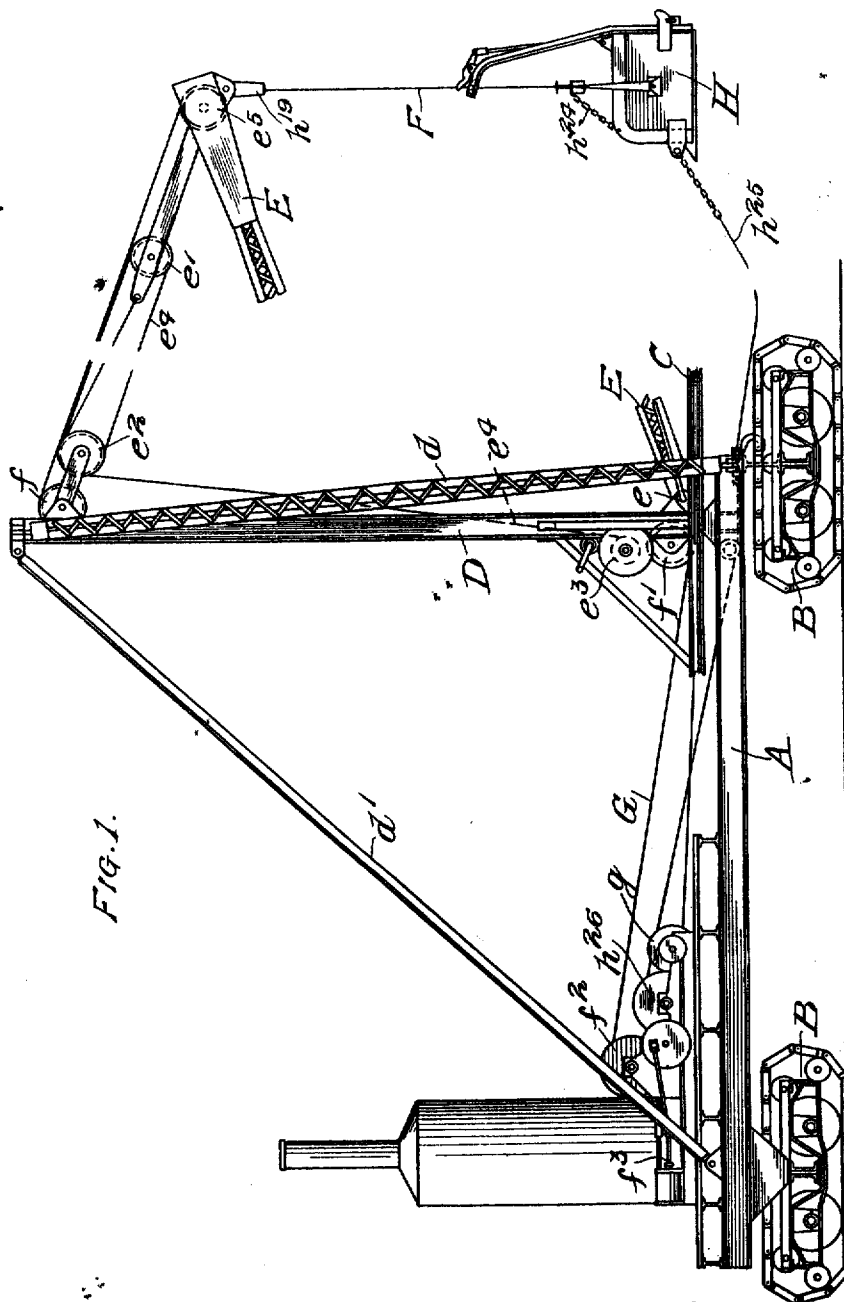


997,542.

M. G. BUNNELL.
EXCAVATING MACHINE.
APPLICATION FILED SEPT. 2, 1908.

Patented July 11, 1911.

