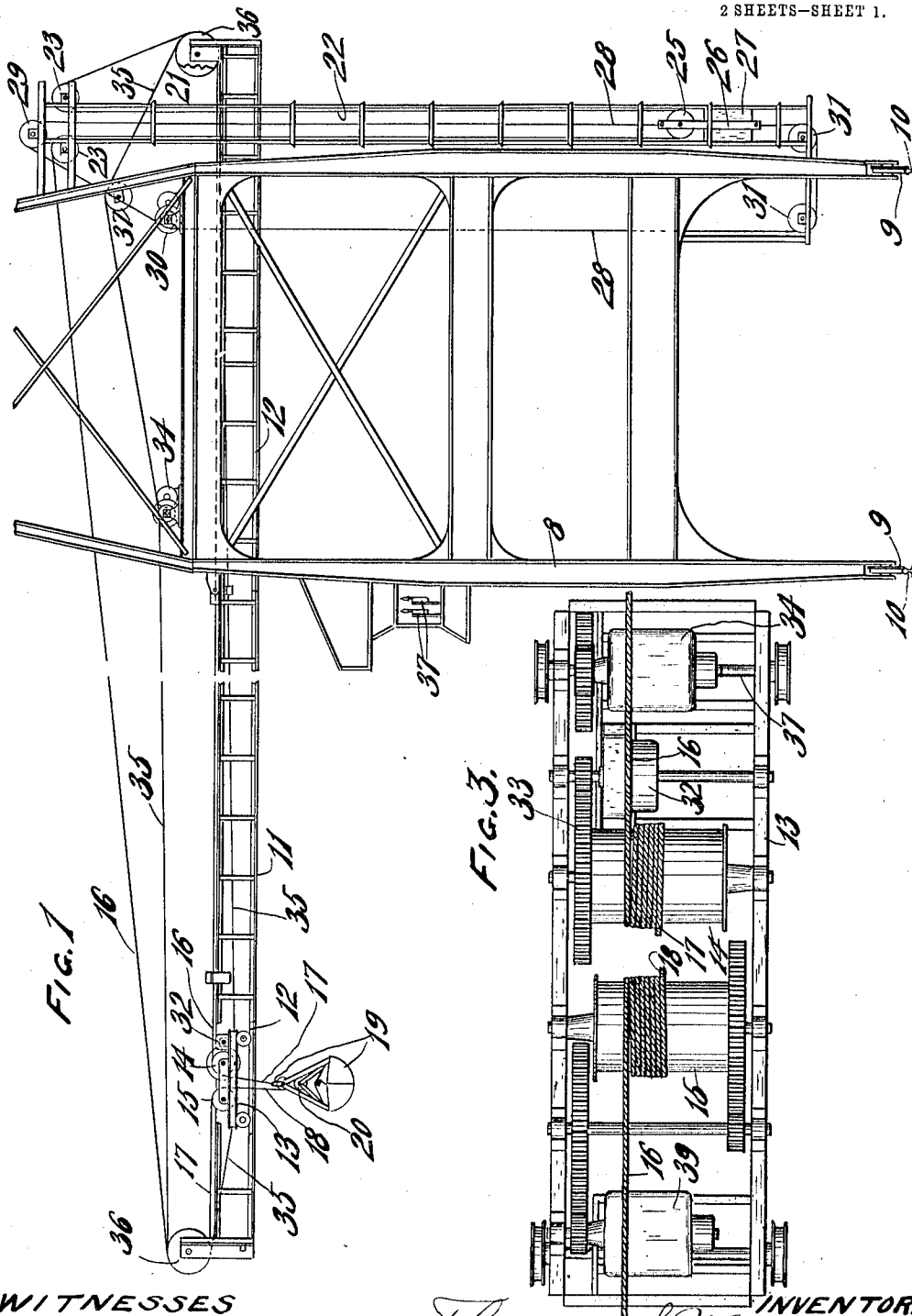


T. S. WATSON.
ELEVATING, TRANSPORTING, AND DISCHARGING APPARATUS.
APPLICATION FILED MAR. 2, 1911.

1,019,867.

Patented Mar. 12, 1912.

