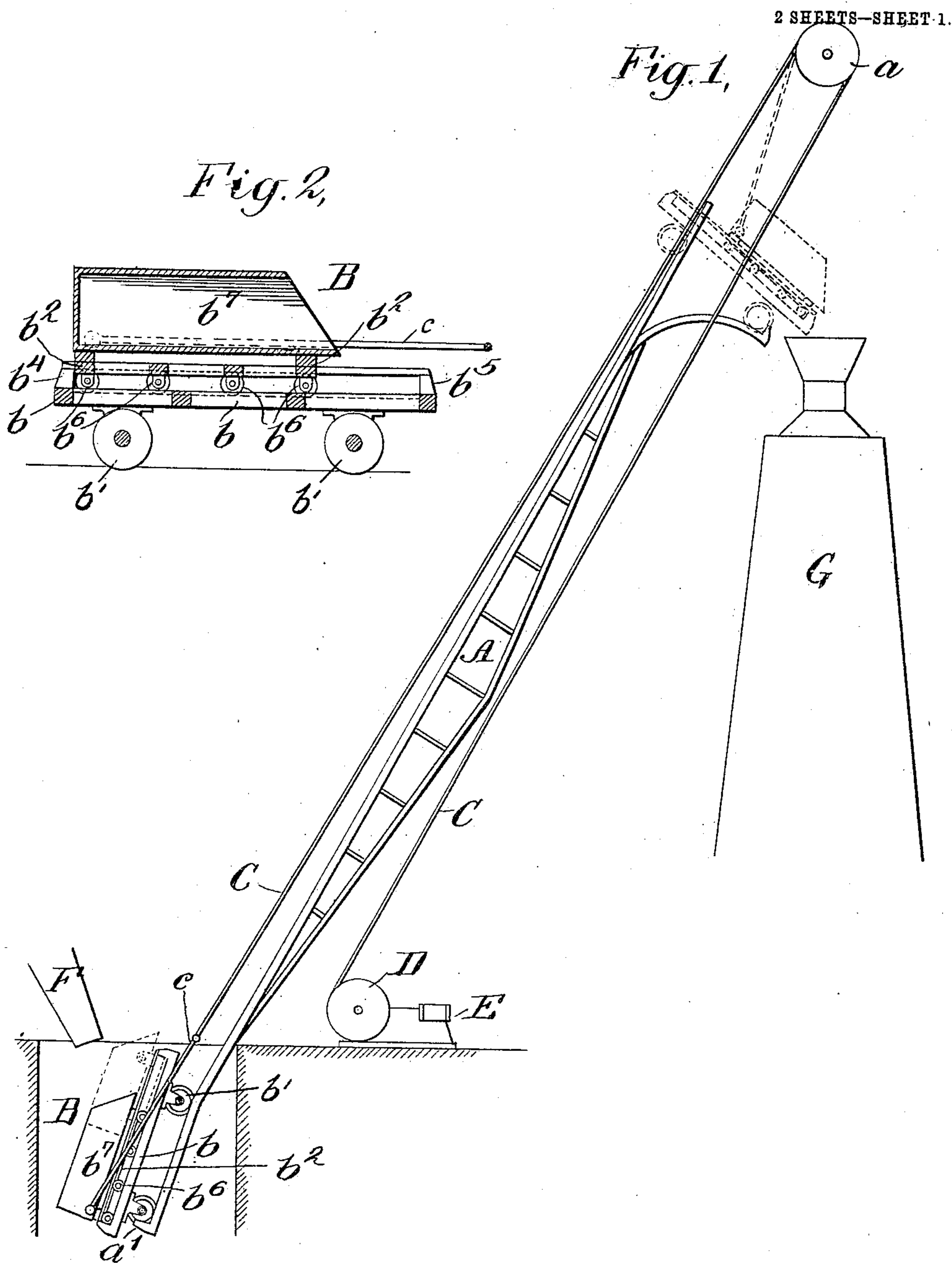
PATENTED APR. 17, 1906.

G. W. BOLLMAN.

HOIST.

APPLICATION FILED JULY 13, 1903.