3 SHEETS-SHEET 1.



WITNESSES

A. Andersen.
C. E. Taylor.

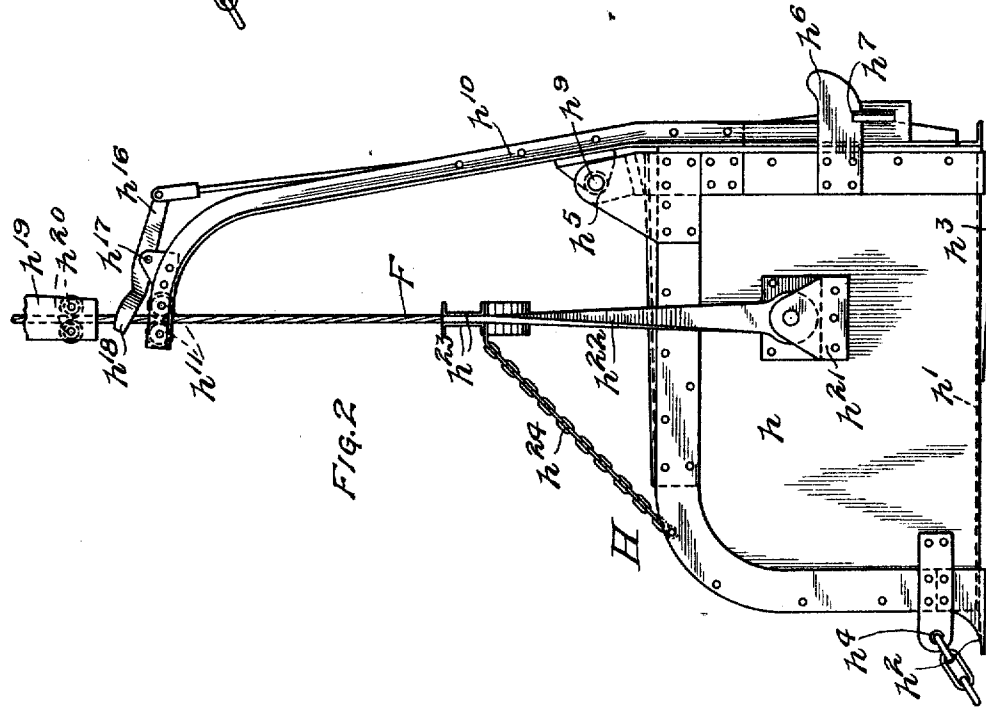
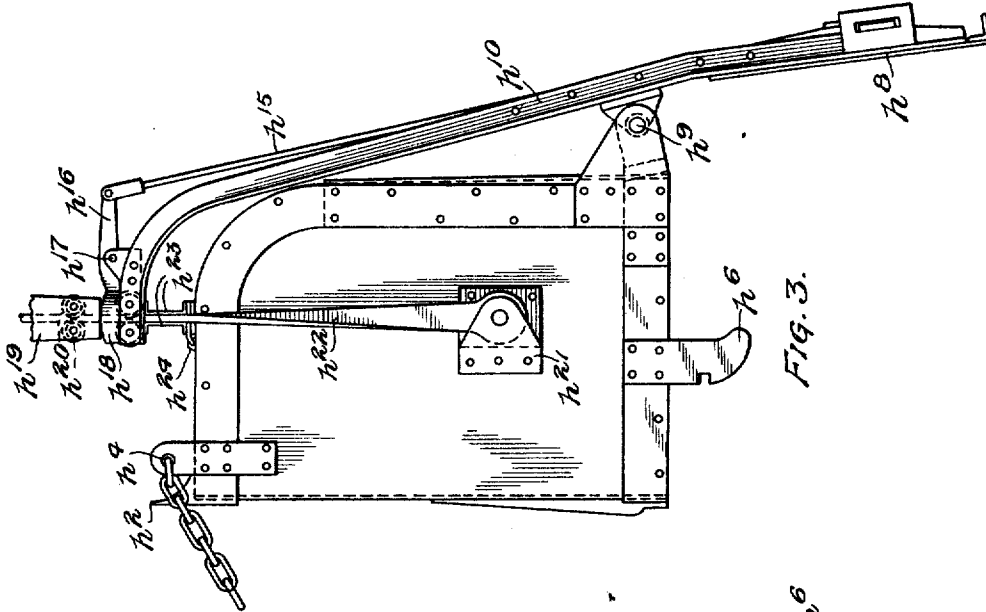
INVENTOR:
MORTON G. BUNNELL,
By *Charles E. Taylor & Co.*
ATTORNEYS

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3 SHEETS—SHEET 2.



