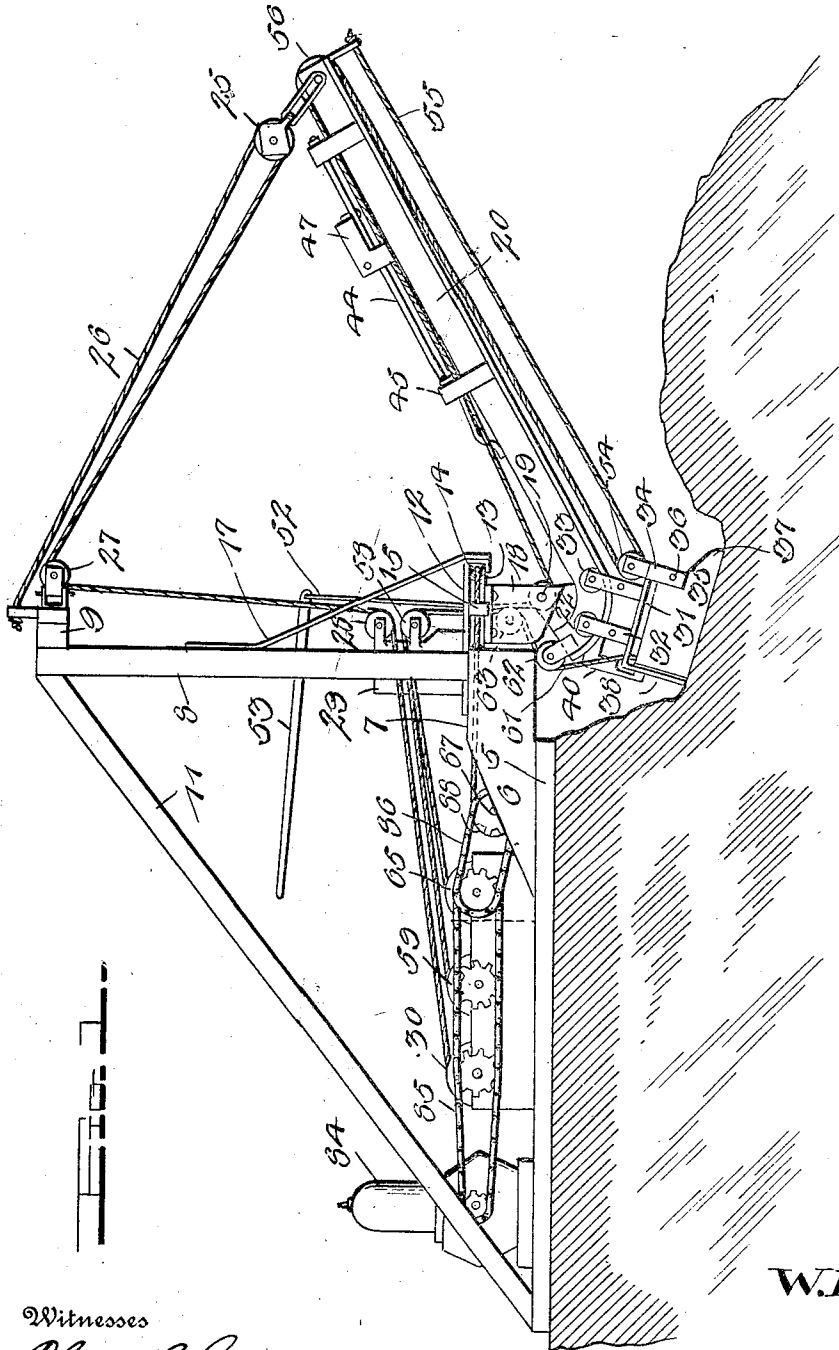


W. L. REED.
EXCAVATOR.
APPLICATION FILED JUNE 8, 1912

1,060,558.

Patented Apr. 29, 1913.

6 SHEETS—SHEET 1.



Inventor
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Witnesses

Chas. L. Griesbauer.

