

Nov. 10, 1925.

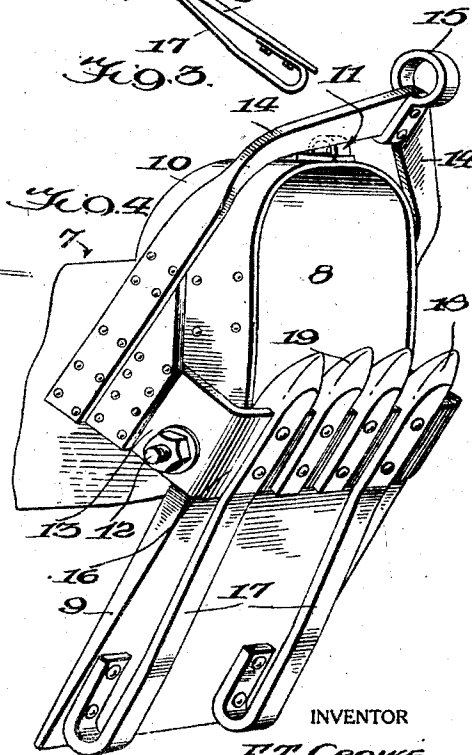
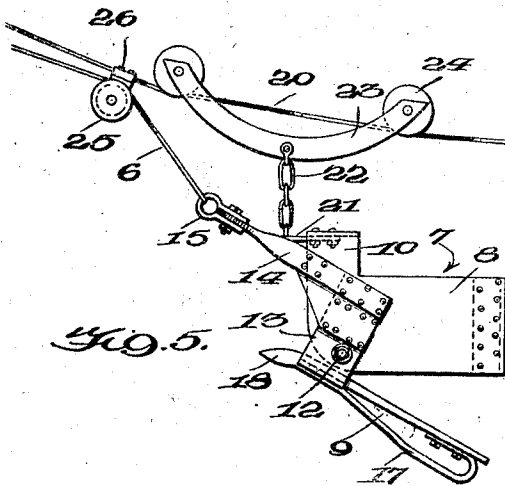
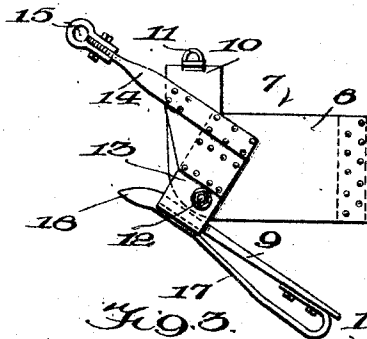
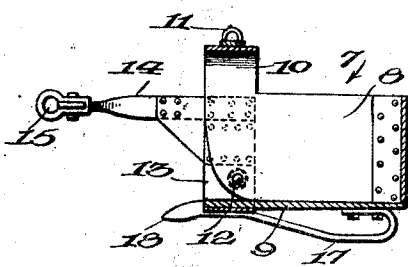
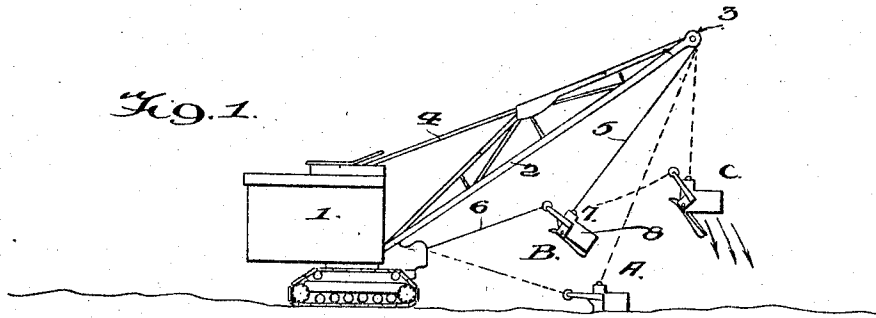
1,560,895

F. T. CROWE

EXCAVATING BUCKET

Filed March 9, 1925

2 Sheets-Sheet 1



WITNESSES
Joseph C. Myers
J. P. Schwart

INVENTOR
F. T. CROWE
BY *Munn & Co.*
ATTORNEYS

Nov. 10, 1925.

