

B. F. DU PONT,
EXCAVATING MACHINE.
APPLICATION FILED JULY 10, 1919.

Patented Nov. 16, 1920.
2 SHEETS—SHEET 1.

1,359,237.

Fig. 2.

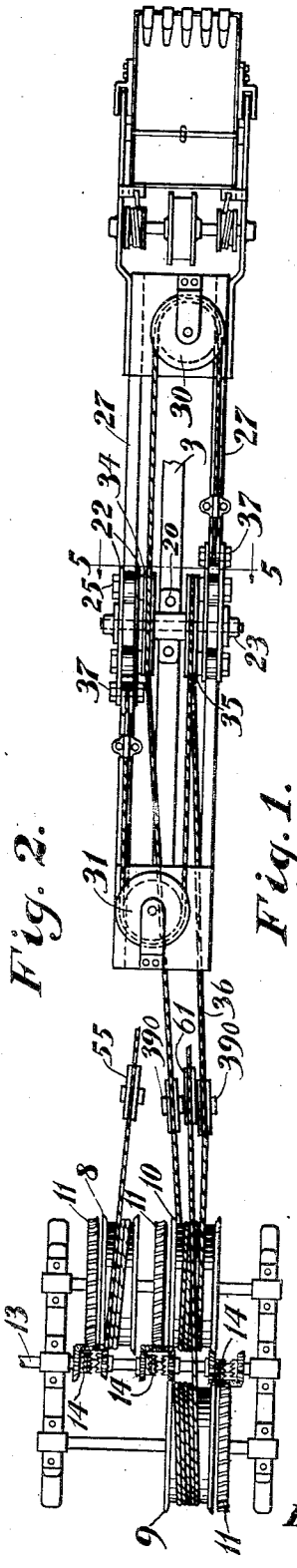
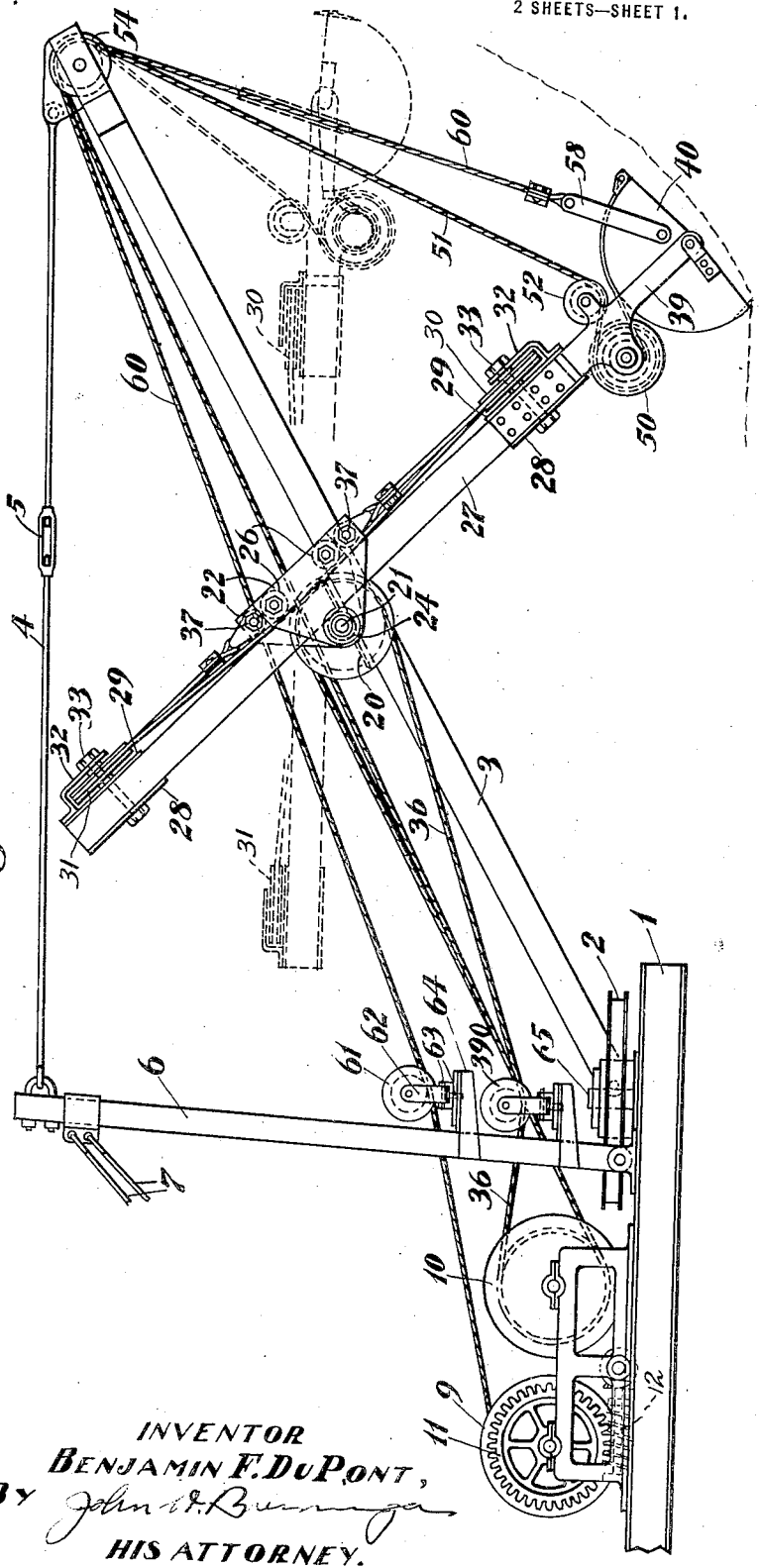