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By

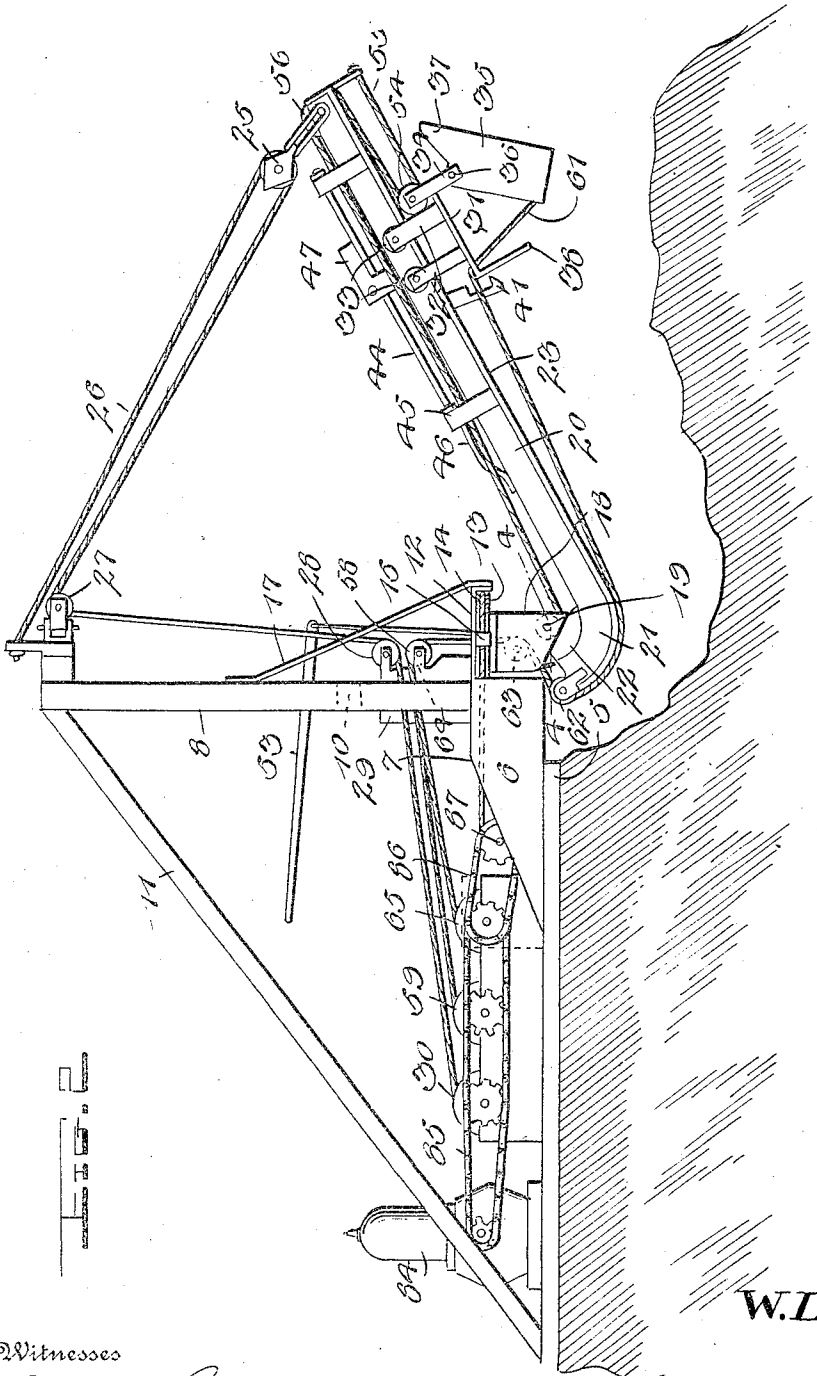
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6 SHEETS—SHEET 2.



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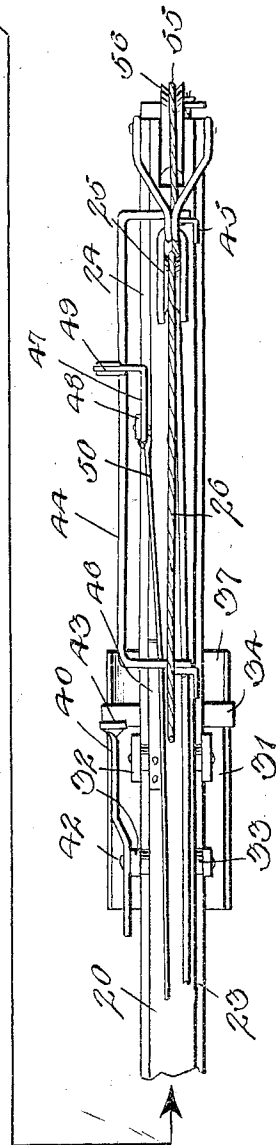
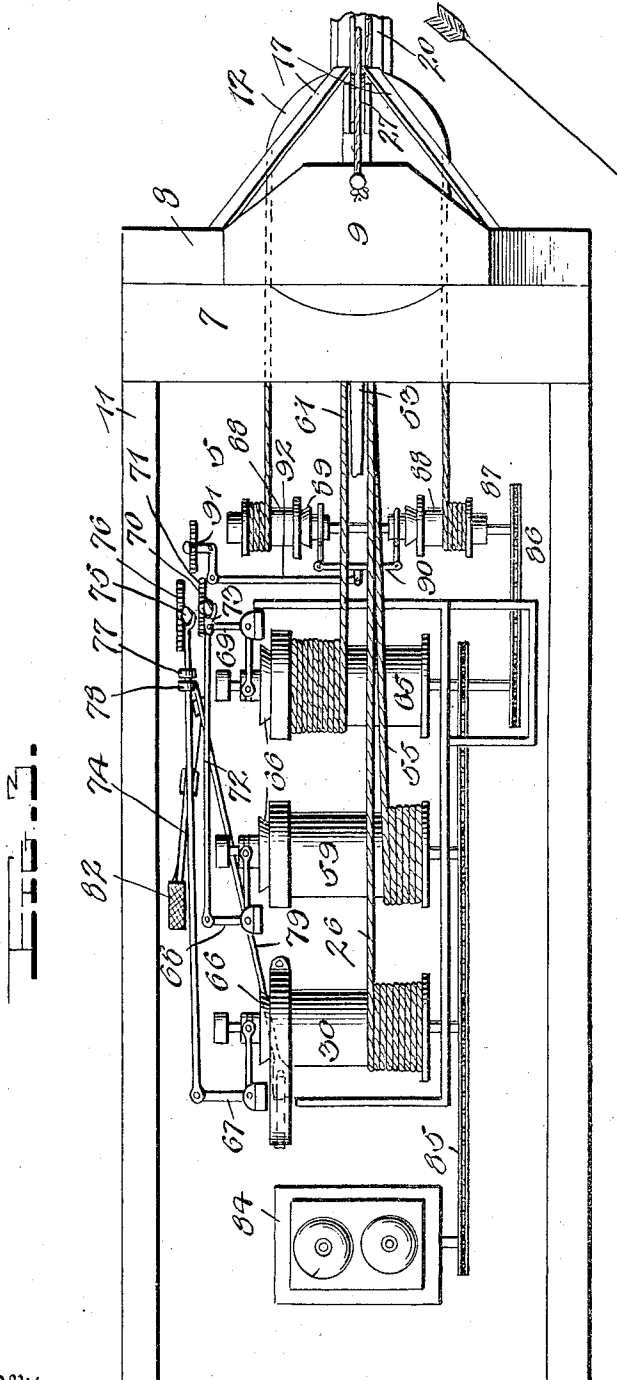
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6 SHEETS-SHEET 3.



