

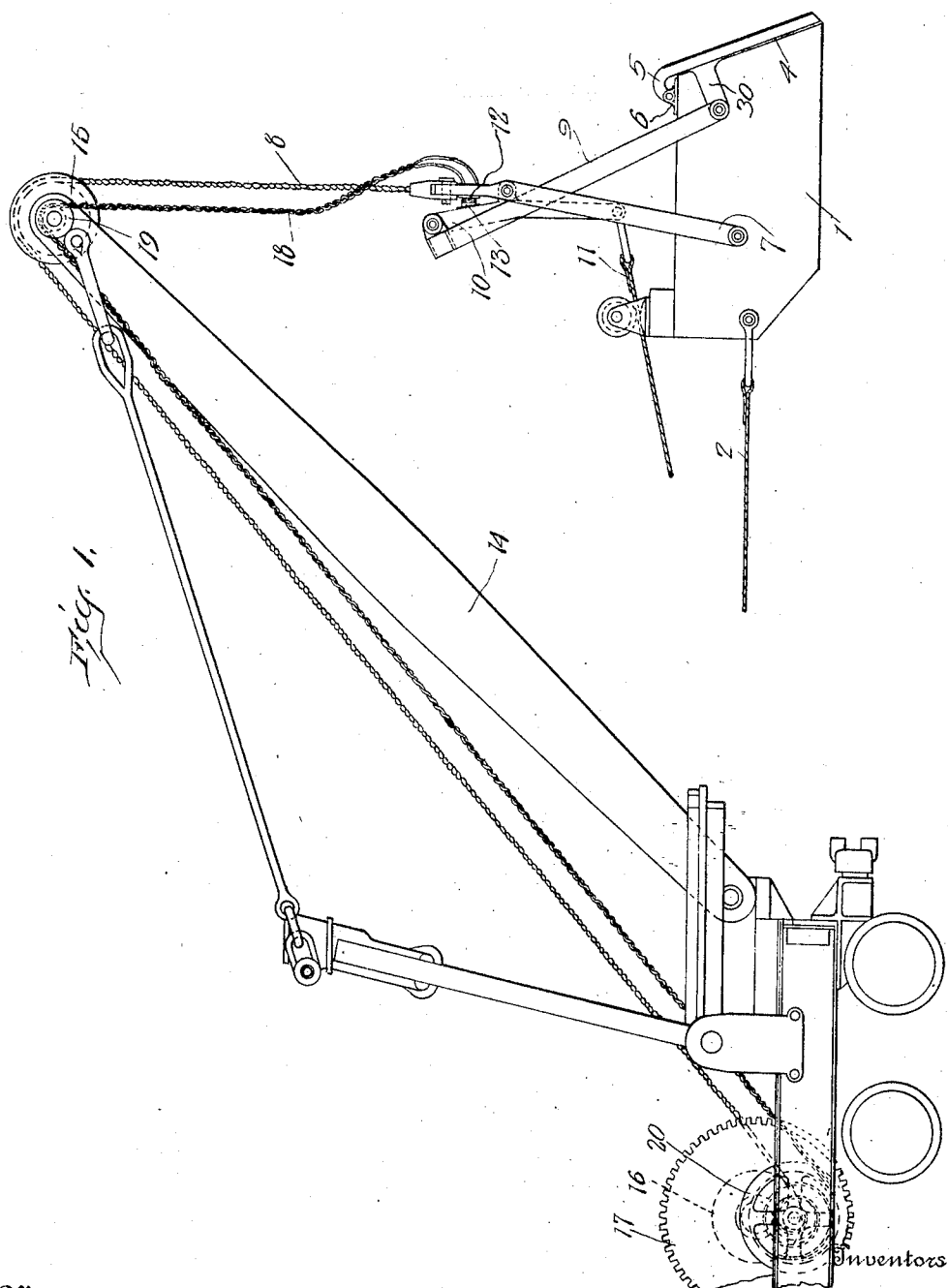
G. W. KING, C. B. KING, H. T. GRACELY & H. E. ROUSH.
EXCAVATING BUCKET.

APPLICATION FILED SEPT. 24, 1910.

Patented Jan. 21, 1913.

2 SHEETS-SHEET 1.

1,050,840.