WITNESSES
A. Andersen.
C. E. Taylor.

INVENTOR:
MORTON G. BUNNELL.
By *Culley & Ward & Dwyer*
ATTORNEYS

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3 SHEETS—SHEET 3.

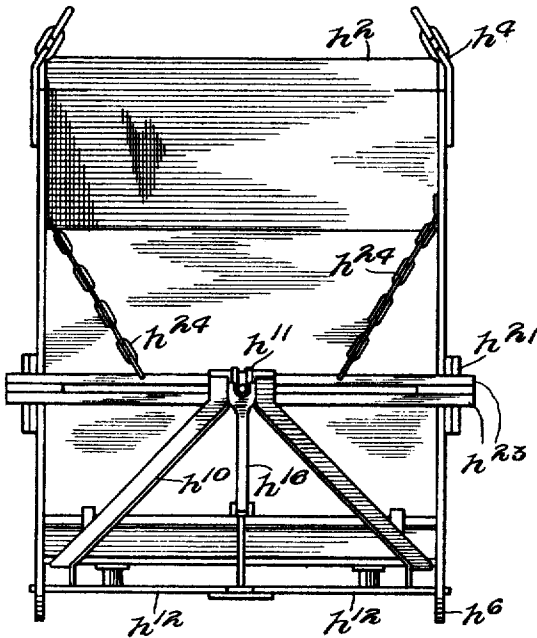


FIG. 4.

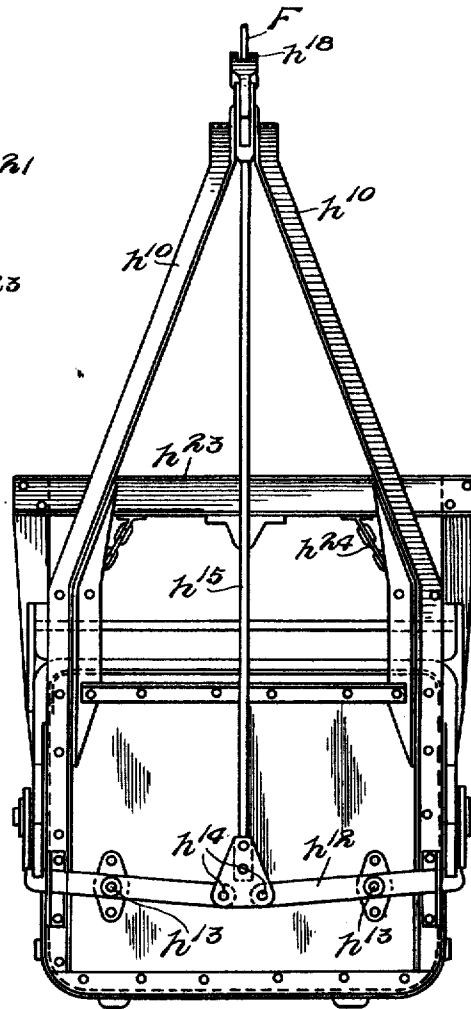


FIG. 5.

WITNESSES

A. Andersen
C. E. Taylor

INVENTOR:
MORTON G. BUNNELL,

By *Buckley & Ward & Co.*
ATTORNEYS

UNITED STATES PATENT OFFICE.

MORTON G. BUNNELL, OF CHICAGO, ILLINOIS, ASSIGNOR TO FREDERICK C. AUSTIN, OF CHICAGO, ILLINOIS.

EXCAVATING-MACHINE.

997,542.

Specification of Letters Patent.

Patented July 11, 1911.

Application filed September 2, 1908. Serial No. 451,296.