2 SHEETS—SHEET 1.



WITNESSES
J. O. Hanner
Laura A. Kelley

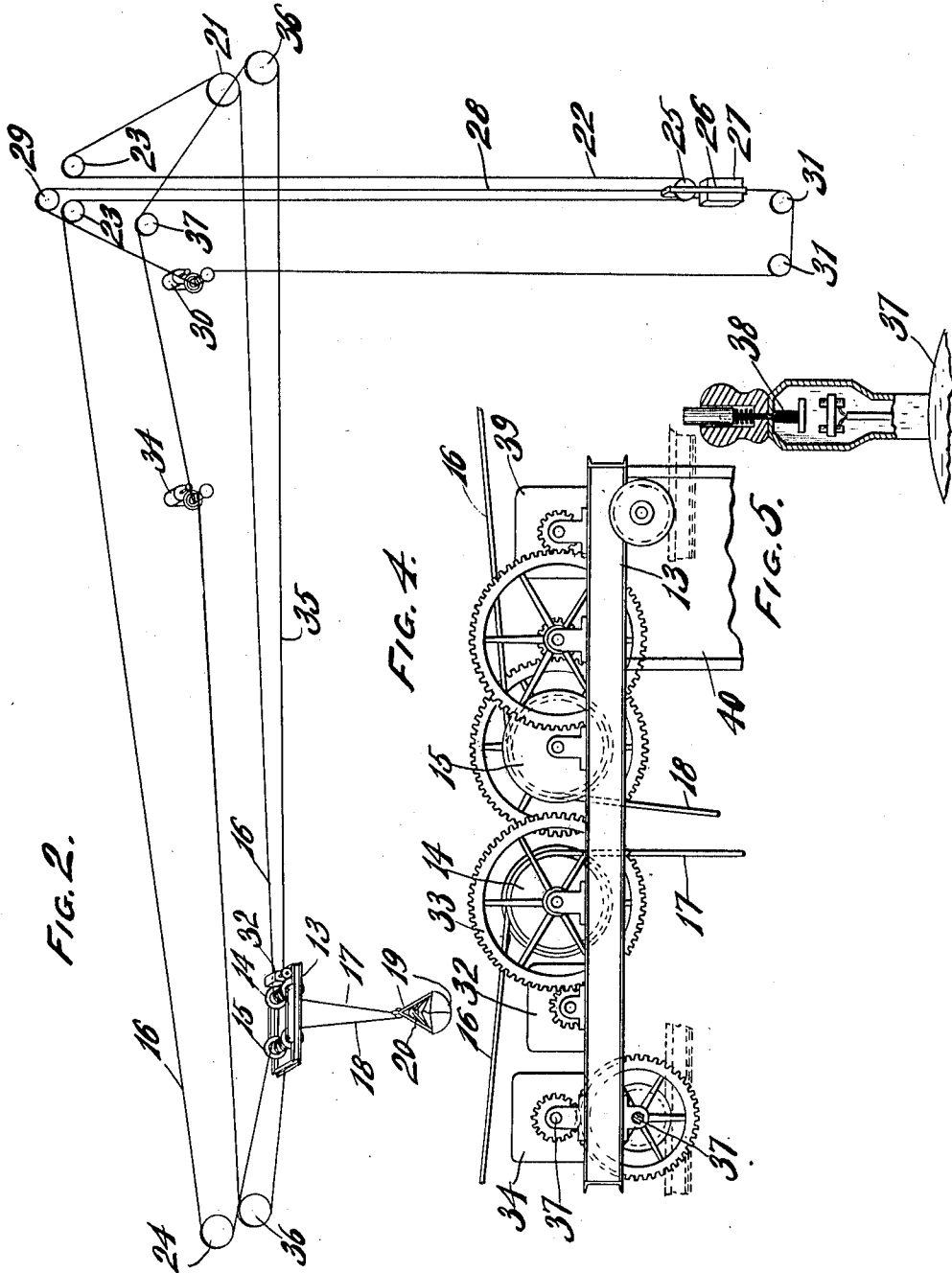
By Thomas S. Watson,
Morsell + Caldwell,
ATTORNEYS.

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WITNESSES

L. C. Thayer.
Laura R. Kelley

INVENTOR

Thomas S. Watson.
By *Morsell & Caldwell.*
ATTORNEYS.

UNITED STATES PATENT OFFICE.

THOMAS S. WATSON, OF MILWAUKEE, WISCONSIN, ASSIGNOR TO THOS. S. WATSON COMPANY, OF MILWAUKEE, WISCONSIN, A CORPORATION OF WISCONSIN.

ELEVATING, TRANSPORTING, AND DISCHARGING APPARATUS.

1,019,867.

Specification of Letters Patent.

Patented Mar. 12, 1912.

Application filed March 2, 1911. Serial No. 611,903.

To all whom it may concern:

Be it known that I, THOMAS S. WATSON, a citizen of the United States, residing in Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented new and useful Improvements in Elevating, Transporting, and Discharging Apparatus, of which the following is a description, reference being had to the accompanying drawings, which are a part of this specification.