Inven.
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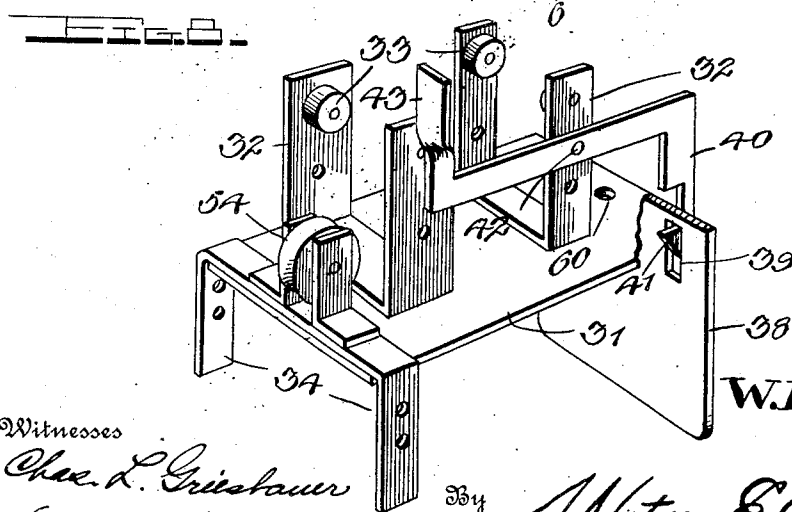
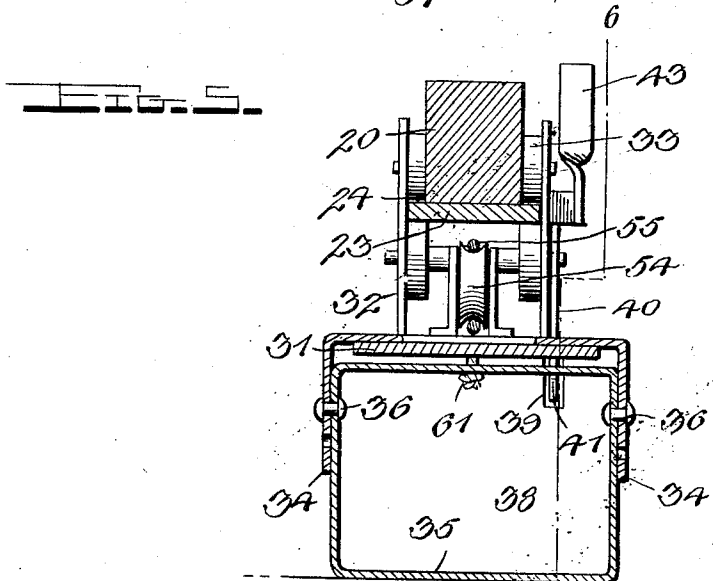
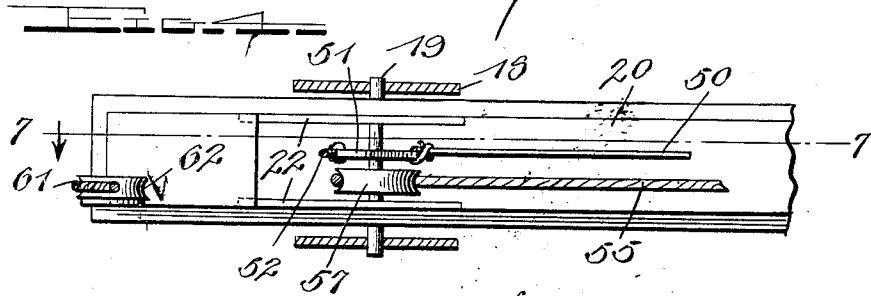
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6 SHEETS-SHEET 4.