2 SHEETS—SHEET 1.



WITNESSES:

Timothy J. Lane  
Henry C. Kirby

INVENTOR

George W. Bollman

BY

E. W. Marshall

ATTORNEY

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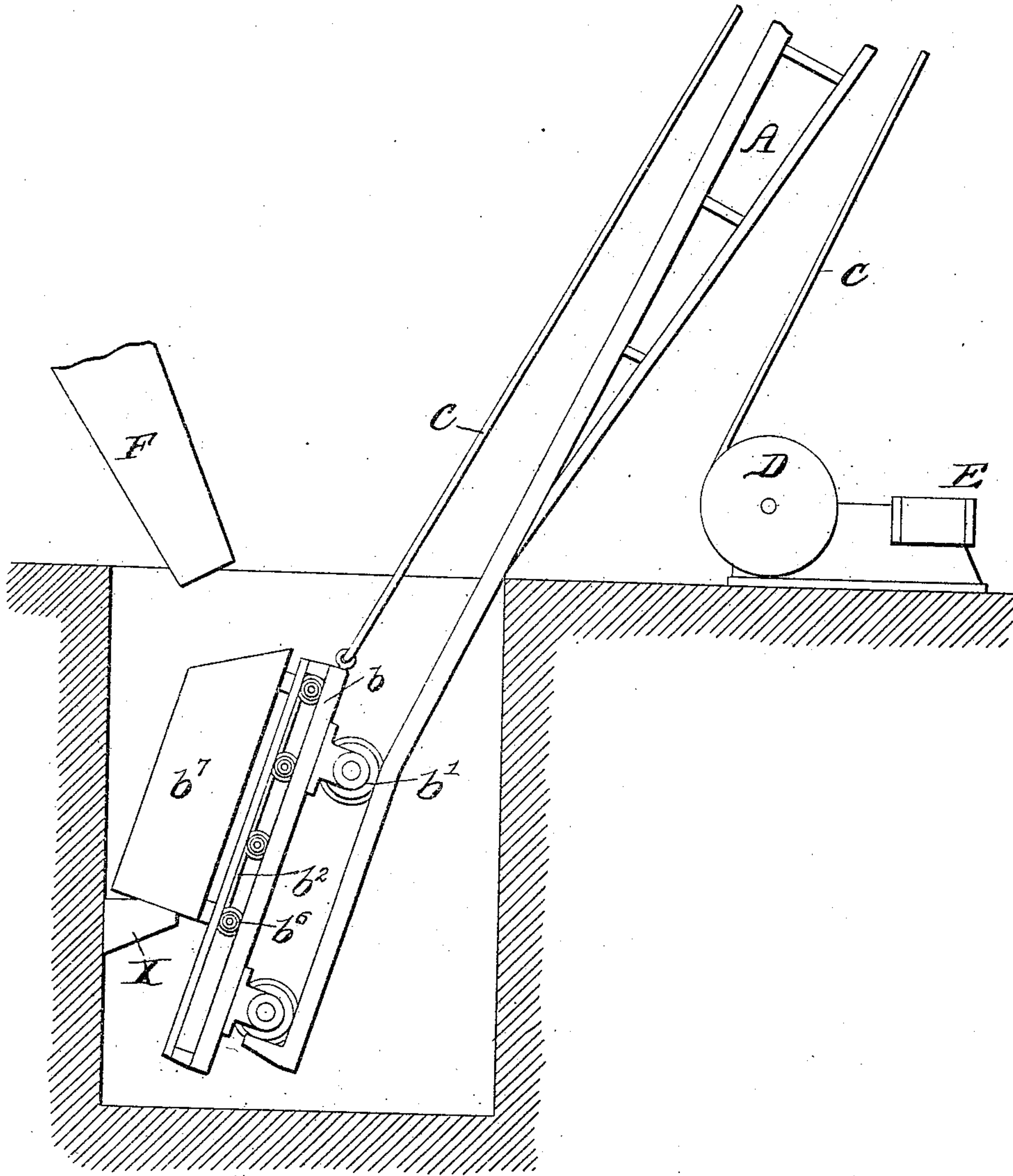
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# UNITED STATES PATENT OFFICE.