This invention relates to improvements in elevating, transporting and discharging apparatus for handling coal or other material.

It is one of the objects of this invention to provide an elevating, transporting and discharging apparatus in which the construction is simplified by having the main hoisting motor adapted to also open and close the material holding receptacle.

A further object of the invention is to provide an apparatus of the class described in which the independent control of a motor on the carriage serves to draw in the slack of one of the operating cables and also expedites the opening of the material receptacle.

A further object of the invention is to provide an apparatus of the class described in which the counterweight ordinarily used may be dispensed with, if desired, without materially affecting the operation of the apparatus.

A further object of the invention is to provide an elevating, transporting and discharging apparatus which is adapted for use in connection with long and short hauls and in which the traversing motor may be placed on a fixed support in a short haul apparatus and in a long haul apparatus the traversing motor may be placed on the carriage and the carriage cable be dispensed with.

A further object of the invention is to provide an apparatus of the class described in which the counterweight is raised or lowered to raise or lower the receptacle by means of an independent motor located at a fixed point.

With the above, and other objects in view, the invention consists of the elevating, transporting and discharging apparatus as set forth in the claims, and all equivalents thereof.

In the accompanying drawings in which the same reference characters indicate the same parts in all of the views: Figure 1 is

a side view of a portion of a tower provided with the improved elevating, transporting and discharging apparatus, parts broken away; Fig. 2 is a diagrammatic perspective view of the cable system thereof and also showing the carriage, the motors, the counterweight and the pulleys; Fig. 3 is a top view of the carriage modified to the extent of having the motors mounted thereon; Fig. 4 is a side view thereof; and Fig. 5 is a detail view of the electric controller handle for controlling the modified form of carriage.

Referring to the drawings the numeral 8 indicates a portion of a tower which is mounted on wheels 9 adapted to travel on the track 10 in the usual manner. The tower is provided with a boom 11, and tracks 12 carried by said tower and boom support a carriage 13 which is adapted to travel back and forth thereon. A hoisting drum 14 and a receptacle opening and closing drum 15, respectively, are mounted on the carriage and have connected thereto a drum rope or cable 16 which is wound therearound and depends downwardly therefrom. The depending ends 17 and 18 of the cable are connected, respectively, to the receptacle 19 and to the opening and closing mechanism 20 of said receptacle. This cable 16 extends from the hoisting drum 14 in the direction of the line of travel of the carriage to and around a guide pulley 21, upwardly and around and depending in a loop 22 between pulleys 23 and returning in the direction of travel over the carriage and around a pulley 24 located at the free end of the boom and from thence returning to the receptacle opening and closing drum 15 and terminating in the end 18 before described. A pulley 25 engaged by the loop 22 of the cable 16 is journaled in a strap 26 which carries a counterweight 27 in the lower portion thereof. A counterweight operating cable 28, the upper end of which is connected to the upper end of the counterweight strap, extends upwardly therefrom between the looped portion of the cable 16 and around a pulley 29 and down to the drum of the counterweight motor 30 located on the tower. The cable is wound around the said drum and depends downwardly therefrom and around the guide pulleys 31 and up to and is connected to the lower end of the counterweight strap 26 so that when said motor is rotated, the counterweight will be raised or lowered with the

loop 22 of the cable 16 and cause the raising or lowering of the receptacle 19. An electric brake 32 having a geared connection 33 with the hoisting drum 14 is adapted to retard the speed of rotation of the drum in order to open or close the jaws of the receptacle when desired. In this short haul apparatus the motor 34 for traversing the carriage back and forth along the track is located on the tower and a traversing rope or cable 35 wound on the drum of said motor extends in the direction of travel of the carriage and the opposite ends of the cable are connected to opposite ends of the carriage. The cable is supported on suitable pulleys 36 located at opposite ends of the trackway and on the upper intermediate pulley 37 for supporting the portion of the cable which extends over the carriage. The motors on the tower are controlled by the electric controllers 37 while the retarding brake on the carriage is controlled by the push button contact 38 forming part of one of the handles of said controllers.

