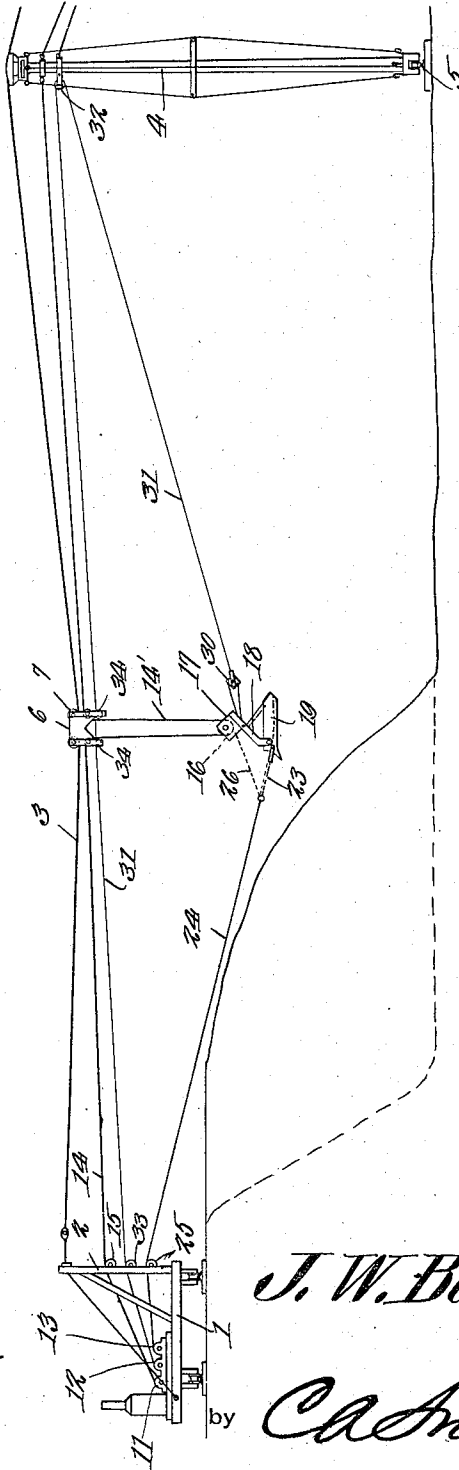


1,217,552.

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EXCAVATING APPARATUS.
APPLICATION FILED MAY 13, 1916.

Patented Feb. 27, 1917.
3 SHEETS—SHEET 1.

Fig. 1.



Witnesses

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3 SHEETS—SHEET 3.

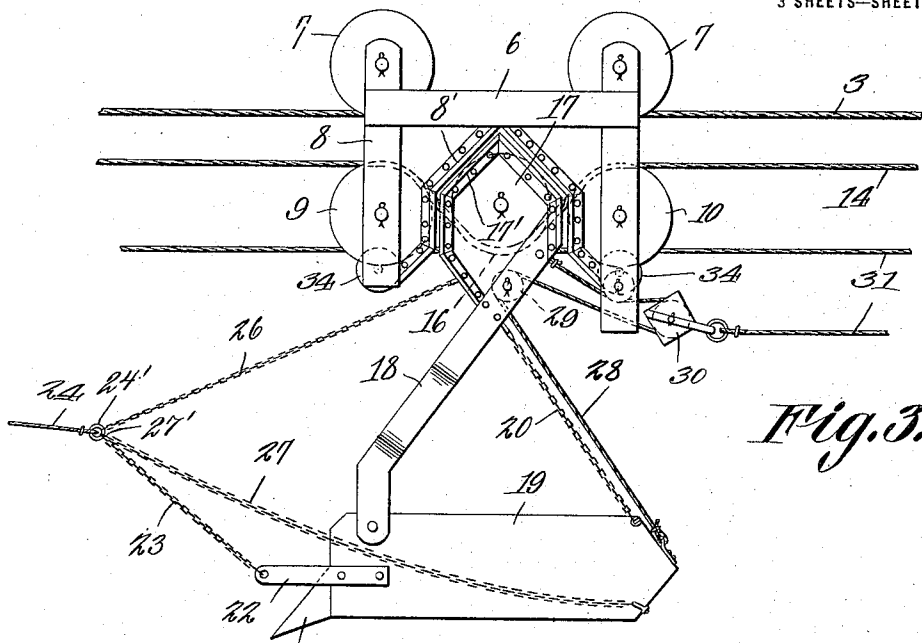


Fig. 3.