GEORGE W. BOLLMAN, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO  
OTIS ELEVATOR COMPANY, OF EAST ORANGE, NEW JERSEY, A COR-  
PORATION OF NEW JERSEY.

## HOIST.

No. 817,747.

Specification of Letters Patent.

Patented April 17, 1908.

Application filed July 13, 1903. Serial No. 165,301.

*To all whom it may concern:*

Be it known that I, GEORGE W. BOLLMAN, a citizen of the United States, residing in Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Hoists, of which the following is a specification.

My invention relates more particularly to hoists, and especially to that class of hoists used in connection with furnaces.

I will describe a hoist embodying my invention and then point out the novel features thereof in claims.

In the accompanying drawings, Figure 1 is a diagrammatical view in elevation of a hoist embodying my invention and certain other devices employed in connection with the hoist. Fig. 2 is a view in vertical longitudinal section of a car and bucket comprised in my invention. Fig. 3 shows a modified form of apparatus also embodying my invention.

Similar letters of reference designate corresponding parts in all of the figures.

Referring to the drawings, A designates an incline, which may be of any desired construction and material.

B designates a car adapted for travel up and down the incline on tracks which, as here shown, are so arranged at the upper end of the incline as to cause a tilting of the car in the manner shown in dotted lines to discharge its contents into the furnace G. The travel of the car up and down the incline is here shown as being effected through a cable C, one end of which is preferably connected to a bail c, secured to the car B. The cable C passes over a sheave or pulley a, suitably journaled at the upper part of the incline, and the other end of the cable is connected to a drum D, which is rotated by an engine or motor E. The drum may be rotated in one direction only by the motor and allowed to run free in the opposite direction by reason of gravity acting on the car. In the latter case a suitable brake should be employed to stop the rotation of the drum. A stop a' is shown at the lower end of the incline to limit the downward travel of the car. The lower end of the incline is also here shown as being in a different and steeper grade than the remainder of the incline, a purpose of which arrangement is to have the car in such position

as to be conveniently filled from a chute F. This is an arrangement in common use in hoists; but it is not necessary, and the lower end may be in the same grade as the remainder of the incline.

The engine or motor E may be of any desired type, and it is arbitrarily represented in the drawings. The drum may also be of any desired type, and any desired form of gearing may be employed between the engine or motor E and the drum.

In order that the engine or motor may be started easily and quickly, I find it desirable under many circumstances, such as where the car and load are on a steep grade (as, for example, that shown in Fig. 1) or where the full power of the engine or motor employed for raising the car and load is not available at the starting of the engine or motor, to provide means for overcoming the inertia of the load and car with less initial pull than would otherwise be required. This may be accomplished by the means shown in the drawings. The car B, as here shown, comprises a suitable body b, mounted on wheels b', which travel on the rails on the incline, and a frame b<sup>2</sup>, provided with rollers or other devices b<sup>6</sup>, which travel on suitable ways provided on the body b. A bucket or receptacle b<sup>7</sup> is rigidly mounted on the frame b<sup>2</sup>. The bail c, to which the end of the cable C is secured, is here shown as being pivotally connected with the bucket or receptacle. The movement of the frame b<sup>2</sup>, which carries the load, is limited by stops b<sup>4</sup> b<sup>5</sup>, provided on the body b.

It will be apparent from the foregoing that when the engine or motor is started the only load upon it will be the weight of the bucket, frame, and the contents of the bucket and that by reason of the movement of the load relatively to the body of the car the engine or motor is enabled to acquire momentum before it starts to raise the load and car together. The advantage of my invention in the case of two-cylinder engines will be readily seen. For starting this type of engine only one cylinder is available, and the only load upon it will be the bucket, frame, and contents of the bucket. The movement of the load independently of the body permits of both pistons being brought into service before the full weight of the bucket, frame, contents, and body b is to be raised on the in-



cine. It will be understood that after the frame  $b^2$  has been moved against the stop  $b^5$  of the body of the car, as shown in dotted lines, the continued action of the engine or motor will raise both to the top of the incline, where the contents of the bucket may be discharged into the furnace G.