The operation of the apparatus thus far described is as follows: Assuming that the parts are in the positions shown and it is desired to charge the receptacle and convey the material to the opposite end of the track and discharge it, the counterweight cable motor is rotated to lift the counterweight which movement will shorten the loop of the drum cable and lower the material bucket or receptacle. At the same time the push button is pressed to cause the retarding brake to slightly retard the rotation of the hoisting drum which will cause the jaws of the bucket to open while the bucket is dropping toward the material. The momentum of the dropping receptacle will force the jaws thereof deeply into the material so that when the motors are reversed and the retarding brake retards the rotation of the hoisting drum, the opening and closing drum will draw in its cable at a greater rate of speed and cause the jaws to dig into the material and fill the receptacle and the receptacle will then be elevated to a point adjacent to the carriage by the pull of both cables. The traversing motor is now started to pull on the traversing cable and pull the carriage to the opposite end of the track, the drum cable being carried along by the carriage and playing freely through the counterweight pulley and the guide pulleys. As soon as the opposite end of the track is reached, the traversing motor will be stopped and the counterweight cable motor rotated to again raise the counterweight and lower the bucket and at the same time the retarding brake is operated to retard the hoisting drum and the jaws of the bucket will then open and discharge the material.

In the modified form shown in Figs. 3

and 4 the traversing motor 34 is mounted directly on the carriage and the traversing cable 35 is dispensed with. This motor has a geared connection with the carriage wheel shaft 37 for driving the carriage back and forth on the track. In this modified form of apparatus it is desirable to provide means for taking up slack in the opening and closing portion of the cable 16 to prevent whipping of the cable and to accomplish this result a small motor 39 mounted on the carriage and geared to the opening and closing drum 15 is provided for accelerating the speed of rotation of said drum and keeping the cable taut. A cab 40 suspended from the carriage of the modified form of apparatus is adapted to accommodate the electric motor controllers 37, before described, if desired in order to control the motors from said carriage. The accelerating motor 39 is controlled by a push button connected to one of the controller handles which is similar to the push button shown for controlling the brake. In the operation of this modified form of apparatus the counterweight cable motor is rotated to raise and lower the receptacle and the retarding motor rotated to control the opening and closing of the jaws of the receptacle in the same manner as before described and the traversing motor on the carriage is rotated to cause the travel of said carriage on the track. In operating the apparatus at a fast rate of speed the tendency of the opening and closing cable to sag and whip is overcome by means of the accelerating motor which is rotated to take up slack and hold the cable taut.

The independent connection of the hoisting motor to the counterweight cable provides a simple construction and relieves the carriage of the weight of the motor and also provides for eliminating the counterweight if desired as it is obvious that the said weight may be dispensed with and the apparatus will operate in the same manner with the exception that the receptacle will not be counterbalanced and more power will be required to elevate the receptacle.

From the foregoing description it will be seen that the apparatus is very simple in construction and operation and is well adapted to perform the functions desired. The novel arrangement and construction of the parts provides for the location of the smaller motors either on the carriage or on the relatively fixed support and thus adapts the apparatus to a large variety of uses and modifications.

What I claim as my invention is:

1. An apparatus for elevating, transporting and discharging material, comprising a track, a carriage provided with a material holding receptacle constructed to travel on the track, a cable connected to the carriage

and to the receptacle and having a loop formed therein at relatively a fixed point, said cable adapted to open and close and raise and lower the receptacle, another cable
5 connected to the loop of the first mentioned cable for controlling the length of said loop, and means for causing the travel of the carriage on the track.

2. An apparatus for elevating, transporting and discharging material, comprising a
10 track, a carriage constructed to travel on the track and provided with cable drums, a cable wound on the drums and extending in the direction of the line of travel of the carriage and having a loop formed at a point
15 relatively fixed with relation to the carriage, a material receptacle suspended from the carriage by said cable and also opened and closed by said cable, a means for extending and contracting the cable loop to raise and
20 lower the receptacle, and means for traversing the carriage on the track.

3. An apparatus for elevating, transporting and discharging material, comprising a
25 track, a carriage constructed to travel on the track and provided with cable drums, a cable wound on the drums and extending in the direction of the line of travel of the carriage and having a loop formed at a point
30 relatively fixed with relation to the carriage, a material receptacle suspended from the carriage by said cable, another cable connected to the loop of the first mentioned cable for extending and contracting the
35 cable loop to raise and lower the receptacle and to open and close the receptacle, a motor for operating the cable connected to the loop, and means for traversing the carriage on the track.

4. An apparatus for elevating, transporting and discharging material, comprising a
40 track, a carriage constructed to travel on the track, drums journaled on the carriage, a cable wound on the drums and extending in the direction of the line of travel of the carriage and having a loop formed at a point
45 relatively fixed with relation to the carriage, a material receptacle suspended from the carriage by said cable, means for retarding the rotation of one of the drums to open and
50 close the receptacle, another cable connected to the loop of the first mentioned cable for extending and contracting the loop to raise and lower and open and close the receptacle, and means for traversing the carriage on
55 the track.