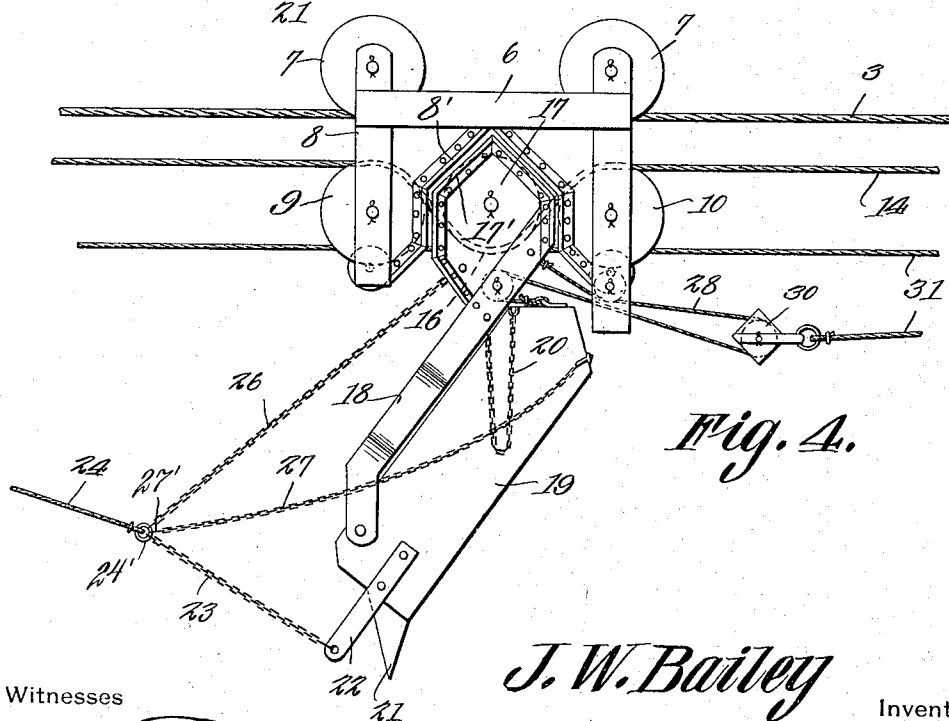


Fig. 4.

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UNITED STATES PATENT OFFICE.

JOSEPH W. BAILEY, OF AUGUSTA, GEORGIA.

EXCAVATING APPARATUS.

1,217,552.

Specification of Letters Patent. Patented Feb. 27, 1917.

Application filed May 13, 1916. Serial No. 97,351.

To all whom it may concern:

Be it known that I, JOSEPH W. BAILEY, a citizen of the United States, residing at Augusta, in the county of Richmond and State of Georgia, have invented a new and useful Excavating Apparatus, of which the following is a specification.

This invention relates to excavating apparatus, one of its objects being to provide apparatus of this character utilizing a bucket mounted for travel along a track line and which bucket is under the control of a set of cables arranged in a novel manner and by means of which the bucket can be caused to engage the ground at a predetermined point and cut forwardly thereinto so as to dig up a portion of the soil, after which the bucket can be used for conveying the engaged soil to a point where it is to be dumped, the dumping operation being effected by the manipulation of certain of the controlling cables.

A further object is to provide apparatus of this type especially suited to deep excavations where it is necessary to go to a considerable depth for the load and to hoist the load quickly to the point of delivery.

A further object is to provide excavating apparatus in which the bucket can be dumped at the will of the operator while going at full speed backwardly or forwardly or which can be operated to dump the load after the bucket has been brought to a stand, it being unnecessary in any event to use any kind of a stop or buffer in order to effect the dumping.

