July 24, 1923. 1,463,090

S. O. NAFZIGER

CLAMSHELL BUCKET OPERATING MECHANISM

Filed Oct. 7, 1920 2 Sheets-Sheet 1

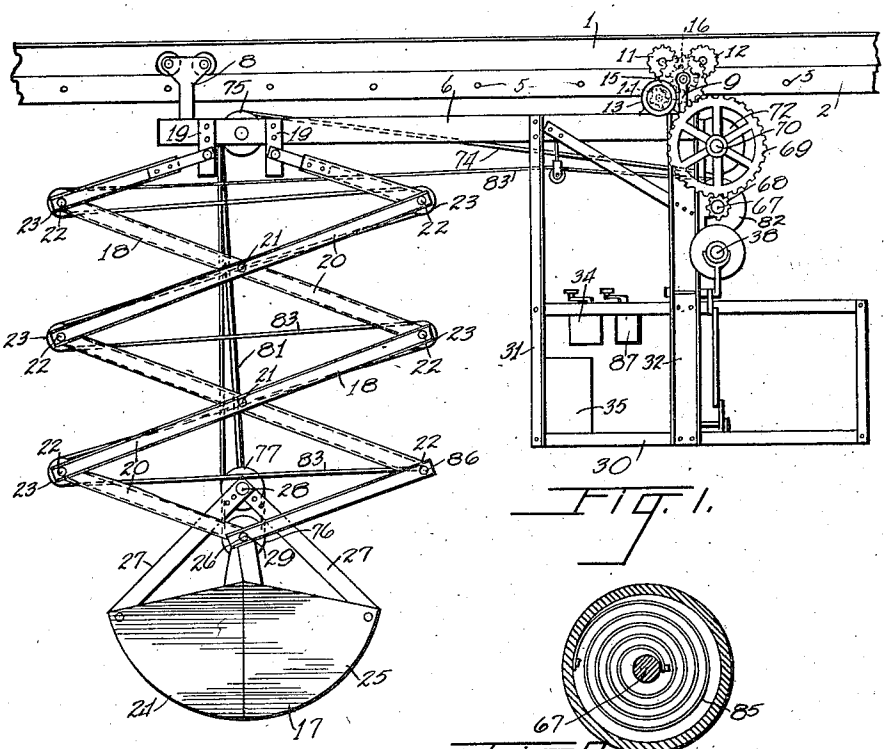


Fig. 1.

Fig. 9.

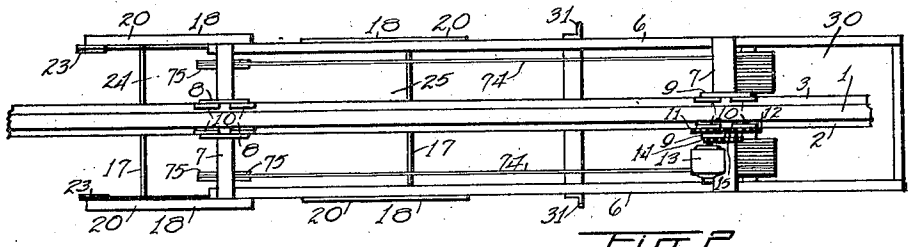


Fig. 2.

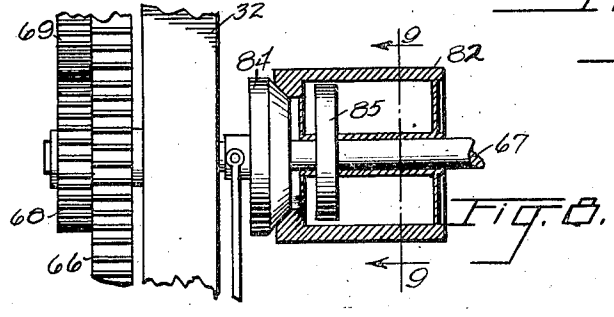


Fig. 8.