5. An apparatus for elevating, transporting and discharging material, comprising a
60 track, a carriage constructed to travel on the track, drums journaled on the carriage, a cable wound on the drums and extending in the direction of the line of travel of the carriage and having a loop formed at a point
65 a material receptacle suspended from the

carriage by said cable, means mounted on the carriage for retarding the rotation of one of the drums to open and close the receptacle, another cable connected to the loop of the first mentioned cable for extending
70 and contracting the loop to raise and lower and open and close the receptacle, and means for traversing the carriage on the track.

6. An apparatus for elevating, transporting and discharging material, comprising a
75 track, a carriage constructed to travel on the track, drums journaled on the carriage, a cable wound on the drums and extending in the direction of the line of travel of the carriage and having a loop formed at a point
80 relatively fixed with relation to the carriage, a material receptacle suspended from the carriage by said cable, a brake mounted on the carriage and engaging one of the drums for retarding the rotation of said drum to
85 open and close the receptacle, another cable connected to the loop of the first mentioned cable for extending and contracting the loop to raise and lower and open and close the receptacle, and means for traversing the car-
90 riage on the track.

7. An apparatus for elevating, transporting and discharging material, comprising a
track, a carriage constructed to travel on the track, a hoisting drum and an opening and
95 closing drum mounted on the carriage, a cable wound on the drums and extending in the direction of the line of travel of the carriage and having a loop formed at a point relatively fixed with relation to the carriage,
100 a material receptacle suspended from the carriage by said cable and having opening and closing jaws, a brake mounted on the carriage and engaging the hoisting drum for retarding the rotation of said drum to
105 open and close the jaws of the receptacle, a pulley suspended in the loop of the cable, another cable connected to the pulley and to the drum of a motor mounted on a relatively fixed support for extending and con-
110 tracting the cable loop, and means for traversing the carriage on the track.

8. An apparatus for elevating, transporting and discharging material, comprising a
115 track, a carriage mounted on the track, drums mounted on the carriage, a cable wound on the drums and extending in the direction of the line of travel of the carriage and having a loop formed at a point relatively fixed with relation to the carriage,
120 a material receptacle suspended from the carriage by said cable, means on the carriage for retarding the speed of rotation of one of the drums, a motor mounted on the carriage for accelerating the speed of rota-
125 tion of the other drum, means for extending and contracting the cable loop to raise and lower the receptacle, and means for traversing the carriage on the track.

9. An apparatus for elevating, transport- 130

ing and discharging material, comprising a track, a carriage mounted on the track, drums mounted on the carriage, a cable wound on the drums and extending in the
5 direction of the line of travel of the carriage and having a loop formed at a point relatively fixed with relation to the carriage, a material receptacle suspended from the carriage by said cable, a means on the carriage for retarding the speed of rotation of
10 one of the drums, a motor mounted on the carriage for accelerating the speed of rotation of the other drum, a pulley suspended in the loop of the cable, another cable connected to the pulley and to the drum of a
15 motor mounted on a relatively fixed support for extending and contracting the cable loop, and means for traversing the carriage on the track.

20 10. An apparatus for elevating, transporting and discharging material, comprising a track, a carriage mounted on the track, drums mounted on the carriage, a cable wound on the drums and extending in the
25 direction of the line of travel of the carriage and having a loop formed at a point relatively fixed with relation to the carriage, a material receptacle suspended from the carriage by said cable, means on the carriage
30 for retarding the speed of rotation of one of the drums, a motor mounted on the carriage for accelerating the speed of rotation

of the other drum, a counterweight suspended from the loop of the cable for counterbalancing the receptacle, a cable and
35 motor means connected to the counterweight for extending and contracting the cable loop to raise and lower the receptacle, and means for traversing the carriage.

11. An apparatus for elevating, transporting and discharging material, comprising a track, a carriage constructed to travel
40 on the track, drums journaled on the carriage, a cable wound on the drums and extending in the direction of the line of travel
45 of the carriage and having a loop formed at a point relatively fixed with relation to the carriage, a material receptacle suspended from the carriage by said cable, a brake
50 mounted on the carriage and engaging one of the drums for retarding the rotation of said drum to open and close the receptacle, means connected to the loop of the first mentioned cable for extending and contracting
55 the loop to raise and lower and open and close the receptacle, and means for traversing the carriage on the track.

In testimony whereof, I affix my signature, in presence of two witnesses.

THOMAS S. WATSON.

Witnesses:

O. C. H. KEENEY,
KATHERINE HOLT.