Fig. 1.



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2 SHEETS—SHEET 2.

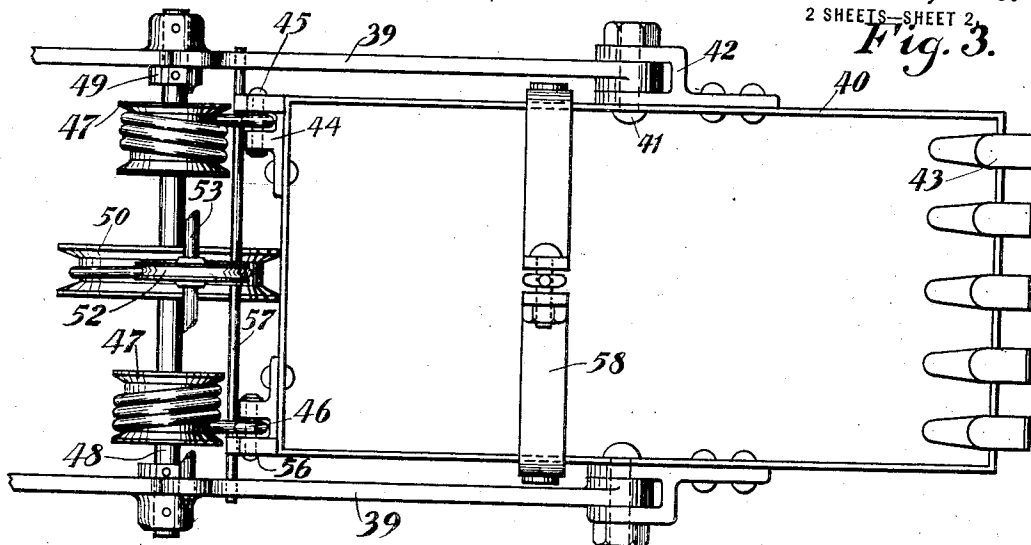


Fig. 3.

Fig. 4.