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CLAMSHELL BUCKET OPERATING MECHANISM

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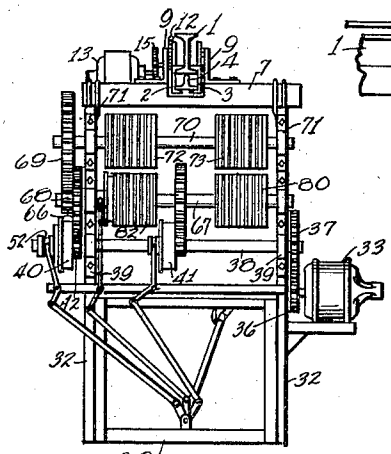


Fig. 4.

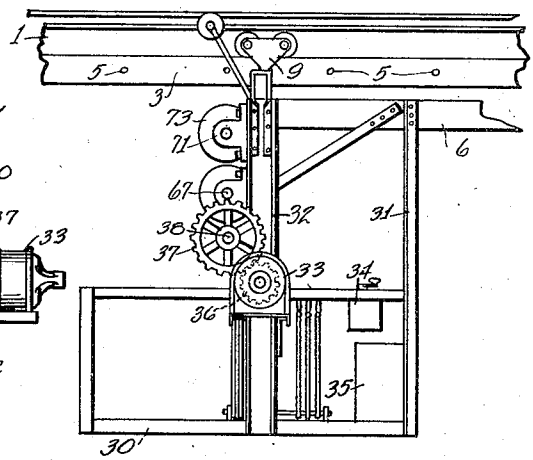


Fig. 3.

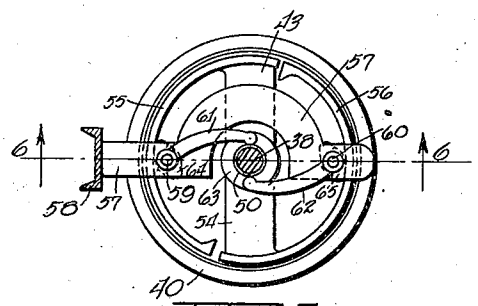


Fig. 5.

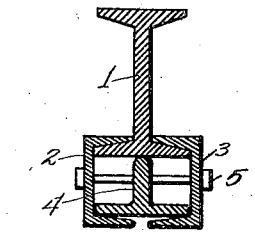


Fig. 10.

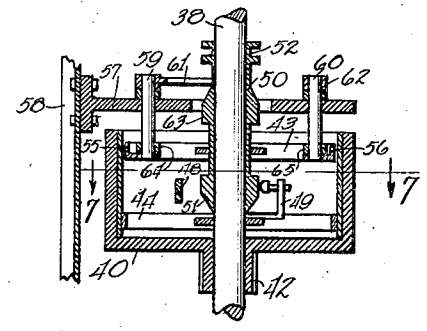


Fig. 6.

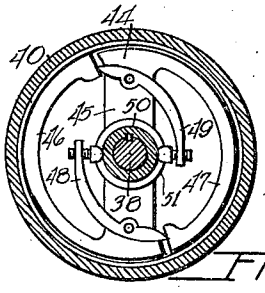


Fig. 7.

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Patented July 24, 1923. 1,463,090

UNITED STATES PATENT OFFICE.

SAMUEL OSCAR NAFZIGER, OF GOSHEN, INDIANA.

CLAMSHELL-BUCKET-OPERATING MECHANISM.

Application filed October 7, 1920. Serial No. 415,248.

To all whom it may concern:

Be it known that I, SAMUEL O. NAFZIGER, a citizen of the United States, and a resident of Goshen, in the county of Elkhart and State of Indiana, have invented a new and useful Improvement in Clamshell-Bucket-Operating Mechanism, of which the following is a full, clear, and exact description.

My invention relates to clam-shell bucket operating mechanism and it consists in the combinations, constructions, and arrangements, herein described and claimed.

An object of my invention is to provide a light clam-shell bucket which has means for positively holding it rigidly, while the two halves are being closed in the act of digging.