To all whom it may concern:

Be it known that I, MORTON G. BUNNELL, a citizen of the United States of America, and resident of Chicago, Cook county, Illinois, have invented a certain new and useful Improvement in Excavating-Machines, of which the following is a specification.

In a certain well known type of excavator, the work of excavating is done by means of a bucket that can be pulled forward until it is loaded, and which can then be hoisted and operated to discharge the dirt at any given point within reach of the machine, an arrangement of this kind being ordinarily known as a drag-line bucket, for the reason that a rope or cable is used for dragging it along the ground. Machines of this character have certain advantages in connection with certain kinds of work, which are well known and understood by those skilled in the art, and which need not be here discussed.

Objects of my invention are the provision of a drag-line bucket of such character that it will automatically discharge the dirt from the rear end thereof when hoisted and brought over the place where it is desired to deposit the load; to provide a bucket which will automatically discharge the load therefrom when the hoist-line, which has only its lower end secured thereto, is given a final upward movement; and to provide certain details and features of improvement tending to increase the general efficiency of a drag-line bucket, as will hereinafter more fully appear.

To these and other useful ends, my invention consists in matters hereinafter set forth and claimed.

In the accompanying drawings:—Figure 1 is a side elevation of an excavator equipped with a drag-line bucket involving the principles of my invention. Fig. 2 is an enlarged side elevation of the bucket shown at the right in Fig. 1. Fig. 3 is a view of the said bucket in dumping position. Fig. 4 is a plan of the bucket shown in Fig. 1. Fig. 5 is a rear elevation of the bucket shown in Fig. 1.

As thus illustrated, the excavator shown comprises a suitable body or platform A mounted on trucks B of any suitable, known or approved form. At one end the machine is provided with a turn table or revolving

support C that serves as a base for the mast or upright D and the swinging boom or derrick arm E, which latter has its lower end suitably connected with the base of the upright D, and is provided at its outer end with an arm carrying a sheave e' . Another sheave e^2 is mounted at the upper end of the mast or upright D, and a hand winch e^3 is disposed in position at the base of the same. A rope or cable e^4 is secured at one end to the arm of the sheave e' , and after going once around the sheaves e' and e^2 extends downwardly to the said hand winch e^3 , whereby the boom or arm E can be raised and lowered. The hoist-line or cable F extends over the sheaves e^5 and f mounted respectively on the outer end of the arm E and the upper end of the upright D, and then extends downward where it passes below a sheave f' at the base of said upright; and from here the said hoist-line extends to the windlass or drum f^2 operated by the engine f^3 , which latter is controlled in any suitable manner. A cable G passes around the grooved periphery of the revolving support C and is operated by another drum g driven by said engine and under the control of the operator. Side braces d and a longitudinal brace d' connect the top of the mast with the body A in such manner that the said mast or upright D is free to turn with the support C, thus insuring strength without interfering with the lateral swing of the boom or derrick arm E during use of the machine for excavating. The devices so far are old and may be of any suitable or desired character.

The drag-line bucket H is, however, a matter of special improvement, and comprises sides h and a bottom h' , the latter having a lip or cutting edge h^2 and a pair of heels or runners h^3 . Said sides are provided with eyes h^4 for the drag-line connection, and with ears h^5 at the rear of the top of the bucket which is closed by a suitable top wall or cover. A pair of bars h^6 having notches h^7 in the lower edges thereof are secured to the opposite sides of the bucket and project from the rear thereof. The swinging rear end wall or door h^8 is pivoted at h^9 to the ears h^5 , and has a couple of upwardly extending and converging rigid arms h^{10} . A pair of guide rolls h^{11} for the hoist-line F are mounted between