Another object is to provide a carriage which constantly remains in position on its track line and is not to be lowered with the bucket during the loading operation, this resulting in a considerable saving of wear and the conservation of power.

A still further object is to provide a carriage and a bucket supporting block so shaped as to fit snugly one within the other when the bucket is in its raised position, thus to provide a rigid structure movable along the track line.

A further object is to provide means whereby the bucket can be made to dig at any angle desired, thus to meet the condition of the material to be dug.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in

the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, can be made within the scope of what is claimed, without departing from the spirit of the invention.

In the accompanying drawings the preferred form of the invention has been shown.

In said drawings:—

Figure 1 is a side elevation of the complete excavating apparatus.

Fig. 2 is an enlarged side elevation of the bucket in digging position, adjacent parts of the apparatus being shown.

Fig. 3 is a side elevation of the bucket in traveling position.

Fig. 4 is a side elevation of the bucket in dumping position.

Fig. 5 is an elevation of a portion of the apparatus and showing a modified construction.

Referring to the figures by characters of reference 1 designates an ordinary hoist of that type utilizing three independently operating drums. This hoist has a mast to which is connected one end of a track line 3, the other end of the track line being attached to a mast or tower 4. This tower or mast can be mounted for movement along a track 5 parallel with the path of movement of the hoist 1 or, if desired, the mast or tower 4 can be stationary while the hoist 1 is adapted to travel relative thereto.

The track line supports a carriage 6 having wheels 7 for engaging the track line and depending from the end portions of the carriage are hangers 8 in which are journaled sheaves 9 and 10 respectively. The carriage is provided in each side with a V-shaped recess 8' for the purpose hereinafter pointed out.

The three drums on the hoist 1 are designated at 11, 12 and 13 respectively, the drum 11 constituting the hoist drum and having secured to it one end of a hoist cable 14 which extends over a guide sheave 15 and has its other end fixedly connected to the mast or tower 4. This hoist cable is extended over the sheaves 9 and 10 and has a depending loop 14' between said sheaves and which loop engages and supports a sheave 16 mounted in a block 17 at the upper end of a yoke 18. This block has an angular extension 17' at the top thereof. The lower end of the yoke is pivotally con-

nected to the closed sides of a bucket 19
 close to the open front end of said bucket,
 the rear end of the bucket being closed
 and connected by one or more chains 20 or
 5 other flexible elements to the upper portion
 of the yoke 18. Thus under normal condi-
 tions the yoke 18 and chain 20 will coop-
 erate to support the bucket 19 in a substan-
 tially horizontal position, as shown in Figs.
 10 2 and 3. Extending from the bottom of the
 bucket at the open end thereof and prefer-
 ably at an angle of 25° is a digger 21 which
 can be in the form of a lip or of a series of
 teeth. Arms 22 are extended forwardly
 15 from the sides of the bucket and these arms
 are connected by chains 23 or other suitable
 flexible element to a ring 24' on a haul or
 digging cable 24 extending over a guide
 sheave 25 on the mast 2 and secured to the
 20 hauling drum 13. Another chain 26 pref-
 erably connects the haul cable ring 24' to
 the block 17 while a third chain or other
 suitable flexible element 27 may be used,
 this chain connecting the haul cable ring
 25 24' to the back portion of the bucket, as
 shown in Figs. 2, 3 and 4 and having a
 hook 27'. This chain 27 is adjustable in
 length and can be easily lengthened or
 shortened by drawing it through ring 24'
 30 and placing hook 27' in engagement with
 any of the links of the chain. Thus the
 operator by lengthening or shortening it
 can make the bucket dig at any angle de-
 sired, thus to increase or lessen the digging
 35 tendency according to the density of the
 material to be dug.