A further object of my invention is to provide a device of the type described that has means to steady the clam-shell bucket from swaying while it is being raised or lowered.

A further object of my invention is to provide a device of the type described that has a novel braking and starting mechanism which cooperates with the bucket in raising and lowering it.

A further object of my invention is to provide a device of the type described that has a novel track runway construction on which the bucket and operating mechanism are carried.

Other objects and advantages will appear in the following specification, and the novel features of the device will be particularly ponted out in the appended claims.

My invention is illustrated in the accompanying drawings forming part of this application, in which:

Figure 1 is a side elevation of the device,

Figure 2 is a top plan view of the device,

Figure 3 is a side elevation of a portion of the device,

Figure 4 is a rear elevation of a portion of the device,

Figure 5 is an enlarged detail of a portion of the device,

Figure 6 is a section along the line 6—6 of Figure 5,

Figure 7 is a section along the line 7—7 of Figure 6,

Figure 8 is an enlarged detail partly in section of a portion of the device.

Figure 9 is a section along the line 9—9 of Figure 8,

Figure 10 is an enlarged sectional detail of a portion of the device.

In carrying out my invention, I provide a track runway which is supported by any suitable means (not shown), and which comprises an I-beam 1 (see Figure 10) to which are attached two channel irons 2 and 3 that are disposed on each side of the I-beam 1 in such a manner, that the upper outer faces of the channel irons are at right angles to the side faces of the I-beam. The channel irons 2 and 3 are spaced from each other by a third iron 4 which is T-shaped in cross section and that is disposed between them, and are secured together by means of a plurality of bolts 5 which are disposed in aligned holes in the channel irons 2, 3, and 4. It will thus be seen with this construction that trolley-wheels will not have to be beveled so as to ride on the flange of the I-beam 1, as is the case with the tracks now in use, but can ride on the channel irons 2 and 3 and thus do away with the slipping due to the beveled wheels.

A carrying frame consisting of horizontal side members 6 which are spaced from each other by members 7 is slidably suspended from the track 1 by means of hangers 8 and 9 which have trolley wheels 10 mounted thereon (see Figures 1 and 2).

For moving the carrying frame along the track, two of the trolley wheels are provided with gears 11 and 12 which are driven by a small motor 13 through the medium of the gears 14, 15, and 16.

A clam-shell bucket 17 is yieldingly carried by two lazy tongs 18 which are in turn secured to the forward end of the members 6 by means of fixed arms 19. The lazy tongs 18 comprise a plurality of channel irons 20 hinged at their midponts 21 and at their ends 22. The ends 22 also carry pulleys 23 for a purpose hereinafter set forth. The bucket 17 is of the ordinary construction which is composed of the two halves 24 and 25 which are pivotally connected together at their upper inner edges 26. The outer

edges of the halves 24 and 25 are pivotally connected by links 27 to a shaft 28. A shaft 29 is also provided at the connection 26. The lower end of the lazy tongs 18 is pivotally secured at 26 to the bucket 25.

An operator's controlling platform is secured to the rear end of the members 6. The platform 30 is supported by means of vertical channel irons 31 to the members 6.

A second pair of channel irons 32 is secured to the frame 30 and to the members 6 which act as supports to the platform and also act as carrying means for a plurality of gears to be described later.

A motor 33 which is operated by a controller 34 through a suitable resistance 35 is mounted on a frame that is secured to one of the channel irons 32. The motor shaft has a gear 36 mounted thereon which is in mesh with a gear 37 that is secured to a horizontal shaft 38. The shaft 38 is rotatably mounted in bearings 39 which are secured to the channel irons 32. Two drums 40 and 41 are loosely mounted on the shaft 38 and have one of their ends fashioned into gears (see Figures 4 and 6). Since both the drums 40 and 41 are identical in construction, the explanation of the drum 40 will suffice. An expanding brake band 43 and an expanding clutch band 44 are mounted in the drum 40 which carries a gear 42. The clutch is composed of a body portion 45 that is keyed to the shaft 38 and which has two arcuate fingers 46 and 47 that are spaced from the drum 40 (see Figure 7). Pivotally mounted on the body portion 45 are two arms 48 and 49 which are adapted to engage the free ends of the fingers 46 and 47 and force them against the drum 40. A collar 50 is feathered on the shaft 38 and has a raised portion 51 at one of its ends and an annular groove 52 at its other end (see Figure 6). The arms 48 and 49 engage the portion 51 of the collar 50 and are therefore moved about their points when the collar 50 is moved, which causes the fingers 46 and 47 to grip the drum 40 so as to revolve it with the shaft 38.

