

M. G. BUNNELL.
DRAINAGE EXCAVATOR.
APPLICATION FILED DEC. 10, 1908.

991,696.

Patented May 9, 1911.

2 SHEETS—SHEET 1.

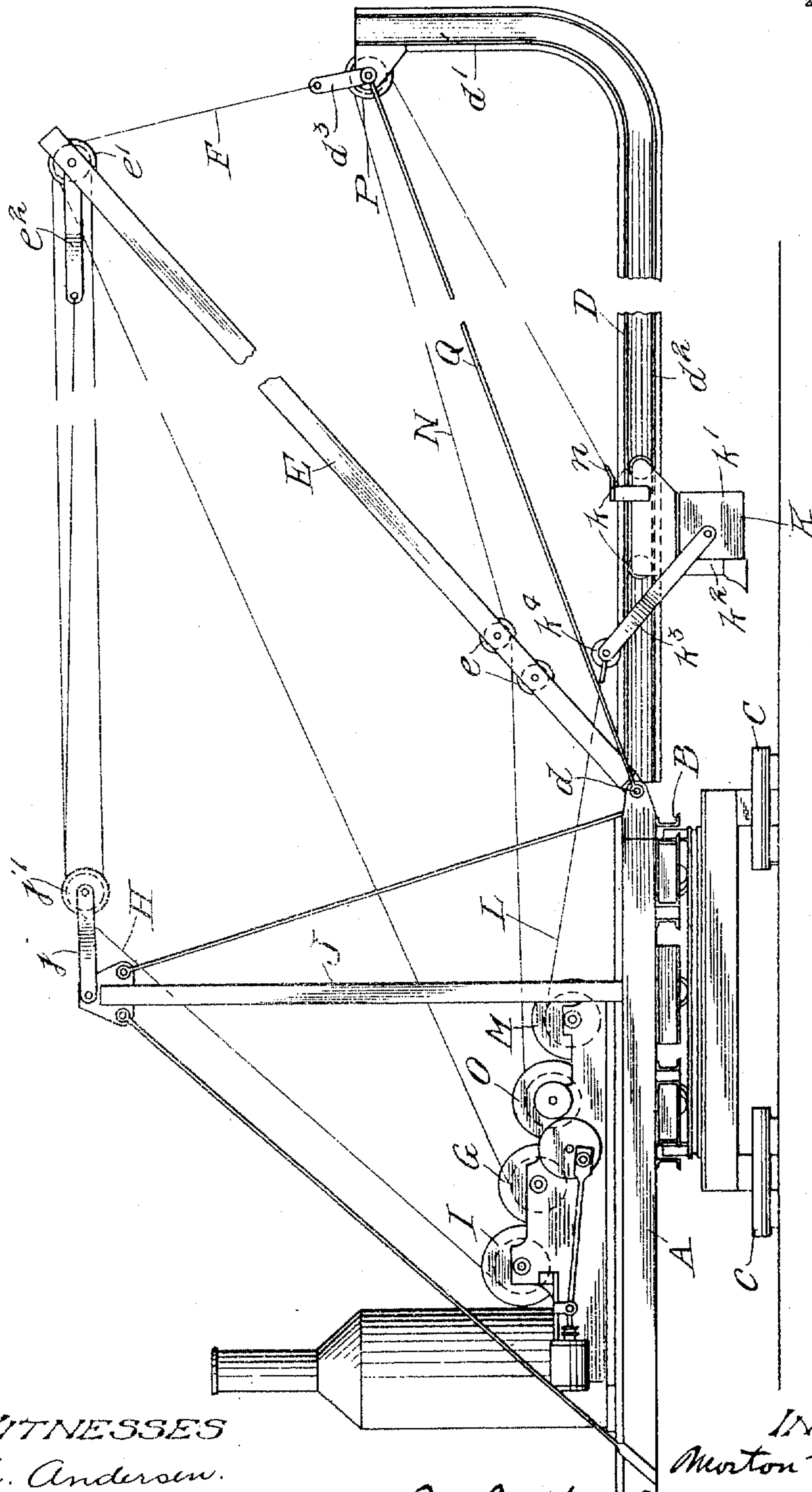


FIG. 1

WITNESSES

A. Anderson.

R. B. Bridges

INVENTOR:

Morton G. Bunnell

By Bulkeley Forward & Drury
ATTORNEYS,

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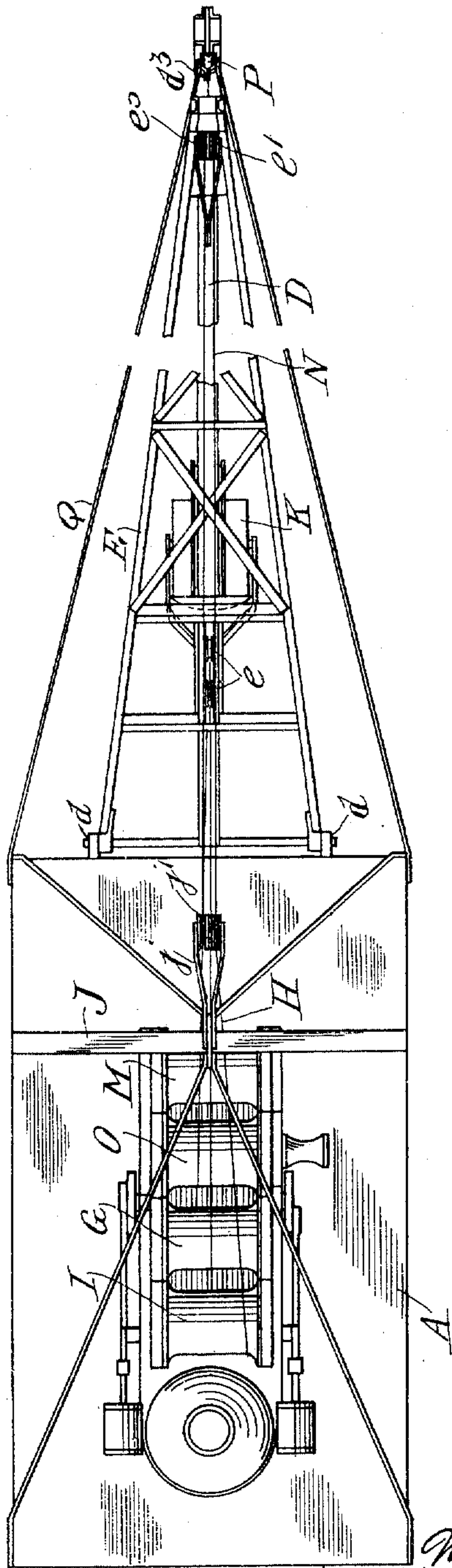


FIG. 2

WITNESSES

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MORTON G. BUNNELL, OF CHICAGO, ILLINOIS, ASSIGNOR TO FREDERICK C. AUSTIN,
OF CHICAGO, ILLINOIS.

DRAINAGE-EXCAVATOR.

991,696.

Specification of Letters Patent.

Patented May 9, 1911.

Application filed December 10, 1908. Serial No. 466,809.

To all whom it may concern:

Be it known that I, MORTON G. BUNNELL, a citizen of the United States of America, and resident of Chicago, Cook county, Illinois, have invented a certain new and useful Improvement in Drainage-Excavators, of which the following is a specification.

My invention relates to drainage excavators of that type in which a bucket or scoop travels back and forth upon a swinging arm or runway adapted to reach across the ditch or trench which is being formed, or across the area to be excavated, and at one side of which the body of the machine is adapted to stand.

In a drainage excavator embodying the principles of my invention, the contents of the bucket or scoop may be dumped at either side of the excavation, inasmuch as the entire machine is supported upon a turn table. With this arrangement the bucket or scoop may be filled and then drawn to the outer end of the runway, at which point it can be caused to discharge its load, thus gradually accumulating a volume of dirt at the farther side of the excavation. On the other hand, and for other kinds of work, the bucket or scoop can be filled and run out to the end of the runway, and then by raising the runway and revolving the machine on the turn table the load may be discharged at the same side of the excavation at which the excavator is standing. Furthermore, the bucket is preferably made wider than the runway, and with this arrangement the cut made by the bucket or scoop will be wider than the runway, permitting the latter to fall downward to any desired depth. In this way the excavator can be brought into position, the runway can be lowered to permit the bucket to rest on the ground, and the engine drums can then be operated to cause the bucket or scoop to travel back and forth and gradually work itself down into the ground, and the depth is not limited by the extent to which the bucket projects below the lower surface of the runway. Thus the ultimate or full depth desired for the trench or ditch can be reached at every step or position of the excavator, and when the end of the ditch or trench is reached the full depth will have been reached throughout the entire length thereof. Again, and with my improved arrangement, a vertically swinging boom is disposed above the run-