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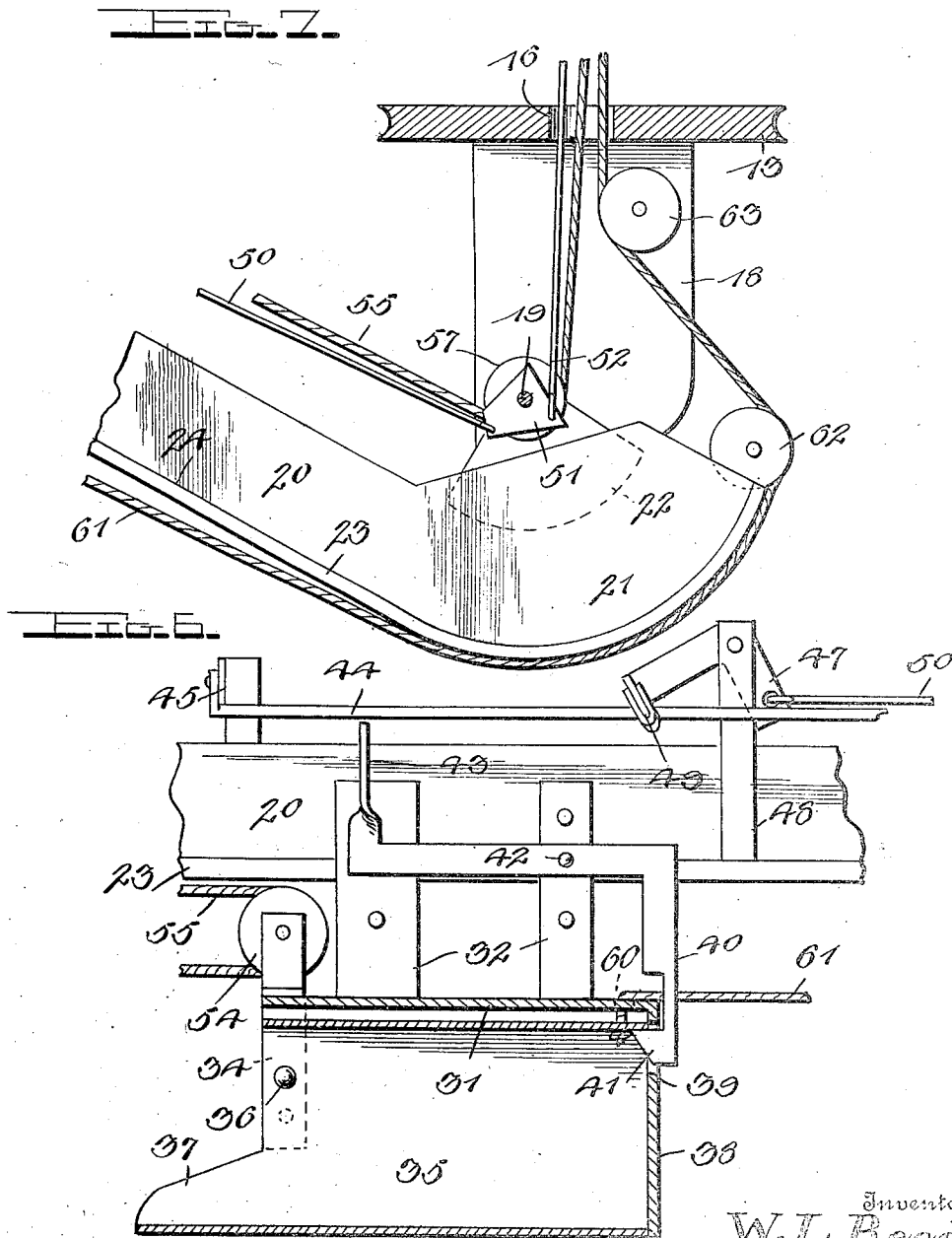
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6 SHEETS—SHEET 5.