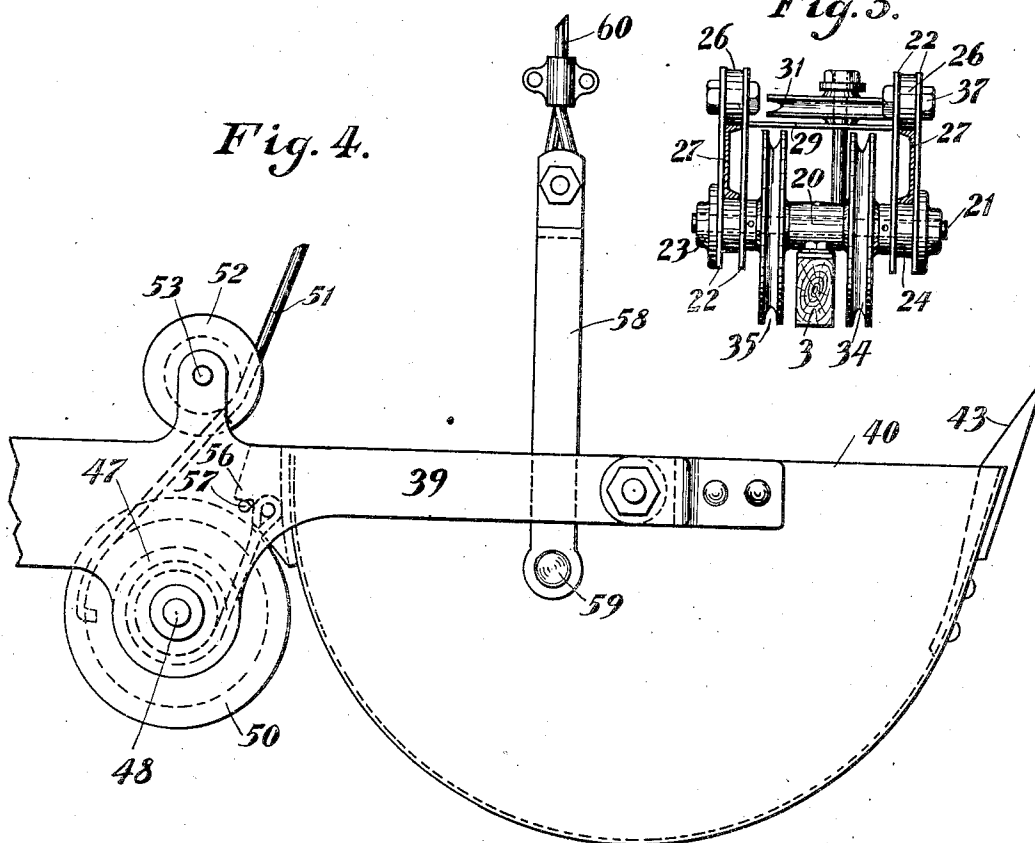
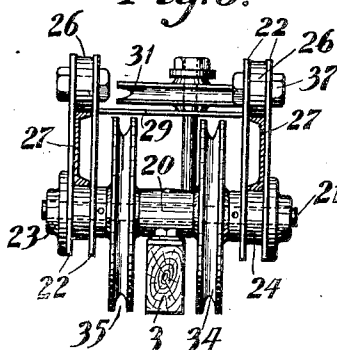


Fig. 5.



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EXCAVATING-MACHINE.

1,359,237.

Specification of Letters Patent.

Patented Nov. 16, 1920.

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To all whom it may concern:

Be it known that I, BENJAMIN F. DU PONT, a citizen of the United States, and residing at Dania, Florida, have invented the new and useful Improvement in Excavating-Machines, of which the following is a specification.

This invention relates to excavating machines, and more particularly to machines or apparatus of the type utilizing an excavating bucket.

One of the objects of this invention, therefore, is to provide an excavating machine utilizing the pivoted bucket which is so constructed, arranged and mounted as to be adapted for effective control.

Another object is to provide means for controlling the movement of the bucket carrier by means of cables.