the upper ends of said arms, and upon the back of said door the latches h^{12} are pivoted at h^{13} , said latches having their inner ends pivoted at h^{14} to the lower end of a rod h^{15} , and the outer ends being extended through slotted guide plates on the arms h^{10} and adapted to engage the notches h^7 to lock the door shut. The upper end of the rod h^{15} is pivotally connected with a trigger h^{16} that is pivoted on the arm h^{10} at h^{17} and provided with a fork h^{18} at its opposite end. The hoist-line F passes down through a shoulder h^{19} on the arm E, and between a pair of guide rolls h^{20} mounted therein; and when the fork h^{18} strikes the shoulder the door h^8 is opened. Plates h^{21} are secured to the sides of the bucket and to these are pivoted the lower ends of the bail arms h^{22} , the latter being connected together at their upper ends by the cross bars or channel irons h^{23} ; and a pair of chains h^{24} connect the supporting bail thus formed with the front of the bucket. It will be observed that the hoist-line is secured to the middle of the upper portion of said bail, and that the drag-line h^{25} is secured to the eyes h^4 . The other end of said drag-line is operated by a drum h^{26} at the engine.

In operation, the machine is positioned and the bucket allowed to descend to the ground by paying out the hoist-line F. Then the drag-line h^{25} is operated to pull the bucket forward, and in this way the same is loaded as it is dragged along the ground. When full the bucket is raised by operating the hoist-line F, and is then swung to the desired position to dump by turning the support C, in the well known manner. Further upward movement of the bucket causes the trigger h^{16} to come in contact with the shoulder h^{19} , with the result that the door is unlatched by the disengagement of the latch h^{12} from the notches h^7 ; and the upward movement then causes the bucket to rotate to the position shown in Fig. 3, thus allowing the load to dump from the open rear end thereof. When the bucket is lowered it rights itself and the door automatically closes and latches. It will be seen, therefore, that I provide a drag-line bucket excavator in which the mere act of hoisting the bucket serves automatically at the right time to dump the load from the rear end thereof. It will also be seen that the bucket is automatically tilted by the final upward movement of the hoist-line, notwithstanding that the latter has only its lower end attached to the bucket, and extends in a straight line from the end of the boom to the bail of the bucket.

For the broader purpose of my invention, the bucket does not necessarily dump from the rear, and is not necessarily provided with a door, as the feature of a straight

line single hitch or connection for the hoist-line, and also the feature of an arm that reaches up from the bucket to engage the boom, thus causing the bucket to tilt about its axis, may be embodied in other forms of bucket without departing from the spirit of my invention.

What I claim as my invention is:—

1. In an excavator, the combination of a drag-line bucket having a door at the rear end thereof, hoisting means, and means serving automatically to open said door when the bucket is hoisted into position for dumping.

2. In an excavator, a bucket having a bottom and a door at its rear end, the front of the bucket being open, means for forcibly tilting the bucket and opening said door to dump the load, when the bucket is raised, and means for operating the bucket.

3. In an excavator, a tilting bucket having its rear end provided with a door, a hoist-line and a drag-line for said bucket, and means operated by the pull of the hoist-line for automatically opening said door and tilting said bucket to dump the load from the rear end thereof.

4. In an excavator, a pivoted bucket, a door for the rear end thereof, hoisting means, and means operative to automatically open said door when the bucket is hoisted and to then rotate the bucket about its axis to bring the open rear end thereof into position to discharge the load therefrom.

5. In an excavator, a bail, a bucket pivoted on said bail, a hinged door for the rear end of said bucket, an arm rigid with said door and extending upwardly therefrom, a latch for said door, a hoist-line connected with said bail, a trigger on said arm connected with said latch, and means for engaging said trigger when the bucket is hoisted, adapted to serve as a shoulder to limit the upward movement of said arm, permitting the bucket to tilt to dumping position.

6. In an excavator, a bucket, hoisting means, and means for automatically discharging the load from the bucket, by the final upward movement thereof, comprising a pivoted part on the bucket.

7. In an excavator, the combination of a drag-line bucket having a door at the rear end thereof, hoisting means, means serving automatically to open said door when the bucket is hoisted into position for dumping, and a laterally swinging boom or derrick arm upon the outer end of which said bucket is carried.