Witnesses

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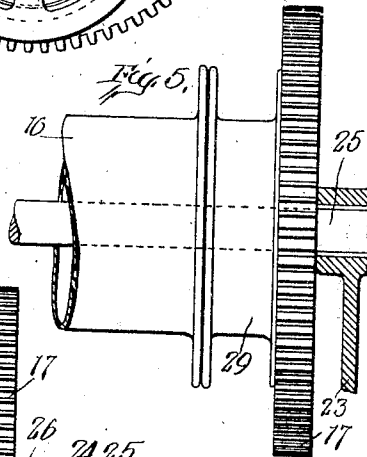
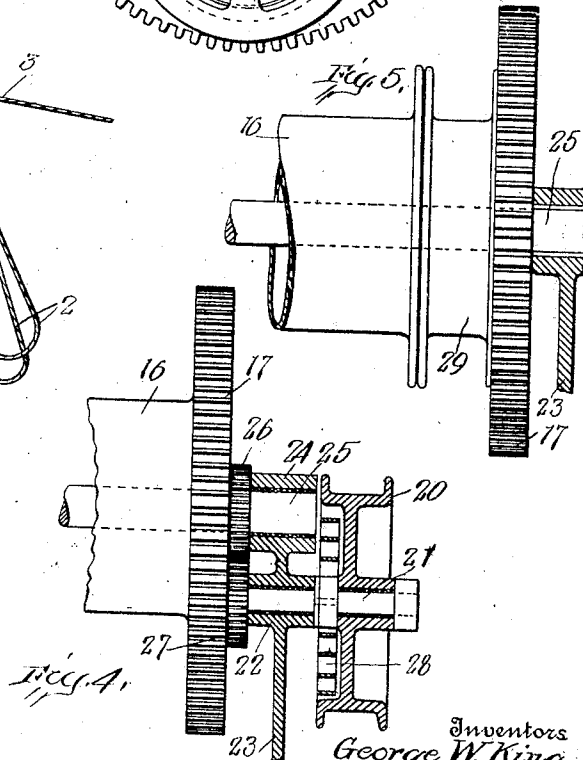
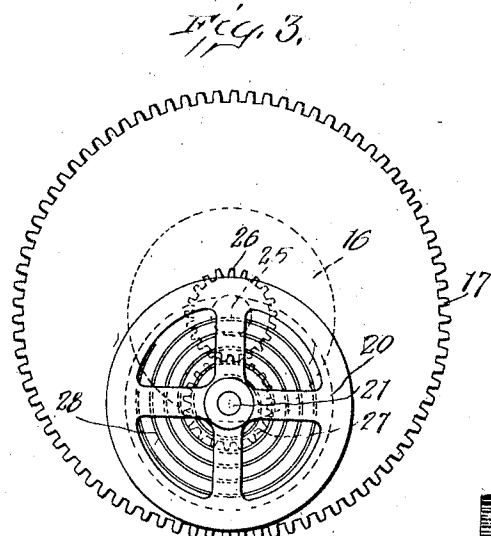
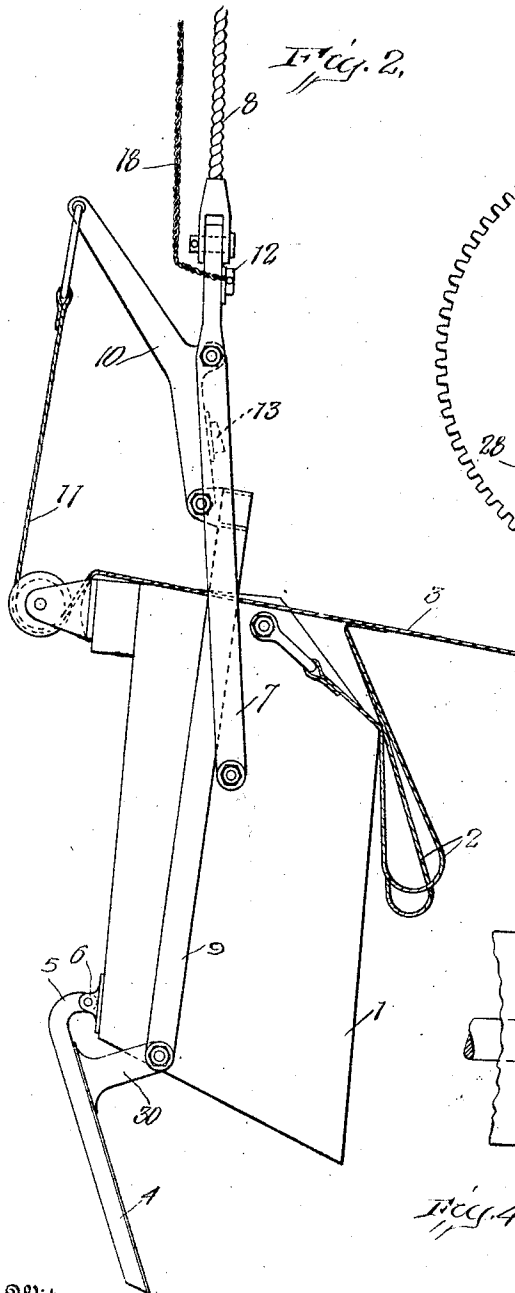
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UNITED STATES PATENT OFFICE.