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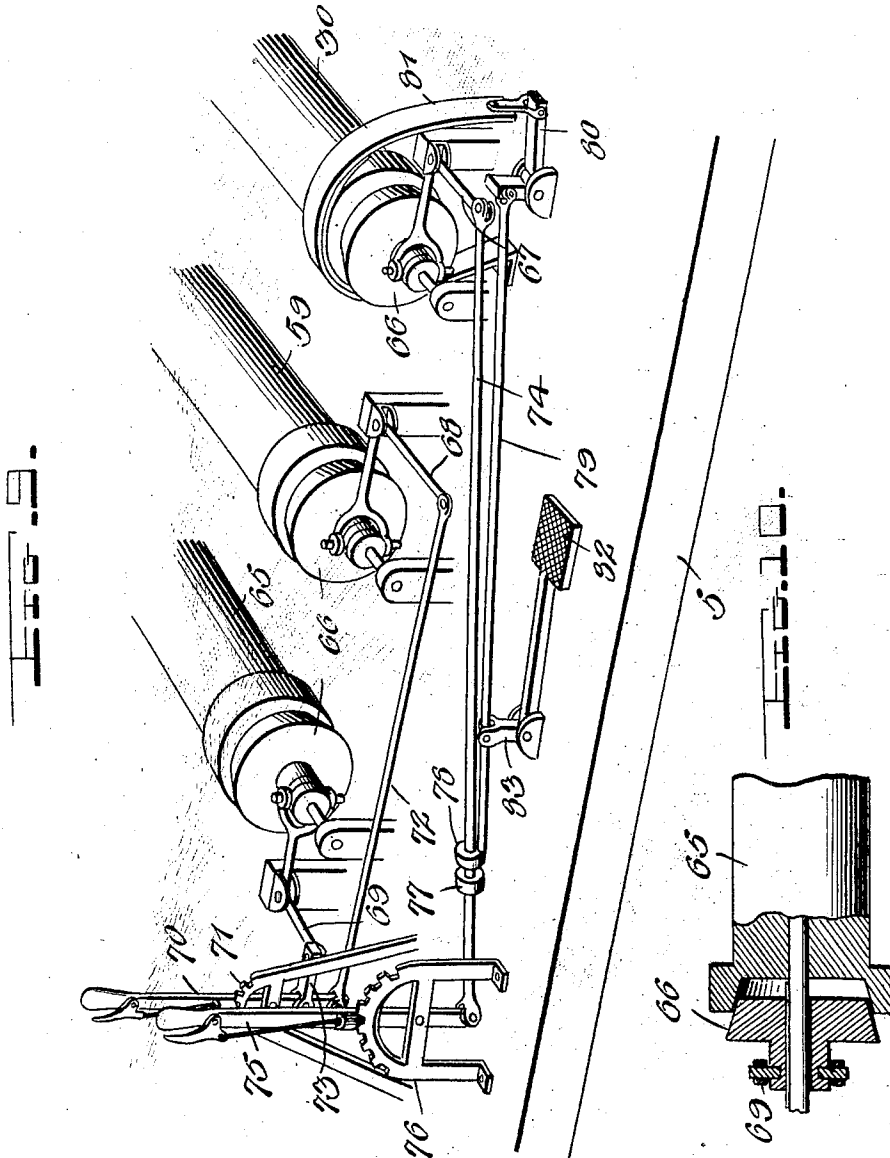
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APPLICATION FILED JUNE 8, 1912.

1,060,558.

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6 SHEETS—SHEET 6.



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UNITED STATES PATENT OFFICE.

WILLARD L. REED, OF WASHINGTON, PENNSYLVANIA.

EXCAVATOR.

1,060,558.

Specification of Letters Patent.

Patented Apr. 29, 1913.

Application filed June 8, 1912. Serial No. 702,522.

To all whom it may concern:

Be it known that I, WILLARD L. REED, a citizen of the United States, residing at Washington, in the county of Washington and State of Pennsylvania, have invented certain new and useful Improvements in Excavators, of which the following is a specification, reference being had to the accompanying drawings.

10 This invention relates to excavating machines and has for its object to provide a machine of this character which will operate efficiently upon either light or heavy materials, is strong and durable in construction and may be economically manufactured.

Another object of the invention resides in the provision of a pivotally mounted swinging boom, a bucket to travel thereon and improved means for dumping the bucket.

20 A further object of the invention is to provide operating means for the traveling bucket to move the same back and forth upon the boom, said operating means including a cable which is attached to the bucket and is adapted to move the same into closed position against a stationary end wall after the material has been dumped.

A further and more specific object of the invention is to provide a bucket carriage to travel upon the pivoted boom, said carriage including an end plate which constitutes one end of the bucket when the same is closed, a latch device mounted upon the carriage to engage the bucket and hold the same in closed position, and improved means for actuating said latch device at any point in the movement of the carriage to release the bucket and dump the material.

40 Still another object of the invention is to generally improve and simplify the construction of excavating machines of the above character whereby they will occupy comparatively small space and may be advantageously employed in excavating work without interfering with traffic.

With the above and other objects in view as will become apparent as the description proceeds, the invention consists in certain constructions, combinations and arrangements of the parts that I shall hereinafter fully describe.

For a full understanding of the invention reference is to be had to the following description and accompanying drawings, in which—

Figure 1 is a side elevation of an excavat-

ing machine embodying the present invention showing the bucket in position upon the boom to enter the embankment and receive its load. Fig. 2 is a similar view showing the bucket on the outer end of the boom and its position after the load has been dumped: Fig. 3 is a top plan view; Fig. 4 is a section taken on the line 4—4 of Fig. 2; Fig. 5 is an enlarged section of the bucket showing the same upon the boom and in its closed position; Fig. 6 is a section taken on the line 6—6 of Fig. 5; Fig. 7 is an enlarged detail section taken on the line 7—7 of Fig. 4; Fig. 8 is a detail perspective view of the carriage showing the latch member thereon; Fig. 9 is a detail perspective view of the drums and clutch operating means therefor; and Fig. 10 is a detail fragmentary section of one of the drums.

Corresponding and like parts are referred to in the following description and designated in the accompanying drawings by like reference characters.

Referring in detail to the drawings 50 designates a base upon which the supporting members 6 are mounted at one end thereof. These supporting members are connected by means of a transverse sill 7 upon which the inclined uprights 8 are erected, said uprights being connected at their upper ends by a cross bar 9 and by the intermediate strengthening bar 10. Inclined bracing beams 11 are secured to the upper ends of the uprights and to the rear end of the platform or base 5.