1,560,895

F. T. CROWE

EXCAVATING BUCKET

Filed March 9, 1925

2 Sheets-Sheet 2

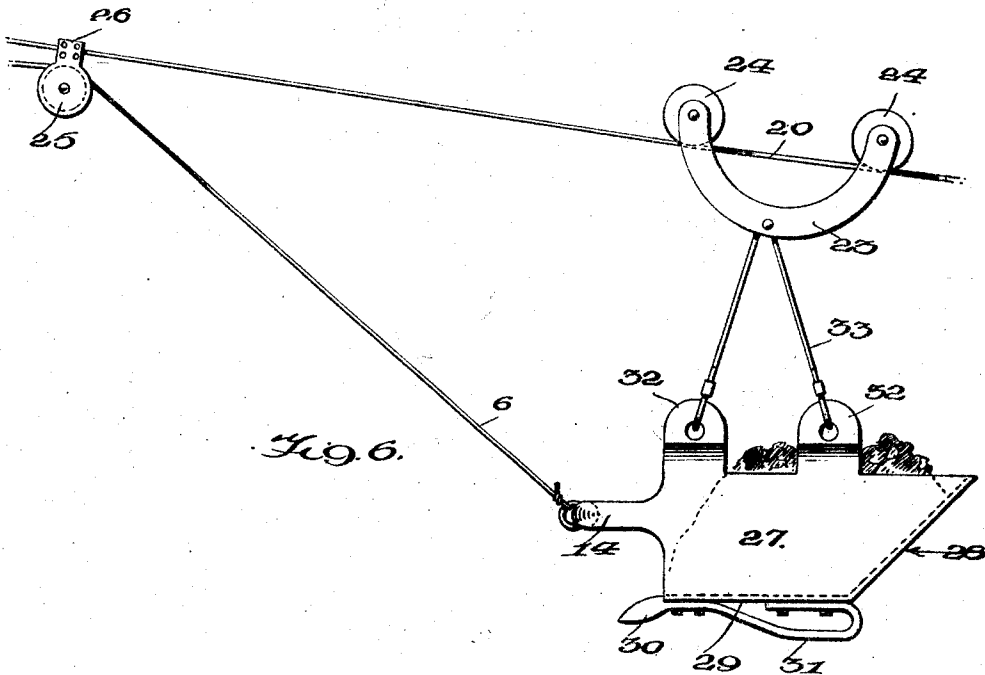


Fig. 6.

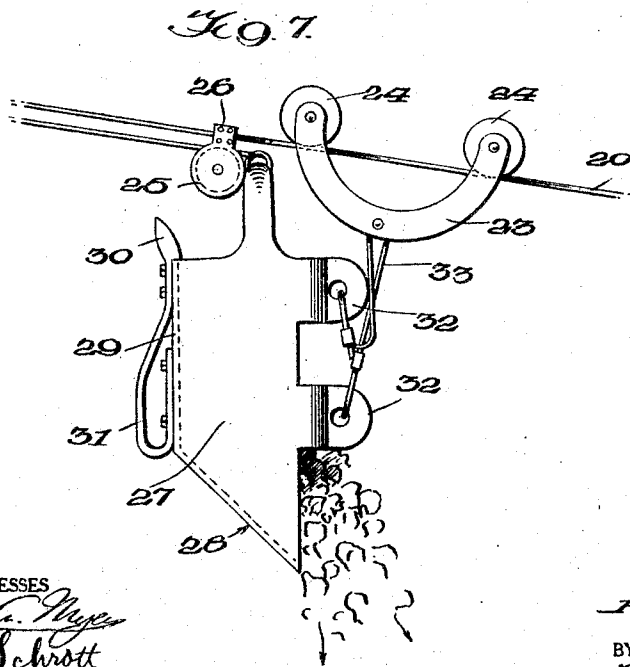


Fig. 7.