The brake 43 consists of a body portion 54 which has two arcuate fingers 55 and 56. The portion 54 is supported by a bracket 57 which is bolted to a channel iron 58 that is carried by the channels 32. Two stub shafts 59 and 60 are pivotally secured to the bracket 57 and are also pivotally secured to the fingers 55 and 56. Secured to the upper ends of the shafts 59 and 60 are two arms 61 and 62 which are adapted to engage the raised portion 63 of the collar 50. The other end of the shafts 59 and 60 have cams 64 and 65 mounted thereon. It will thus be seen that when the collar 50 is moved in one direction the clutch 44 will grip the drum 40 and cause it to revolve with the shaft 38 as previously explained, and when the collar 50 is moved in the opposite direction the arms 61 and 62 are moved by the raised portion 63 of the collar, thus turning the shafts 59 and 60 and the cams 64 and 65, and pressing the fingers 55 and 56 against the drum 40 and bringing the drum to a stop.

The gear 42 on the drum 40 is in mesh with a gear 66, that is loosely mounted on a shaft 67. A gear 68 is integral with the gear 66 and meshes with the gear 69, that is secured to a shaft 70 which is mounted in bearings 71. Two drums 72 and 73 are secured to the shaft 70 and have cables 74 wound around them (see Figures 1 and 2). The cable 74 passes around the pulleys 75, the pulleys 76 and the pulleys 77, and are secured to the pulleys 77.

A gear 78 on the drum 41 is in mesh with a gear 79 on the shaft 67. A drum 80 over which a cable 81 is wound, is mounted on the shaft 67 and is adapted to rotate with the shaft. The cable 81 passes around the pulley 75 and is secured to the links 27 at 28. Loosely mounted on the shaft 67 is a drum 82 around which is wound a cable 83. A cone brake 84 (see Figure 8) is adapted to engage the drum 82 and keep it from rotating. A spiral spring 85 has an end secured to the drum 82 and its other end secured to the channel 32 in such a manner that it causes the drum to revolve in a direction which will tend to wind up the cable 83. The cable 83 is passed around the pulleys 23 in a zig-zag manner as shown in Figure 1, and has its end secured to the lazy-tongs 18 at a point 86.

From the foregoing description of the various parts of the device the operation thereof may be readily understood. The operator by moving the handle of a controller 87 can start the motor 13 which will carry the bucket 25 to the desired place whereupon the motor 13 is stopped and the motor 33 started. The brakes in the three drums 40, 41, and 82 are released, which causes the drums 72, 73 and 80 to unwind their cables 74—74 and 81 respectively, while the spring actuated drum 82 is winding up the cables 83. The bucket 25 drops and the lazy-tongs 18 are extended, which causes the cable 83, that has become slack, to be wound up on the drum 82. The brake is now applied to the drum 41 which causes the cable 81, wound around the drum 80 to support the bucket at the point 28, and allows the halves 24 and 25 to open. Again all the brakes are released and the opened bucket plunges into the dirt or other material to be conveyed. The brakes are now applied to the drum 82, while the cables 74 are being wound up on the drums 72 and 73, thus closing the bucket 25. It is obvious that as long as the cable 83 is kept from unwinding from the drum 82, the lazy-tongs 18 cannot collapse and therefore the bucket 25 is positively held in

position while it is filling itself, and does not depend upon its own weight to keep it down, as do the present types of buckets. When the bucket has been filled the three brakes are released from the drums 40, 41, and 82, and the cables 74 and 81 lift the bucket 25, while the cable 83 unwinds, allowing the lazy-tongs 18 to collapse.