Upon the sill 7 a plate 12 is rigidly secured, said plate having a forwardly extending horizontal portion upon the under side of which the turn table 13 is mounted. This turn table is provided with a peripheral groove to receive a cable 14. The plate 12 is provided upon its edge with downwardly turned tongues or flanges 15 which extend beneath the turn table at its outer edge and retain the same in position. The turn table is provided with a central opening 16 which coincides with an opening in the plate 12; the purpose of which will be more fully apparent as the description proceeds. The forwardly extending portion of the plate 12 is braced by means of the bars 17, the upper ends of which are bolted or otherwise securely fixed to the uprights 8.

To the under side of the turn table 13 the depending hanger plates 18 are secured, and the lower ends of these plates are connected by means of the transversely disposed rod

19. The swinging boom 20 is provided with a rearwardly curved end 21 and to this curved end of the boom the spaced plates 22 are secured, said plates being loosely mounted upon the rod 19. The boom 20 consists of a rectangular body upon the bottom surface of which a longitudinally extending plate 23 is secured. This plate extends the entire length of the boom and is wider than the body of the boom to provide the track flanges 24, whereon the traveling bucket carriage to be later described is adapted to move. To the forward end of the boom 20 a sheave 25 is attached which is traversed by a cable 26. One end of this cable is fixed to the bar 9 of the frame structure, and the same passes around a second sheave or pulley 27 supported upon said bar. From this latter sheave the cable passes downwardly around a sheave 28 which is mounted upon a bearing plate 29 fixed to the sill bar 7. From this sheave the cable passes rearwardly and is secured to a drum 30 upon which the same is adapted to be wound and unwound to raise or lower the bucket carrying boom.

The bucket carriage which is mounted to move longitudinally on the boom embodies a body plate 31 to which spaced pairs of arms 32 are rigidly secured. These arms extend upwardly upon opposite sides of the boom and are provided with rollers 33 which are rotatably mounted upon the arms and rotate upon the track flanges 24 of the plate 23. To the forward end of the body plate 31 and at opposite sides thereof the downwardly extending bearing members 34 are secured between which the bucket 35 is mounted, the side walls of the bucket being pivotally mounted upon said bearing members at their forward ends by means of the short pins 36. The bottom wall of the bucket is forwardly extended to provide a dipper or scoop 37 which is adapted to cut into the soil as the bucket is moved upon the boom at the start of its outward movement when disposed in the position shown in Fig. 1. The body plate 31 of the bucket carriage has its rear end disposed at a right angle and downwardly extended to form the rear end wall of the bucket when the same is in its closed position, as indicated at 38. This end wall adjacent its upper end is provided with a slot 39 to receive the shouldered end 41 of a latch member 40 which is pivotally mounted as at 42 upon one of the hanger arms 32 of the bucket carriage. This shouldered end of the latch member when disposed through said slot engages beneath the rear end of the top wall of the bucket and maintains the same in its closed position. The other end of the latch member 43 is vertically disposed and is adapted to be engaged by a trip rod 44. This rod extends longitudinally upon the boom and

may be of any desired length, the ends of the rod being disposed at right angles to the intermediate portion thereof and pivotally mounted upon the bearing plates 45, which are fixed upon the boom. This trip rod is yieldingly held against downward movement into engagement with the latch member by means of a leaf spring 46 which is fixed at one end to the boom and bears at its free end against one end of said rod. The trip rod is actuated by means of a bell crank lever 47 fulcrumed upon a supporting plate 48 secured to the boom. One end of this bell crank lever is laterally extended as at 49 and disposed over the longitudinally extending trip rod. To the other end of said lever one end of a wire 50 is connected, the other end of said wire being connected to a plate 51 loosely mounted upon the boom supporting rod 19. A second wire 52 has one of its ends connected to said plate upon the opposite side of the rod 19 and extends upwardly through the central opening in the turn table 13 and is connected to one end of a lever 53 mounted upon the transverse frame bar 10.

Upon the forward end of the bucket carriage and beneath the boom, a sheave or pulley 54 is mounted in suitable bearings or supports and around the same a cable 55 extends. One end of this cable is fixed to the outer end of the boom and from the sheave or pulley 54 the same extends around a pulley 56 rotatably mounted in the outer end of the boom. From this latter pulley the cable extends rearwardly and around a pulley 57 mounted upon the rod 19. The same is then passed upwardly through the opening in the turn table and over a pulley 58 mounted upon the bearing plate 29. The other end of said cable is secured to a second drum 59 and is adapted to be wound thereon.

The body plate of the bucket carriage is provided with an opening 60 through which the end of a cable 61 is passed and attached in any preferred manner to the rear end of the pivotally mounted bucket. This cable extends rearwardly beneath the boom and passes around a sheave or pulley 62 mounted upon the rear curved end thereof. From this pulley the cable extends around a second pulley 63 mounted between the hanger plates 18 and then upwardly through the opening in the turn table and over another pulley 64 which is mounted upon the bearing plate 29. From this latter pulley the cable extends rearwardly and has its ends secured to a third drum 65.