While I have described my invention in connection with hoists for furnaces, it will be understood that it may be employed wherever is desired to overcome the inertia of a load with less initial pull than would otherwise be required. It will also be understood that I do not desire to be limited to the arrangement described and shown in the drawings, as various changes may be made in the several parts described without departing from the spirit of my invention. For example, Fig. 3, the cable C may be connected with the body  $b$  instead of to the bucket or receptacle  $b^7$  or its frame  $b^2$ . In this case the body  $b$  may be started in advance of the bucket or receptacle, and subsequently take up the same. In this modification the bucket may be prevented from remaining at the lower end of the car when the same is at its lowest position in any suitable way, such as by a stop or buffer X, suitably arranged.

What I claim as my invention is—

1. The combination with a car carrying a load, of a motor for moving said car and load and means for first overcoming the inertia of one or the other with less initial pull or strain than would otherwise be required and then placing the full pull or strain of the car and load on said motor as soon as the inertia of the former has been overcome.
2. The combination with a car carrying a load, of a motor for moving said car and load, and means for first overcoming the inertia of one or the other with less initial pull or strain than would otherwise be required while the motor is acquiring momentum, then placing the full pull or strain of the car and load upon said motor as soon as said motor has acquired momentum.
3. The combination with a car carrying a load, of a motor for moving said car and load and means wholly carried by said car for overcoming the inertia of said car and load with less initial pull than would otherwise be required and subsequently placing the full pull and strain of said car and load on the motor.
4. The combination of an incline, a car adapted for travel up and down the incline and comprising a body and a receptacle carried by the body, a cable and a motor for effecting the travel of the car on the incline, and means permitting of a relative movement between the body and the receptacle whereby the inertia of said body and receptacle is overcome with less initial pull than would otherwise be required.

5. The combination in a hoist, of an incline, a car adapted for travel up and down the incline, a cable and motor for effecting the travel of the car on the incline, said car comprising a body and a bucket capable of a movement independently of the body whereby the inertia of said body and bucket is overcome with less initial pull than would otherwise be required.

6. The combination in a hoist of an incline, a car adapted for travel up and down the incline, a cable and motor for effecting the travel of the car on the incline, said car comprising a body, a frame movable on said body and carrying a bucket whereby the inertia of said body and frame is overcome with less initial pull than would otherwise be required.

7. The combination in a hoist, of an incline, a car adapted for travel up and down the incline, a cable and motor for effecting the travel of the car on the incline, said car comprising a body, a frame movable on said body and carrying a bucket, whereby the inertia of said body and frame is overcome with less initial pull than would otherwise be required, and stops for limiting the movement of the frame on the body.

8. The combination of an incline, the lower end of which is in a steeper grade than the remainder of the incline, a car adapted for travel up and down the incline, a load carried by said car, a cable and motor for effecting the travel of the car on the incline, and means permitting of a relative movement between the load-bearing part and its support whereby the inertia of said load and its support is overcome with less initial pull than would otherwise be required when the car is on the steeper grade of the incline.

9. The combination of an incline, a car comprising a body and a receptacle carried thereby adapted for travel up and down the incline, a cable and a motor for effecting the travel of the car on the incline, said cable being connected with the receptacle, and means permitting of a relative movement between the body and the receptacle whereby the inertia of said body and receptacle is overcome with less initial pull than would otherwise be required.

10. The combination in a hoist, of an incline, a car adapted for travel up and down the incline, a cable and motor for effecting the travel of the car on the incline, said car comprising a body and frame movable on said body, and carrying a receptacle, to which the cable is connected whereby the inertia of said body and receptacle is overcome with less initial pull than would otherwise be required, and stops for limiting the movement of the frame on the body.

11. The combination with a car carrying a load, of a motor adapted to move said car and load from a starting-point, and means which are near the car and starting-point



whenever said car and load is at the starting-point, and adapted to overcome the inertia of said car and load with less initial pull or strain than would otherwise be required and thereafter place the full pull and strain thereof on the motor.

In witness whereof I have signed my name

to this specification in the presence of two subscribing witnesses.

GEORGE W. BOLLMAN.

Witnesses:

W. H. BRADY,  
HENRY E. KIRBY.