WITNESSES
George C. Meyer
J. D. Schrott

INVENTOR
F. T. CROWE
BY *Munn Co.*
ATTORNEYS

UNITED STATES PATENT OFFICE.

FRANCIS TRENHOLM CROWE, OF DENVER, COLORADO.

EXCAVATING BUCKET.

Application filed March 9, 1925. Serial No. 14,174.

To all whom it may concern:

Be it known that I, FRANCIS T. CROWE, a citizen of the United States, and resident of Denver, in the county of Denver and State of Colorado, have invented certain new and useful Improvements in Excavating Buckets, of which the following is a specification.

This invention relates to improvements in excavating apparatus, and it consists of the constructions, combinations and arrangements herein described and claimed.

An object of the invention is to provide a bucket capable of use either with a standard excavating machine or a so-called "slack line" cableway, the pivoted bottom of which is held closed by virtue of the novel application of the pulling and hoisting lines.

Another object of the invention is to provide an excavating bucket in which the pivoted bottom is held closed solely by the method of suspension of the body and the manner of application of the pulling line, thereby eliminating the need of a locking device of any description to hold the bottom in a closed position.

Another object of the invention is to provide a dump block for use in connection with slack line cableways, said dump block being adjustable anywhere along the cableway and functioning in such a manner in connection with the pull line that dumping of the bucket can be accomplished anywhere along the cableway.

Other objects and advantages appear in the following specification, reference being had to the accompanying drawings, in which

Figure 1 is a side elevation of a standard excavating machine, diagrammatically illustrating the various loading, conveying and dumping positions of the bucket.

Figure 2 is a longitudinal section of the excavating bucket,

Figure 3 is a side elevation showing the bottom in the dumping position.

Figure 4 is a perspective view of the front portion of the bucket, particularly illustrating the reinforced structure of the bottom.

Figure 5 is a side elevation illustrating the adaptation of the excavating bucket to a slack line cableway.

Figure 6 is a side elevation illustrating the use of the improved dumping block

upon a cableway in connection with an excavating bucket having a sloping back.

Figure 7 is a side elevation illustrating the bucket of Figure 6 in dumping position.

In Figure 1 the excavating machine 1 may be regarded as of any standard type. This machine has a pivoted boom 2 with a pulley or pulleys 3 at the outer extremity over which various cables run in a manner quite commonly known. Of these cables, 4 may be regarded as those for actuating the boom 2, 5 the hoisting cable or line, and 6 the pulling or loading line. The various cables are actuated by suitable machinery under the control of an operator. It is only the lines 5 and 6 with which the first form of the invention is concerned. The excavating bucket 7 is composed of a body 8 which would resemble a U if cut horizontally, in that it consists only of the sides and back. The rest of the body is open, so far as the body structure is concerned, but a bottom 9 provides the necessary closure for retaining material to be handled.

A yoke 10 provides the place of attachment of the hoisting line 5. This place may be composed of an eye 11 or any other suitable coupling device. The bottom 9 is pivoted at 12 to the sides of the body 8. It is important to note that a perpendicular line drawn through the eye 11 will pass to the front of the pivots 12.

The bottom 9 has arms 13 which extend up at the sides 8 substantially at right angles to the bottom 9, terminating in a bail 14 which carries an eye 15 at the extremity for the purpose of attachment to the pulling or loading line 6. The bail 14 is substantially at right angles to the arms 13, and is substantially parallel to the bottom 9. A forward pull on the bail 14 will rock the bottom 9 upon its pivots 12 so that it closes against the body 8 of the bucket. The pull upon the yoke 10, due to the suspension of the bucket at the eye 11 at a point to the front of the pivots 12 has the effect of rocking the body 8 downwardly toward the bottom 9. The two effects have the combined result of tightly closing the bottom against the body.