Upon the shaft of each of the drums 30, 59 and 65 a sliding friction clutch member 66 is arranged and is adapted for engagement with a friction surface on one of the head walls of the drum. Each of these clutch members is actuated through the me-

dium of a bell crank lever, said levers being designated 67, 68 and 69, respectively, which are fulcrumed upon suitable supporting members secured to the frame on which the drums are mounted. The clutch members 66 upon the shafts of the drums 59 and 65 whereon the cables for moving the bucket are wound and unwound, are adapted to be actuated through the medium of a single lever 70 which is fulcrumed intermediate of its ends and carries the usual spring pressed dog for engagement with the teeth of a rack 71. The lower end of this lever is connected by means of a rod 72 to the bell crank lever 68. An arm 73 is pivotally mounted upon the lever below its fulcrum point and is connected to the other bell crank lever 69. From this construction, it will be seen that when the lever 70 is moved in one direction, one of the bell crank levers will be actuated to move the clutch member into frictional engagement with its drum head and the other lever will be actuated to move the other clutch member in a reverse direction and release the other of the drums. Thus the cable will be wound upon one drum when the same is rotated and will unwind from the loose drum. The reverse movement of the lever 70 will of course, reverse the relative movement of the clutch members. When the lever is standing in a vertical position, both clutches are released.

The bell crank lever 67 which shifts the clutch member 66 upon the shaft of the drum 30 upon which the cable 26 is wound to raise and lower the boom is connected by means of a rod 74 to the lower end of a lever 75 fulcrumed upon the rack 76. A collar 77 is fixed upon the rod 74 and is adapted to engage a sleeve 78 formed upon one end of a rod 79, the other end of which is connected to a bell crank lever 80. To one arm of the lever 80 the end of a friction brake band 81 is attached. This band is adapted for engagement upon the periphery of one of the head walls of the drum 30 and is rigidly fixed at its other end in any suitable manner to the drum frame. A foot lever 82 is also pivotally mounted upon the frame and has an upwardly disposed end 83 which is pivotally connected to the rod 79 at a point adjacent the sleeve 78 on the end of said rod. By means of this arrangement it will be readily seen that upon shifting the lever 75 in one direction, the clutch member 66 is thrown into locking engagement with the drum and when said lever is shifted in the opposite direction, the clutch is released and the brake band 81 also tightened upon the drum head by the engagement of the collar 77 on the rod 74 with the sleeve 78 on the end of the rod 79.

84 indicates an engine of any preferred form, the shaft of which is connected by an endless sprocket chain 85 to sprockets fixed

upon the drum shafts whereby said shafts are rotated in the same direction. The shaft of the drum 65 is provided with an additional sprocket which is connected by means of a chain 86 with a sprocket fixed upon one end of a transverse shaft 87 which is mounted in suitable bearings upon the frame structure. On this shaft adjacent the opposite ends thereof drums 88 are loosely mounted. Conical friction clutch members 89 are keyed upon the shaft 87 for sliding movement into and out of engagement with the friction surfaces provided upon the opposed ends of the drums 88. These cone members are connected by means of the bar 90 through the medium of which the same are actuated. The ends of the cable 14 which operates the turn table 13 are connected to the drums 88. A lever 91 is mounted upon the frame structure, and is connected by means of the rod 92 to the bar 90. The shifting of this lever moves one of the clutches 89 into engagement with its drum 88 and moves the other of the clutch members out of engagement with its drum, whereby one of the drums will be locked upon the shaft 87 for rotation therewith, so that one end of the cable 13 is wound upon the fixed drum and unwinds from the loose drum. In this manner the turn table may be rotated in either direction to swing the boom laterally.

By means of the foot member 82, the brake band 81 may be applied to the drum 30 at any time independently of the lever 75 so that the vertical movement of the boom may be controlled.

From the above the operation of the machine will be understood as follows: Assuming that the traveling bucket is in the position shown in Fig. 1 of the drawings, wherein the carriage is arranged upon the rear upwardly curved end of the boom, and the bucket is positioned at an angle with its scoop or dipper pointing downwardly, the boom is first adjusted vertically and the drum 59 is then rotated to wind the cable thereon and move the bucket outwardly upon the boom. As the bucket carriage moves off of the rear end of the boom upon the straight portion thereof, the bucket is filled with earth. When the bucket is disposed at a desired point upon the outer end of the boom, the boom is lifted by winding the cable on the drum 30 and then swung laterally. The operator now releases the bucket by manipulating the lever 53 to actuate the bell crank 47 to force the trip rod 41 downwardly upon the upper end of the latch member 40, thereby permitting the bucket to swing downwardly and release the load carried thereby. The drum 65 is now rotated and the cable 61 first returns the bucket to position beneath the body of the carriage and causes the latch member which

projects through the slot in the end of the carriage to again engage the end of the bucket and to support the same. Upon the further winding of the cable upon the drum, the bucket is moved inwardly upon the rear curved end of the boom into position to receive another load. The above described operations are repeated with each movement of the bucket outwardly and inwardly upon the boom.

From the foregoing it is believed that the construction and manner of operation of my improved excavator will be fully understood. Owing to the specific construction and mounting of the parts and the manner in which the power is applied for the operation of the boom and bucket, it is not necessary that the frame structure be of great weight in excess of the strength required to support the boom, as is usual in machines of this character. The boom may be easily and quickly adjusted and swung to either side of the machine in position to dump the contents of the bucket. The device is adapted for grading purposes, and is capable of removing successive surface layers of the grade without requiring any hand labor. Owing to the facility with which the operation of the bucket may be controlled the work may be quickly completed and the sides or surface of an embankment may be neatly trimmed or finished entirely by the machine, thus eliminating hand labor which has heretofore been necessary. As but comparatively few parts are employed in the construction of the device, it will be obvious that the same may be inexpensively manufactured, is extremely light as well as strong and durable in its construction and may be readily moved from place to place.