Secured to the back of the bucket 19 is
 a dump line 28 extending upwardly over
 a guide sheave 29 in the upper portion of
 40 the yoke 18, thence through a sheave block
 30 and back to the block 17 to which said
 line is fastened. The back haul line 31 is
 connected to the sheave block 30 and ex-
 tends to a guide sheave 32 on the mast or
 45 tower 4 and thence across the excavation
 to the back haul drum 12, this back haul
 line 31 being guided by a sheave 33 on the
 mast 2 and by a sheave 34 carried by the
 hangers 8 of the carriage 6. If desired
 50 and as shown in Fig. 5 the block 30 can be
 dispensed with and line 31' extended
 around sheave 29' and attached to the back
 of the bucket. The bucket while moving
 upwardly and backwardly moves at such
 55 an angle that the pull through the line 31'
 would not be sufficient to dump the bucket
 unless tension should be placed on the
 cable 24.

Assuming that the bucket is suspended
 60 close to the mast 4, the same can be lowered
 to the ground by paying out the cables 14
 and 24. By then simultaneously paying
 out the cable 31 and taking up the cable 24
 the bucket will be caused to travel toward
 65 the hoist 1 so as to dig into soil. The bucket

can be gradually elevated during this dig-
 ging operation by taking up the hoist line
 14. As soon as the bucket has been filled
 it can be elevated above the top of the ex-
 cavation by taking up the hoist line 14
 70 until extension 17' fits snugly in recess 8'.
 It can then be drawn toward the hoist 1,
 it being of course necessary to pay out the
 back haul line 31 during this operation. As
 soon as the bucket has been brought to a
 75 position where the contents thereof are to
 be dumped, the haul line 24 is brought to
 a sufficient tension to cause the back haul
 line 31 to pull, through the sheave block
 30, upon the dump line 28, thus to cause the
 80 back end of the bucket 19 to swing up-
 wardly to the position shown in Fig. 4.

Should it be desired to convey the bucket
 in the opposite direction prior to dumping
 the contents thereof, it is merely necessary
 85 to pull upon the bucket through the back
 haul line 31 and the dump line 28 and at the
 same time to restrain the bucket by holding
 back on the haul line 24. Thus the bucket
 will be conveyed toward the mast or tower
 90 4 without dumping but, as soon as it has
 reached a point where the dumping is to be
 effected, the haul line 24 is brought to suffi-
 cient tension to cause the dumping of the
 bucket, as will be obvious by means of lines
 95 31 and 28.

It will be obvious that the dumping can
 be done at any point within the span of the
 apparatus. Chain 27 may be so adjusted
 as to hold the bucket in proper position for
 100 digging up close to the hoist, thus to pro-
 duce a steep bank. By using this form of
 apparatus the hoist can be placed on top of
 the material to be moved, if so desired and
 material conveyed on an inclined track line
 105 to the mast or tower and there dumped so
 that the digging is thus done close to the
 engine, resulting in a saving on the haul
 line for the reason that only a short length
 of the line is off of the drum while the dig-
 110 ging operation is in progress and the opera-
 tor has a close and unobstructed view of
 his work.

When it is desired to handle mud or other
 material containing a large percentage of
 115 moisture, the chain 20 can be extended or
 paid out so as to allow the back of the bucket
 to normally rest lower than the front por-
 tion thereof, thus preventing spilling and
 assuring a full load when carried to the
 120 dump.

By using the sheaves 34, it becomes un-
 necessary to employ any supplemental fall
 line carriers for supporting the slack in the
 back haul line where a long span is used.
 125

Importance is attached to the particular
 arrangement of recess 8' and the angular
 extension on the block 17, it being apparent
 that when this extension 17' is seated in the
 130 recess 8' the block 17 will be held rigid with

the carriage while said carriage is traveling along the track line, as shown particularly in Figs. 3 and 4.

What is claimed is:—

1. Excavating apparatus including a track line, a carriage mounted for travel thereon, a hoist cable having a loop depending from the carriage, said hoist cable being fixedly secured at one end; a structure supported by the depending loop, a bucket pivotally connected to said structure, a haul cable connected to the bucket, a dump line connecting the back end of the bucket to said structure, a back haul line movably connected to the dump line, and separate means for taking up or paying out the hoist cable, haul cable and back haul line respectively.