This result is brought into evidence when the bucket 7 is suspended in midair. At such time the weight of the presumably loaded bucket exhibits a pull upon the yoke as already mentioned. It is necessary that

a slight tension be maintained in the loading line 6 so that a forward pull upon the bail 14 may be exhibited. As soon as tension on the loading line 6 is released, the

5 load in the bucket 7 causes the bottom 9 to swing by gravity so that a discharge occurs. The structure of the bottom 9 may be subject to some variations. According to Figure 4 the side arms 13 are part of a

10 plate 16 which extends across the bottom, suitably reinforcing the leading edge. The bottom is reinforced by stout ribs 17 which act as runners when the scraping or loading function of the bucket occurs. These

15 reinforcing ribs terminate in prongs or spikes 18 and the space intermediate of the ribs may be occupied by one or more similar spikes 19. The ribs 17 are bent in an appropriate manner to space them farther

20 from the surface of the bottom 9 at the rear or trailing edge than at the front or leading edge.

Figure 5 illustrates such modification of the excavating bucket as adapts it to the requirements of slack line cableway 20. All parts of the bucket similar to the structure already described are identified by similar reference numerals without further description.

30 The yoke 10 has a forward extension 21 to which the suspending chain 22 is applied. This chain is the equivalent of the hoisting line 5. The purpose of the forward extension 21 is to place the point of suspension of the bucket 7 decidedly to the front of the pivots 12. A perpendicular line drawn through the suspension chain 22 will fall farther to the front of the pivots 12 than does the line mentioned in respect

35 to the eye 11 and pivots 12 in the preceding form of the invention.

A carriage 23 has sheaves 24 which run upon the cable 20. The cable is so arranged that it has a slope of about 14° from the horizontal when tight. The pulling or loading line 6 is attached to the eye 15 as before, but in this instance passes over a dump block 25 which is capable of being clamped upon the cable 20 as at 26 at any

40 point where dumping is to take place.

Figures 6 and 7 illustrate the application of the improved dumping device to a cableway in connection with a bucket 27 of a different type. Here the back 28 of the bucket is sloping. The bottom 29 is permanently closed, but it has digging prongs or teeth 30 and reinforcing ribs 31. The bucket has extensions 32 which are regarded as the equivalent of a yoke in that it is to these that the suspending lines 33 are secured. The pulling or loading line 6 is attached to a bail 14 somewhat as already pointed out. The suspending lines are attached to the carriage 23 which runs upon the cableway 20 by means of sheaves

24. The dump block 25 can be clamped at 26 in any desired position or place along the cableway 20.

The operation is readily understood. Consider the first form of the invention in Figure 1. Three positions A, B and C are shown. The first is the loading position, the next the conveying position and the last the dumping or discharging position.

By sufficiently loosening the hoisting line 5, and properly manipulating the boom 2, the operator is able to cast the excavating bucket 7 in a desired position upon the ground or place to be excavated so that it assumes the position A. The pulling or loading line 6 is now drawn upon so that the prongs or teeth 8 and the plate 16 (Fig. 4) cut into the material and load the bucket. The hoisting line 5 is now operated in order to elevate the bucket into the position B. Tension must be maintained in the loading line 6. It is easy to see in Figure 1 that the diverging lines of force along the lines 5 and 6 must have a powerful clamping effect upon both the body 8 of the bucket and upon the bottom 9. These lines of force extend in different directions in respect to the pivots 12. The effect is increased by virtue of the fact that the pull of the hoisting line 5 occurs at a place in front of the pivots 12. The ultimate result is that the bottom 9 is held in a closed position during the act of conveyance without the aid of any kind of locking device.

Upon reaching the place where the discharge is to be made, the operator simply releases the pulling line 6. The bucket now assumes the position B. The weight of the material in the bucket causes the bottom 9 to swing open by gravity. After having discharged the material upon the dump ground the bucket is swung back and the foregoing operations are repeated. Due to the fact that the bail 14 is made rigid in relationship to the leading plate 16 and the prongs or teeth 19 the bucket is exceptionally well adapted for loading.

Due to the relative position of the points 11, 12 and 15, a slight tension at the point 15 holds the bottom 9 firmly against the sides of the bucket 7 so that no material can be dumped when the hoisting pull of the line 5 is applied at the point 11. This has already been fully brought out. The point 11 is so located with reference to the pivotal point 12 that if the bottom 9 sticks in soft clay material when being hoisted, the sides of the bucket are pressed and held firmly against the bottom, again allowing no discharge of the material. This feature has also been fully brought out.