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EXCAVATING-BUCKET.

1,050,840.

Specification of Letters Patent.

Patented Jan. 21, 1913.

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To all whom it may concern:

Be it known that we, GEORGE W. KING, CHARLES B. KING, HARVEY T. GRACELY, and HERBERT E. ROUSH, citizens of the United States, residing at Marion, in the county of Marion and State of Ohio, have invented certain new and useful Improvements in Excavating-Buckets, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to excavating buckets, and more particularly to that type of excavating bucket known as the drag line bucket.

The object of the invention is to provide a bucket of this character with a plurality of supporting members, having an operative connection between said supporting members and means for manipulating that connection to cause the bucket to be supported in a position to retain the material therein or to permit the bucket to assume a position which will cause the material to be discharged therefrom; and to provide an electrically controlled retaining device for retaining said supporting members normally in such relative positions as will support the bucket in a position to retain the material therein; also, to provide means for taking up and paying out the electrical conductors as the bucket is raised and lowered.

It is a further object of the invention to provide the bucket with an end closure or door which will be positively moved into its open position when the bucket moves into its dumping position and will be positively moved into its closed position when the bucket is again restored to its normal position.

In the accompanying drawings, Figure 1 is a side elevation of the forward portion of an excavating machine equipped with a bucket embodying our invention; Fig. 2 is a side elevation of the bucket showing the same in dumping position; Fig. 3 is a side elevation of the take-up device; Fig. 4 is a sectional view of the take-up device shown in Fig. 3; and Fig. 5 is an elevation of a modified form of take-up device for the electrical conductors.

In these drawings we have illustrated one embodiment of the invention and have shown the same as applied to an excavating bucket

1 having a substantially flat bottom and vertical side walls. This bucket is open at its forward end and has connected to the forward edges of its side walls hauling ropes 2 which extend forwardly therefrom and are connected with a drag line 3. The rear or discharge end of the bucket is also open but is normally closed by a closure or door 4 which is preferably provided with upwardly extending hinge lugs 5, by means of which it is pivotally connected to cooperating hinge lugs 6 secured to the side walls of the bucket near the rear ends thereof. The bucket is carried by two supporting members pivotally connected thereto in the front and rear of the center of gravity thereof, respectively. These supporting members are operatively connected one to the other and their relative positions are adapted to be so controlled as to either maintain the bucket in its normal position, *i. e.*, in a position to retain the load therein, or to permit the bucket to assume its dumping position. These supporting members are here shown as comprising two bails having their side members pivotally connected to the respective side walls of the bucket. The forward bail, 7, is here shown as connected with the bucket in front of its center of gravity and as having connected to the upper end thereof a hoisting rope 8 by means of which the bucket is raised and lowered. The other supporting member or bail, 9, is connected with the bucket in the rear of its center of gravity and is preferably somewhat longer than the forward bail 7. This rear bail 9 is also preferably of less width than the forward bail 7 and extends between the arms of said forward bail, thus causing the two supporting members to intersect at points between their ends. The connection between the bails may be of any suitable character. In the present instance it is shown as comprising a lever 10 pivotally connected at one end to the upper end of the bail 9 and pivotally connected at a point between its ends to the bail 7. The lower end of the lever extends some distance below its point of connection to the bail 7 and is connected by means of a rope 11 with the drag line. By means of this connection the lever can be manipulated by the drag line to restore the supporting members to their normal posi-

tions, and, if desired, to retain the same in those positions. We prefer, however, to provide other means for retaining the two supporting members in such relative positions that they will support the bucket in its normal position. This retaining means is preferably electrically controlled and, as here shown, it comprises an electro-magnet 12 mounted on the upper portion of the bail 7 and having its armature 13 mounted upon the lever 10 in such a position that when the supporting members are in their normal positions the armature will be in contact with the electro-magnet. So long as this magnet is energized the parts will be retained in this position. It will be noted that the direction of pull exerted by the hoisting rope 8 upon the supporting member is longitudinal to the lever 10, and, while it is not in line with the lever, it is so nearly so that the tendency of the lever to move about its pivotal connection to the supporting member is very slight. Consequently, the electro-magnet does not need to be of great power in order to retain the parts in their normal positions.