Further objects will appear from the detail description taken in connection with the accompanying drawings, in which:

Figure 1 is a side elevation of an excavating machine embodying this invention;

Fig. 2 is a detail plan view showing more particularly a plan of the bucket carrier and its operating connections;

Fig. 3 is a detail plan on somewhat an enlarged scale of the bucket and a part of its carrier; and

Fig. 4 is a side elevation of the same; and Fig. 5 is a section on the line 5-5, Fig. 2.

Referring to the accompanying drawings, 1 designates a base which may be mounted for movement toward and from the cut in the usual manner and which carries the driving and operating mechanism as is usual in machines of this type. Mounted on this base is the usual turret 2 on which is pivotally mounted a boom 3 which is connected at its upper end by a tie 4 provided with the usual turn buckle 5 to the strut 6 mounted on the base and braced by suitable ties or braces 7 from the base 1.

Mounted on the base 1 is an elevating and controlling mechanism comprising cable drums 8, 9 and 10, each drum being provided with a worm gear 11 meshing with a worm 12 and each worm being adapted for connection with a shaft 13 by means of a clutch 14. The connections between the shaft 13 and the drums 8, 9 and 10 are preferably of the reversing type but as these driving connections are well known to those

skilled in the art, a detail description thereof is unnecessary.

Mounted in a bracket 20 on the boom 3 is a shaft 21. This shaft has pivotally mounted at each end thereof a pair of spaced triangular plates 22 which are retained against endwise movement by means of collars 23. The shaft has mounted thereon and between pairs of plates 22 rolls 24 and mounted also between each pair of plates and on the shanks of bolts 25 are rolls 26. There is thus formed between each pair of plates, a guide way bounded on its lower side by a roll 24 and at its upper side by a pair of rolls 26. The collars 23 are, of course, fixed to the shaft 21 so as to secure the parts in proper relation.

The bucket carrier comprises spaced side or handle members 27 connected at their ends and held in spaced relation by lower plates 28 and upper plates 29. These side or handle members are mounted in the guide ways formed in the pairs of spaced plates 22 so that the carrier will be guided for slidable movement with respect to the boom 3 but can also be moved in a pivotal relation in any position.

Mounted on the handle and at the opposite ends thereof are sheaves 30 and 31, these sheaves being mounted between the upper plates 29 and bearings 32 secured to the plates, and on shanks 33 passing through these bearings and the plates 28 and 29. Sheaves 34 and 35 are loosely mounted on the shaft 21 and spaced from a pair of plates 22 and from the bearing 20.

A cable 36 has one end connected to one of the cross bolts 37 and passes thence over the sheave 30, to and over the sheave 34, thence under one of the sheaves 390 to the drum 10. It is wound several times about the drum 10 and then passes back over the sheaves 390, 35, and 31, and is then connected to the other cross bolt 37.

The construction is, therefore, such that rotation of the drum 10 in any selected direction will slide the carrier in the required direction on the boom and when the drum 10 is at rest and braked, the handle will be retained in the selected position.

Referring now more particularly to Figs. 3 and 4, the carrier 27 has secured thereto a pair of side members 39 which are spaced to receive the bucket 40. This bucket is in the

form of half a cylinder and is pivoted immediately on the ends of side members 39 by bolts 41, the bucket being provided with brackets 42 embracing the ends of the side members. The leading edge of the bucket is provided with claws or teeth 43 whereby the bucket may dig into the material to be excavated.

The lagging edge of the bucket is provided with brackets 44 each embodying spaced lugs connected by a cross-pin or rivet 45 for receiving the ends of cables 46. Each cable is connected with a drum 47 fixed to a shaft 48 mounted to rotate in the side members and retained in position by collars 49. The shaft 48 has fixed thereto a sheave or drum 50 with which is connected a cable 51 passing around a guide sheave 52 mounted on a shaft 53 between the side members passing over a sheave 54 and the end of the boom, over a guide sheave 55 on the strut 6 and around the drum 8.