8. In an excavator, a bucket having a bottom and a door at its rear end, the front of the bucket being open, means for forcibly tilting the bucket and opening said door to dump the load, when the bucket is raised, a laterally swinging boom or derrick arm

upon the outer end of which said bucket is carried, when it is raised for dumping, and a drag-line for operating the bucket.

9. In an excavator, a tilting bucket having its rear end provided with a door, a hoist-line and a drag-line for said bucket, means operated by the pull of the hoist-line for automatically opening said door and tilting said bucket to dump the load from the rear end thereof, and a laterally swinging boom or derrick arm upon the outer end of which said bucket and means are carried.

10. In an excavator, a bail, a bucket pivoted on said bail, a hinged door for the rear end of said bucket, an arm rigid with said door and extending upwardly therefrom, a latch for said door, a hoist-line connected with said bail, a trigger on said arm connected with said latch, means for engaging said trigger when the bucket is hoisted, adapted to serve as a shoulder to limit the upward movement of said arm, and a laterally swinging boom or derrick arm upon the outer end of which said bucket is carried.

11. In an excavator, a bucket, hoisting means, means for automatically discharging the load from said bucket by the final upward movement thereof, and a laterally swinging boom or derrick arm upon the outer end of which said bucket and means are carried, whereby the bucket may swing back and forth, and a drag-line for said bucket.

12. In an excavator, the combination of a drag-line bucket having a door at the rear end thereof, hoisting means, means serving automatically to open said door when the bucket is hoisted into position for dumping, a movable body, an engine carried on said body, and means whereby the engine operates the bucket.

13. In an excavator, a bucket having a bottom and a door at its rear end, the front of the bucket being open, means for tilting the bucket and opening said door to dump the load, a movable body, an engine carried on said body, and means whereby the engine operates the bucket.

14. In an excavator, a tilting bucket having its rear end provided with a door, a hoist-line and a drag-line for said bucket, means operated by the pull of the hoist-line for automatically opening said door and tilting said bucket to dump the load from the rear end thereof, a movable body, an engine carried on said body, and means whereby the engine operates the bucket.

15. In an excavator, a pivoted bucket, a door for the rear end thereof, hoisting means, means operative to automatically open said door when the bucket is hoisted and to then rotate the bucket about its axis

to bring the open rear end thereof into position to discharge the load therefrom, a movable body, an engine carried on said body, and means whereby the engine operates the bucket.

16. In an excavator, a bail, a bucket pivoted on said bail, a hinged door for the rear end of said bucket, an arm rigid with said door and extending upwardly therefrom, a latch for said door, a hoist-line connected with said bail, a trigger on said arm connected with said latch, means for engaging said trigger when the bucket is hoisted, adapted to serve as a shoulder to limit the upward movement of said arm, a movable body, an engine carried on said body, and means whereby the engine operates the bucket.

17. In an excavator, a bucket, hoisting means, means for automatically discharging the load from the bucket by the final upward movement thereof, a movable body, an engine carried on said body, means whereby the engine operates the bucket, to cause the same to fill, and means whereby the engine operates said hoisting means.

18. In an excavator, a bucket, a hoist-line having only a straight downward single connection to said bucket, and means for automatically tilting said bucket into dumping position when the hoist-line is given a final upward movement.

19. In an excavator, a bucket, a hoist-line therefor, an arm extending upward from the bucket, means below the upper end of said arm for giving the hoist-line a straight downward single connection to said bucket, and means for engaging said arm to allow the final pull of the hoist-line to tilt the bucket into dumping position.

20. In an excavator, a bucket, a hoist-line having only a single straight connection therewith, and means operated by the final pull of the hoist-line to discharge the load therefrom.

21. The improved drag-line bucket, the said bucket provided with a pivoted bottom which is operated by means on the end of the boom, substantially as shown and described.

22. In an excavator, a combined hoisting and tripping rope for the bucket thereof, arranged over a plurality of sheaves, adapted by upward movement to trip the latch and tilt the bucket, substantially as described.

Signed by me at Chicago, Illinois, this 22nd day of August 1908.

MORTON G. BUNNELL.

Witnesses:

C. E. TAYLOR,
ELLEN CLEGG.