In the present instance we have shown the bucket as employed in connection with an excavating machine having a boom 14, and, in this form of the device, the hoisting rope 8 passes about a sheave 15 on the end of the boom, thence inwardly and about a hoisting drum 16 mounted on the body of the machine and driven by a gear 17. It is desirable that the electrical conductors for the electro-magnet should be paid out and taken up simultaneously with the movements of the hoisting rope and we have, therefore, provided means controlled by the movement of the hoisting rope for taking up and paying out these electrical conductors. As here shown the conductors which are indicated at 18 extend from the magnet about a guide or pulley 19 on the boom 14 and preferably mounted on the same axis with the sheave 15. Thence the conductors extend inwardly along the boom and about a drum 20, the rotation of which is controlled by the rotation of the drum 16 for the hoisting rope. The electrically controlled retaining device will probably be used to a large extent as an attachment to be applied to machines already equipped with the bucket, the use of the electrically controlled retaining device depending largely upon the availability of electric current. For this reason it is preferable that the drum 20 should be of such a character as to be attached to and detached from existing machines. We have, therefore, shown the drum 20 as mounted on a shaft 21 which is journaled in a bearing 22 on a bearing bracket 23 carrying the bearing 24 for the shaft 25 of the hoisting drum 16. A gear 26 secured to the gear 17 meshes with a second gear 27 on the shaft 21, there-

by causing the drum 20 to rotate in unison with the drum 16 and controlling the taking up and paying out of the electrical conductors in unison with the movement of the hoisting cable. The drum 20 is preferably loosely mounted on the shaft 21 and resiliently connected thereto to permit the same to give should the electrical conductors become fouled or for any reason they should be prevented from moving with the hoisting drum. This resilient connection is here shown as a spring 28 connected at one end to the drum 20 and at its other end to the shaft 21. This spring is sufficiently stiff to cause the drum to rotate normally in unison with the hoisting drum, but should any resistance be offered to the movement of the drum, as by the electrical conductors becoming fouled, the spring will permit the hoisting drum to move independently of the drum 20, thereby preventing the breaking of the conductors and giving time either to clear the same or to stop the machinery.

It will be obvious that the means for taking up and paying out the electrical cable may be of any suitable character and may be arranged at any suitable point on the machine and controlled in any suitable manner, and, in Fig. 5 we have shown one other arrangement of the drum for the conductors. In this form the drum is mounted on the shaft 25 of the hoisting drum 16, as indicated at 29, and rotates in unison therewith.

The door or closure 4 on the rear end of the bucket may be controlled in any suitable manner, but, in the present instance, this door is positively controlled, this being preferably accomplished by connecting the same directly with the supporting member 9. In the form here shown the door 4 has at its opposite sides forwardly extending arms 30 which are pivotally connected to the lower ends of the rear bail or supporting member and form the connection between the bail and the bucket. When the bails or supporting members are moved into their normal positions the door 4 will be positively moved into its closed position, as indicated in Fig. 1, and, when the supporting members alter their positions to permit the bucket to dump, the movement of the bail or supporting member 9 positively moves the door 4 into its open position, thereby permitting the material to be discharged from the rear end of the bucket.

While we have herein shown and described one form of our invention it will be understood that this form is chosen for the purpose of illustration only and that the construction and arrangement of the several parts of the device can be materially altered without departing from the spirit of the invention. We, therefore, wish it to be further understood that we do not desire

to be limited to the details of construction shown and described, for obvious modifications will occur to a person skilled in the art.

5 Having thus fully described our invention, what we claim as new and desire to secure by Letters Patent, is:—

1. The combination, with an excavating bucket, and a hoisting rope therefor, of two supporting members interposed between said bucket and said hoisting rope, positively actuated means connected with said supporting members to control the relative positions of said members, and an electrically controlled device for holding said supporting members against movement relatively one to the other in either direction.