2. Excavating apparatus including a track line, a carriage mounted for travel thereon, a hoist cable supported between its ends by the carriage and having a loop depending from the carriage, a structure movably supported by the depending loop, a bucket pivotally connected to said structure, flexible means connecting said structure to the bucket for normally holding the bucket in load retaining position, a dump line connected to said structure and to the back end of the bucket, a back haul line movably connected to the dump line and having a portion thereof extending along the path of travel of the carriage, means on the carriage for engaging the back haul line to support the slack therein, a haul cable connected to the bucket and its supporting structure, and separate means connected to the hoist cable, haul cable and back haul line respectively for taking up or paying out said cables and line.

3. Excavating apparatus including a track line, a hoist cable anchored at one end, a carriage movable along the track line and movably engaging the hoist cable, said hoist cable having a loop depending from the carriage, a sheave block supported by said loop, a yoke depending from and fixed relative to the sheave block, a bucket having an open end and pivotally mounted adjacent said end to the yoke, the other end of the bucket being closed, a flexible connection between the upper portion of the yoke and the closed end of the bucket, said connection and the yoke coöperating to hold the bucket normally in load retaining position, a dump line secured at one end to the upper portion of the yoke and at its other end to the closed end of the bucket, a back haul line movably connected to an intermediate portion of the dump line and a portion of said back haul line being extended along the path of the carriage, means upon the carriage for engaging the adjacent portion of the back haul line to support it, a haul cable connected to the bucket and to the sheave block connected thereto, and independently

operated drums connected to the haul cable, back haul line and hoist cable respectively for paying out or taking up said cables and line.

4. In excavating apparatus, the combination with a track line and a carriage mounted for travel therealong, said carriage having a recess extending upwardly thereinto from its bottom, the walls of the recess converging upwardly to form a centering angle, of a hoist cable having a loop depending from the carriage, a structure supported by the depending loop and having an angular extension conforming in size and contour with the recess in the carriage, a bucket carried by said structure, and a haul cable connected to the bucket, said loop, when taken up, constituting means for elevating the angular extension on the supported structure into the recess of the carriage, thus to hold said structure rigid with the carriage.

5. In excavating apparatus, a track line, a carriage mounted to travel thereon, a hoisting cable having a loop depending from the carriage, a structure supported by the depending loop, a yoke fixedly connected to and depending from said structure, a bucket pivotally connected to the yoke, said bucket being open at one end, a haul cable connected to the open end of the bucket, and a back haul line connected to the other end of the bucket.

6. In excavating apparatus, a track line, a carriage mounted to travel thereon, a hoisting cable having a loop depending from the carriage, a structure supported by the depending loop, a yoke fixedly connected to and depending from said structure, a bucket pivotally connected to the yoke, said bucket being open at one end, a haul cable connected to the open end of the bucket, a back haul line connected to the other end of the bucket, and means upon the carriage for movably engaging and supporting that portion of the back haul line adjacent the carriage.

7. In excavating apparatus, a track line, a carriage mounted to travel thereon, a hoisting cable having a loop depending from the carriage, a structure supported by the depending loop, a yoke fixedly connected to and depending from said structure, a bucket pivotally connected to the yoke, said bucket being open at one end, a haul cable connected to the open end of the bucket, a dump line connecting the other end of the bucket to said loop supported structure, and a back haul line connected to the dump line.

8. In excavating apparatus, a track line, a carriage mounted to travel thereon, a hoisting cable having a loop depending from the carriage, a structure supported by the depending loop, a yoke fixedly connected to and depending from said structure, a bucket pivotally connected to the yoke, said

bucket being open at one end, a haul cable
connected to the open end of the bucket, a
dump line connecting the other end of the
bucket to said loop supported structure, a
5 back haul line connected to the dump line,
and means upon the carriage for movably
engaging and supporting that portion of the
back haul line adjacent the carriage.

In testimony that I claim the foregoing
as my own, I have hereto affixed my signa- 10
ture in the presence of two witnesses.

JOSEPH W. BAILEY.

Witnesses:

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M. E. GOLDSBY.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."