The brackets 44 have stops 56 adapted to engage a cross-bar 57 on and connecting the side members 39.

A bail 58 is pivotally connected at its lower ends by pins 59 with the bucket, the connection being intermediate the center and the lagging edge of the bucket and somewhat below the upper edge of the bucket. This bail is arranged to clear the side members and is connected at its upper end with a cable 60 passing through a sheave like 54 on the end of the boom under a sheave 61 on the strut 6 and wrapped around the drum 9.

When a pull is applied to the cable 51 and the cable 60 is released, the connection of the cable 51 with the sheave or drum 50 will operate to rotate the shaft 48 so as to wind the cable 46 on the drum 47 thereby rotating the bucket and on its trunnions or axis from the position shown in full lines, Fig. 1, to the position shown in dotted lines, the rotative movement being stopped when the lugs or stops 56 engage the cross bar or shaft 57, Fig. 4. The drums 47 are made somewhat smaller than the drum 50 in order that the pull on the cables 46 shall be greater than the pull on the cable 51 thereby insuring positive and complete rotation of the bucket to the position shown in Fig. 4 before the carrier 27 begins to rise. When in the position of the parts shown in Fig. 4, pull is applied to the cable 60 and the cable 51 is released, the bucket will be swung on its trunnion from dotted line position, Fig. 1, to full line position. It will, of course, be understood that when the bucket is in the position shown in Fig. 1 (dotted lines) and the cable 51 is released, the weight of the parts will cause rotation of the bucket on its trunnions so as to move the bucket from dotted to full line position on its carrier. It will also be understood

that on account of the relative positions of the pivots 59 and 42 (Figs. 3 and 4) the inverted position of the bucket will be such as to insure complete discharge of its contents. If after the cable 51 has been tensioned to rotate the bucket to the position shown in Fig. 4, tension is now applied to both cables 51 and 60, the bucket will be raised together with its carrier, the carrier swinging about the axis of the shaft 21.

It will be understood that the rotation of the bucket 40 to the position shown in Fig. 4 will be independent of the direction of the action of the cable 51 as it leaves the sheave 52. For instance, the sheave 54 could, if desired, be mounted on or adjacent the shaft 21. This arrangement would materially change the direction of action of the cable 51, but would not alter its positive rotation of the bucket.

The sheaves 390, 55 and 61 are mounted for rotation between stirrups 62 which are pivoted on transverse axis 63 on brackets 64 attached to the strut 6. The centers of the sheaves are substantially coaxial with the center 65 of the turret 2. Accordingly the parts will be in proper position irrespective of the position of the boom 3 in a transverse direction. It is, of course, to be understood that the turret 2 has suitable mechanism (not shown) for adjusting it so as to adjust the position of the boom, and since this mechanism may be of well known construction, a detail description thereof is unnecessary.

In the operation of this machine, the frame, the boom and the bucket carrier are so adjusted that the scoop bucket is allowed to reach the bottom of the cut as shown in Fig. 1 when the bucket is in position as shown in full lines. In this position cable 60 is slackened or released. Pull is now applied to the cable 51 while the bucket rests on the bottom of the cut and this will cause the bucket to turn on its trunnions so as to be filled with the material. After the bucket has been turned to the position shown in Fig. 4, the operator will hoist on both cables 51 and 60, thereby moving the bucket and its carrier to dotted position. The operator will now swing the boom to dumping position and he will then release the cable 51 while the cable 60 is held stationary or even pull applied thereto. The weight of the bucket and its contents together with the weight of the arm and the position of the bail to the bucket now turns the bucket instantly on its trunnions so as to dump the contents thereof. The boom is now swung back to position with the engaged side of the cut and by then operating the drum 10, the carrier can be shifted forward, if necessary to move the bucket forward in the cut for repeated operation. The carrier can thus be extended forwardly until

it comes to the end of its movement when the base is moved onward.