2. The combination, with a bucket, and means for filling the same, of two supporting members pivotally connected with said bucket, a lever connecting said supporting members one to the other, and electrically controlled means for retaining said lever in a predetermined position.

3. The combination, with a bucket, and means for filling the same, of two supporting members pivotally connected with said bucket, a lever connecting said supporting members one to the other, and an electro-magnet mounted on one of said supporting members and having its armature mounted on said lever.

4. The combination, with a bucket, and a drag line therefor, of two bails pivotally connected with said bucket, a lever connecting said bails one to the other, a connection between said lever and said drag line, whereby, said lever may be manipulated by means of said drag line, and an electro-magnet carried by one of said bails and having its armature mounted on said lever.

5. The combination, with a bucket, and a drag line therefor, of two intersecting bails pivotally connected with said bucket, a lever connecting said bails one to the other, a connection between said lever and said drag line, whereby, said lever may be manipulated by means of said drag line, and an electro-magnet carried by one of said bails and having its armature mounted on said lever.

6. The combination, with a bucket, and means for filling the same, of two supporting members connected to said bucket and operatively connected one to the other, a hoisting rope connected with one of said members, an electrically controlled device for retaining said supporting members in predetermined positions, electrical conductors for said electrically controlled device, and a take-up device for said electrical conductors controlled by the movement of said hoisting rope.

7. The combination, with an excavating bucket, and a hoisting rope therefor, of two

supporting members interposed between said bucket and said hoisting rope, positively actuated means connected with said supporting members to control the relative positions of said members, an electro-magnet carried by one of said supporting members, and an armature carried by said connecting means and coöperating with said magnet to hold said supporting members against relative movement.

8. The combination, with a supporting member, a hoisting rope connected thereto, and an excavating bucket carried by said supporting member and movable relatively thereto, of an electrically controlled device to control the position of said bucket, electrical conductors for said electrically controlled device, and a take-up device for said conductors controlled by the movement of said hoisting rope.

9. An excavating bucket having a discharge opening at its rear end, a hoisting rope, two supporting members interposed between said bucket and said hoisting rope, means to control the relative positions of said supporting members to control the position of said bucket, a movable closure for said discharge opening, and a connection between one of said supporting members and said closure to hold said closure in a closed position when said bucket is in a hoisting position and to move said closure into an open position when said bucket moves into a dumping position.

10. An excavating bucket having a discharge opening at its rear end, a hoisting rope, two intersecting supporting members interposed between said bucket and said hoisting rope, means for controlling the relative positions of said supporting members to control the position of said bucket, a closure hinged at its upper end to the rear end of said bucket, one of said supporting members being pivoted directly to said bucket and the other being pivotally connected to said closure.

11. The combination, with an excavating bucket having its rear end open, and a drag line connected to the forward end of said bucket, of two supporting members pivotally connected to said bucket, a hoisting rope connected to one of said supporting members, a lever connecting said supporting members one to the other, means for manipulating said lever to control the relative positions of said supporting members, a movable closure for the open rear end of said bucket, and an operative connection between said closure and one of said supporting members.

12. The combination, with an excavating bucket having its rear end open, and a drag line connected with the front end of said bucket, of two bails pivotally connected with said bucket, a hoisting rope connected

with one of said bails, a lever connecting said bails one to the other, an operative connection between said lever and said drag line, a closure for the open end of said bucket pivotally connected thereto, and an operative connection between said closure and one of said bails.

13. The combination, with an excavating bucket, having its rear end open, a closure pivotally connected to said bucket and adapted to close the open rear end thereof, and a drag line connected with the front end of said bucket, of bails for said bucket, one of said bails being pivotally connected with said bucket, a hoisting rope connected with said bail, forwardly extending arms rigidly secured to said closure and pivotally connected with the second of said bails, a lever connecting said bails one to the

other, and a rope connecting said lever with said drag line.

14. The combination, with a bucket, and means for filling the same, of a supporting member for said bucket, a hoisting rope connected with said bucket, a lever connection between said hoisting rope and said supporting member, and electrically controlled means for retaining said lever in a predetermined position.

In testimony whereof, we affix our signatures in presence of two witnesses.

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CHARLES B. KING.
HARVEY T. GRACELY.
HERBERT E. ROUSH.

Witnesses:

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J. H. KUTSCHER.