Furthermore, the type of clam-shell bucket now in use which is suspended by cables, is difficult to keep from swinging, whereas in my device, the clam-shell bucket is positively held from swinging, due to its being suspended from the lazy tongs.

I claim:

1. A device of the type described comprising a supporting rail, a frame movable along and supported by said rail, an operator's platform carried by said frame, a clam shell bucket, actuating means for said bucket carried by said platform, means connecting said bucket with said actuating means, and means carried by said frame for positively holding said bucket in a fixed position, said means comprising two lazy tongs each secured to one side of said bucket at one of their ends, and fastened to said frame at their other ends, and means for positively holding said lazy tongs in a fixed position.

2. A device of the type described comprising a supporting rail, a frame movable along and supported by said rail, an operator's platform carried by said frame, a clam-shell bucket, a pair of lazy tongs each secured to one side of said bucket at one of their ends and fastened to said frame at their other ends, said lazy tongs consisting of a plurality of channels pivotally connected to each other at their ends and midpoints, a plurality of pulleys secured to said channels at their pivotally connected ends, actuating means for said bucket and said lazy tongs, said means being carried by said platform and comprising a plurality of drums, a plurality of cables wound around said drums and secured to said bucket, one of said cables from one of said drums being passed around the pulleys in a zig-zag fashion, and means for actuating the drums.

3. In a device of the type described a supporting rail, a frame movable along said rail, a clam-shell bucket, two lazy tongs each secured to one side of said bucket, and secured at their other ends to said frame, and means cooperating with said lazy tongs for holding said bucket in a fixed position.

4. In a device of the type described a supporting rail, a frame movable along said rail, a clam-shell bucket, two lazy tongs connected to said bucket and to said frame consisting of a plurality of channels pivotally connected to each other at their ends and midpoints, a plurality of pulleys secured to said channels at their pivotally connected ends, means cooperating with said lazy tongs for holding said bucket in a fixed position, said means consisting of a cable passed around said pulleys in a zig-zag fashion, and means for holding said cable from moving, wherefore said lazy tongs are held in a fixed position.

5. A device of the type described comprising a frame, lazy-tongs carried by said frame, a clam-shell bucket carried by the free ends of said lazy-tongs, a shaft carried by said frame, drums rigidly secured to said shaft, cables connecting said drums with said bucket for opening and closing the latter, a second shaft, a drum carried thereby, a cable secured to said second named drum and being adapted to support said bucket, a spring actuated drum loosely mounted on said second named shaft, a cable secured to said spring actuated drum and to said lazy-tongs, whereby said cable will prevent said lazy-tongs from collapsing when said spring actuated drum is locked against movement, a motor, clutches for connecting said first or second named drums to said motor, and braking means for all of said drums.

6. A device of the type described comprising a frame, lazy-tongs carried by said frame, a bucket carried by said lazy-tongs, a spring actuated drum carried by said frame, a cable operatively connected to said lazy-tongs and to said drum, said cable preventing the collapse of said lazy-tongs when said drum is locked against rotation, means for permitting the bucket to drop by gravity and to extend said lazy-tongs, and means for locking said drum against rotation, said drum automatically winding up the slack in said cable when said lazy-tongs are extended.

7. The combination with a movable support, a vertically extending lazy-tong frame depending from said support, a bucket carried by the lower end of said frame, and means for locking said lazy-tong frame against collapse, whereby said bucket can be rigidly held from upward movement during the digging operation.

8. The combination with a movable support, a vertically extending lazy-tong frame depending from said support, the outer ends of said frame being secured to said support at spaced apart places, whereby said frame is prevented from swinging with respect to said support, a bucket carried by the lower end of said frame, and means for locking said lazy-tong frame against collapse, whereby said bucket can be rigidly held against upward movement during the digging operation.

SAMUEL OSCAR NAFZIGER.