While I have shown and described the preferred construction and arrangement of the various elements, it will be obvious that the invention is susceptible of considerable modification without departing from the essential features or sacrificing any of the advantages thereof.

Having thus described the invention, what is claimed is:

1. In an excavator, a pivoted boom, a carriage to travel longitudinally upon said boom, means to move the carriage back and forth upon the boom, a bucket pivotally mounted upon the carriage for vertical swinging movement, said carriage having a downwardly extending plate constituting a stationary end wall for the bucket, a latch device mounted upon the carriage to hold the bucket in its load receiving position with relation thereto, and means to actuate said latch device to release the bucket and permit the same to swing downwardly to dump the contents thereof.

2. In an excavator, a pivoted boom, a carriage to travel longitudinally upon said

boom, said carriage including a body plate having a downwardly extending end portion, a bucket pivotally mounted upon the other end of said plate, said downwardly disposed portion of the plate constituting a stationary end wall for the bucket, a pivoted latch member mounted on the carriage and adapted to engage one end of the bucket to support the same against pivotal movement and maintain the bucket in its loading position, means for moving the carriage back and forth upon the boom, a strip member mounted upon the boom to engage the latch device and release the bucket, and means for actuating said trip member.

3. In an excavator, a pivoted boom, a carriage longitudinally movable upon the boom, said carriage including a longitudinally disposed body plate having a downwardly extending end portion, a bucket pivotally mounted upon the other end of said plate, said downwardly extending end of the plate constituting a stationary end wall for the bucket, a pivoted latch member mounted upon the carriage to engage the bucket and support the same in its loading position, a longitudinally extending trip member pivotally mounted at its ends upon the boom, means to actuate said trip member and release the bucket and dump the contents thereof, and means for moving the bucket carriage back and forth upon the boom, said means including a cable connected at one end to the bucket and adapted to return the same to its load receiving position.

4. In an excavator, a pivoted boom, a carriage to travel longitudinally on said boom, a bucket pivotally mounted for vertical swinging movement on the carriage, a latch device mounted upon the carriage to engage said bucket and support the same in its load receiving position, a longitudinally extending trip rod pivotally mounted upon the boom, a bell crank lever mounted upon the boom and having one of its ends disposed in engagement with the trip rod, means to actuate said lever and cause the trip rod to engage the latch member whereby the bucket is released for swinging movement to dump the load carried thereby, and means for moving the carriage and bucket back and forth upon the boom, said means including a cable connected at one end to the bucket and adapted to return the same to its load receiving position.

5. In an excavator, a pivoted boom, a carriage to travel longitudinally upon the boom, a bucket pivotally mounted for vertical swinging movement on the carriage, a latch member pivotally mounted on the carriage to engage one end of the bucket and support the same in its load receiving position, a pivotally mounted spring held trip rod arranged upon the boom, a bell crank lever mounted on the boom and having one end

engaged with said rod, a lever, a flexible connection between the lever and the bell crank to actuate the latter and force the trip rod into engagement with the latch member to disengage said member from the bucket and permit the bucket to swing upon the carriage to dump the load carried thereby, and means for moving the carriage and bucket back and forth upon the boom, said means including a cable connected to the bucket and adapted to return the same to its load receiving position after the contents thereof have been dumped.

6. In an excavator, a pivotally mounted boom, a carriage to travel longitudinally upon the boom, a bucket pivotally mounted at one of its ends upon the carriage, a latch member mounted upon the carriage to engage the bucket and support the same against pivotal movement, a pivoted trip member mounted upon the boom to engage the latch member and release the bucket for movement to its dumping position, manually operable means to actuate said trip member, and means to first return the bucket to its normal position upon the carriage and then move the carriage upon the boom to dispose the bucket in its load-receiving position thereon.

7. In an excavator, a pivotally mounted boom, a carriage to travel longitudinally upon said boom, a bucket pivotally mounted upon the carriage, a latch member to support the bucket upon the carriage against

pivotal movement, a trip member to engage said latch member and release the bucket for movement to its dumping position, a manually operable member pivotally mounted upon the boom to engage and actuate said trip member, and means to return the bucket to its normal position upon the carriage for engagement by said latch member.

8. In an excavator, a pivotally mounted boom, a carriage longitudinally movable upon said boom, a bucket pivotally mounted at one of its ends upon the carriage, means mounted on the carriage to engage said bucket and support the same against pivotal movement, a trip member mounted upon the boom to engage said supporting means and release the bucket for movement to its dumping position, a manually operable element pivotally mounted upon the boom to engage and actuate said trip member, and means connected to the carriage and to the bucket to return the same to its load-receiving position upon the boom, said means including a cable connected to the bucket to return the same into position upon the carriage for engagement by said supporting means after the load has been dumped.

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

WILLARD L. REED.

Witnesses:

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GEO. S. LIVINGSTON.