It will, therefore, be seen that the invention accomplishes its objects. The machine is not only simple in construction, but effective in its operation. The simplicity of the operating connections and simplicity of mounting the parts not only renders the machine effective in its operation and cheap to construct, but also cuts down operating expenses due to the fact that there are no gears or fine mechanical parts exposed to the sand and other material to be excavated. The bucket carrier on account of the cable connections by which it is operated can have a very long sweep so that minimum movement of the base is required. On account of the bail connections for dumping the bucket, the bottom of the bucket exposed to and working in the material is entirely free and there is no cable or projecting part which is subject to hindrance or wear.

It is obvious that various changes may be made in the details of construction without departing from the spirit of this invention; it is, therefore, to be understood that this invention is not to be limited to the specific construction shown and described.

Having thus described the invention, what is claimed is:

1. In an excavating machine, a boom, a carrier mounted for movement thereon, a bucket pivoted on said carrier, means reacting on said carrier for positively rocking said bucket on said carrier, and for moving said carrier.

2. In an excavating machine, a boom, a carrier mounted for movement thereon, a bucket pivoted on said carrier, means reacting on said carrier for positively rocking said bucket on said carrier in order to fill said bucket, and for afterward moving said carrier and the filled bucket thereon.

3. In an excavating machine, a boom, a carrier mounted for swinging movement thereon, a bucket pivoted on said carrier, means reacting on said carrier for positively rocking said bucket on said carrier, and for swinging said carrier.

4. In an excavating machine, a boom, a carrier mounted for sliding movement thereon, a bucket pivoted on said carrier, means reacting on said carrier for positively rocking said bucket on said carrier, and means for sliding said carrier.

5. In an excavating machine, a boom, a carrier mounted for swinging and sliding movement thereon, a bucket pivoted on said carrier, means reacting on said carrier for positively rocking said bucket on said carrier, and afterward swinging said carrier and means for sliding said carrier.

6. In an excavating machine, a movably supported carrier, a bucket pivoted intermediately on said carrier, means reacting on said carrier for rocking said bucket in order to fill the same, means for moving said carrier and the filled bucket thereon away from the excavation, and means for rocking said bucket in order to discharge its contents.

7. In an excavating machine, a bucket carrier, a bucket pivoted intermediately on said carrier, a cable attached to the lagging edge of said bucket, a cable drum adjacent said bucket, engaged by said cable and adapted to control the rocking of said bucket.

8. In an excavating machine, a bucket carrier, a bucket pivoted intermediately on said carrier, a cable attached to the lagging edge of said bucket, a cable drum adjacent said bucket adapted to control the rocking of said bucket, a shaft for said drum, and an operating connection to said shaft, adapted to rock said bucket in order to fill the same.

9. In an excavating machine, a bucket carrier, a bucket pivoted on said carrier, a cable drum adjacent said bucket, and cable connections to said drum and to said bucket, adapted to positively rock said bucket to fill the same and thereafter move said carrier.

10. In an excavating machine, a bucket carrier, a bucket pivoted on said carrier, a cable drum on said carrier adjacent said bucket, and cable connections to said drum and to said bucket, adapted to positively rock said bucket to fill the same and thereafter move said carrier.

11. In an excavating machine, a bucket carrier, a bucket pivoted intermediately on said carrier, and connections to the lagging side of said bucket adapted to rock the same in opposite directions on its carrier.

12. In an excavating machine, a bucket carrier, a bucket pivoted intermediately on said carrier, a filling connection to the lagging edge of said bucket, and a dumping connection to the same side of said bucket.

13. In an excavating machine, a bucket carrier, a bucket pivoted intermediately on said carrier, a rocking connection to the lagging edge of said bucket, and a second rocking connection the same side of said bucket.

14. In an excavating machine, a bucket carrier, a bucket pivoted intermediately on said carrier, a rocking connection to the lagging edge of said bucket, and a lifting and rocking connection the same side of said bucket.

In testimony whereof I affix my signature this 3rd day of July, 1919.

BENJAMIN F. DU PONT.