The so-called slack line cableway in Figure 5 is used in connection with standard excavating, hoisting and conveying machines.

The bucket 7 is suspended from a carriage 23 which runs upon the cableway. The bucket has a pulling or loading line 6 as before. There is no hoisting line, but the chain 22 may probably be regarded as its equivalent. The bucket 7 is lowered to the ground by slackening the cableway 20, thereby to relieve tension at the point 21. The bucket is then loaded by pulling upon the loading line 6.

When the bucket is loaded it is raised from the ground by tightening the cableway 20, the tension then being held in the loading line 6. As soon as the bucket clears the ground it is hauled up the cableway to the dumping ground. At this point the cableway carries a so-called dump block 25. This dump block consists of nothing more than a sheave 25 which is fastened in place at 26 upon the cableway. Obviously the dump block is capable of adjustment to any position along the cableway.

As soon as the eye or point 15 (Fig. 5) reaches the dump block 25, it being remembered that the loading line 6 is being pulled, the relative loads at 15 and 21 change in respect to the pivotal point 12 so that the bottom 9 is caused to rock upon the pivot and permit the load to dump. Mention has been made of the point of attachment of the chain 22 being placed farther to the front of the pivotal point 12 than is the eye 11 in respect to the point 12, for example in Figure 2. This slight advance of the suspension point in Figure 5 is necessary to insure against premature dumping. The tension at the eye 15, when the bucket is suspended, is only such as is created by the tendency of the carriage 23 to slide down the cableway.

It is to be borne in mind that the principles of the invention are not confined to any particular kind of excavating bucket. The buckets in Figures 4 and 5 are of somewhat different types, and the bucket in Figures 6 and 7 is of still another type. The dump block 25 (Figs. 6 and 7) is located wherever desired upon the cableway 20. The pulling or loading line 6 draws the bucket 27 to the place of discharge, and as the dump block is approached the bucket is caused to tilt substantially as shown in Figure 7 so that the contents are discharged at the sloping back 28.

While the construction and arrangement of the improved excavating bucket is that of a generally preferred form, obviously modifications and changes may be made without

departing from the spirit of the invention or the scope of the appended claims.

I claim:—

1. Apparatus of the character described comprising a cableway, a bucket which is capable of traveling along the cableway, means by which the bucket is suspended, and other means to which the suspension of the bucket is transferable to cause tilting of the bucket.

2. Apparatus of the character described comprising a cableway, a bucket, a carriage traversing the cableway from which the bucket is suspended, a loading line, and means carried by the cableway over which the loading line passes, being capable of changing the suspension of the bucket from the carriage to the loading line, when said means is approached thereby causing tilting of the bucket and the discharge of the contents.

3. Apparatus of the character described comprising a cableway, a bucket, a carriage traversing the cableway from which the bucket is suspended, a dump block, attached to the cableway, and means for changing the suspension of the bucket from the carriage to the dump block thereby causing tilting of the bucket for the discharge of its contents.

4. Apparatus of the character described comprising a cableway, a carriage traversing the cableway, a bucket suspended from the carriage, a pull line by which the bucket and carriage are drawn, and a dump block fixed in any desired location upon the cable through which the pull line is threaded causing tilting of the bucket upon its suspension as the carriage approaches said dump block.

5. The combination of a cableway, a bucket, a carriage traversing the cableway from which the bucket is suspended, guide means variably fixed upon the cableway, and a loading line attached to the bucket passing through said guide means advancing the carriage toward the guide means and pulling on the bucket until the bucket suspension is transferred to the loading line at said means.

6. The combination of a cableway, a bucket suspended therefrom, an attached loading line which causes traveling of the bucket along the cableway, and means on the cableway at which the suspension of the bucket is transferred to the loading line and the bucket is shifted in position.

FRANCIS TRENHOLM CROWE.