way and provided with means for supporting the latter, whereby the cable for raising and lowering the runway extends upwardly therefrom, and is adapted to exert a more direct upward pull upon the end of the runway, when it is desired to raise the latter out of the excavation. In addition, I provide means for centering the pull upon the bucket or scoop when the latter is being drawn toward the machine for the purpose of gathering a load, said means consisting preferably of a bail adapted to embrace the runway, and provided at its middle portion with a wheel adapted to travel along the upper surface of the same. With this provision the bucket is adapted to travel more easily and effectively along the runway or swinging arm upon which the same is mounted, and which is adapted to reach from the side of the body of the excavator and extend across the area to be excavated. After the bucket or scoop is filled by movement of the same toward the body of the excavator, it is then caused to travel backward to the outer end of the said runway, and upon reaching the outer end of the runway the bucket or scoop is upset and the contents thereof discharged at the farther side of the excavation. If desired, and as previously explained, the bucket or scoop can be run out to the outer end of the runway, and the entire excavator can then be swung around to bring the bucket to a point where it may discharge its load on the ground or into the water at the same side of the excavation at which the body of the excavator is standing. The nature and advantages of my invention, in connection with its use for excavation for drainage and other purposes, will, however, hereinafter more fully appear.

In the accompanying drawings—Figure 1 is a side elevation of a drainage excavator embodying the principles of my invention. Fig. 2 is a plan of the excavator shown in Fig. 1.

In these two figures it will be seen that intermediate portions of the runway, the boom and the cables are shown broken away for convenience of illustration, it being understood that in practice these are usually of considerable length, depending upon the kind of work the excavator is intended to handle.

As thus illustrated, my invention comprises a body or platform A mounted to

revolve upon the turn table B, which latter can be supported for transportation upon land or water, the same being shown mounted upon rollers C, to enable the excavator to move along step by step in the direction of the ditch or excavation. At one side of the said body a runway D is pivoted thereto at d , said runway having an upturned outer end portion d' , and its opposite sides providing tracks or ways d^2 , it being observed that the said runway may consist of an I-beam bent into the proper shape. A boom E is also pivoted to the body at d and provided with two lower sheaves e and a sheave e' at its upper and outer end. The outer end of the runway is provided with a pivoted or swinging link d^3 to which is secured the lower end of the hoisting cable F, which latter is arranged to run over the sheave e' , and has its other end wound upon the operating drum G. With this arrangement the runway can be raised and lowered to accomplish the different operations necessary in excavating. The said boom may be raised and lowered by means of a hoisting cable H that has one end attached to a link e^2 pivotally secured to the outer end of the boom, which has its other end wound upon the operating drum I.

An upright structure J is mounted on the body of the excavator, and at its upper end the said structure carries a pivoted link j , which latter in turn carries a sheave j' . At the outer end of the boom, and adapted to rotate about an axis coincident with the axis of the sheave e' , there is another sheave e^3 , as shown more clearly in Fig. 2. It will be seen that the hoisting cable H is arranged to travel upon these sheaves e^3 and j' , thus giving increased hoisting power for raising and lowering the boom and the runway. Thus there are two arrangements for raising and lowering the runway, namely the cable F by which it can be raised and lowered without shifting the boom, and the other cable H by which both the boom and runway can be raised and lowered about the axis provided by the pivot d at the side of the machine.

An excavating bucket or scoop K, preferably wider than the runway, is provided with wheels k adapted to travel in the tracks provided by the opposite sides of the I-beam forming the runway. The said bucket or scoop has a closed outer end k' , and has its mouth or open end k^2 disposed in the direction of the body of the excavator, whereby the bucket is filled by movement along the runway toward the excavator. The said bucket or scoop is provided with a bail or draft appliance k^3 that embraces both the bucket and the runway, and which is provided at its upper or free end with a wheel k^4 adapted to travel along the top of the runway. A cable L for filling the bucket

is secured at one end to the said bail k^3 and at its other end to the operating drum M, thus the draft of the cable L is centrally of the runway and the bucket, and the bail is prevented from dragging on the runway by the wheels k^4 which run upon the top of the latter.

For pulling the bucket or scoop back to the outer end of the runway there is provided a cable N which has one end attached at n to the truck-like structure that forms the upper portion of the bucket or scoop, and which has its other end wound upon the operating drum O. A sheave P is mounted upon the outer end of the runway, and it will be seen that the operating cable N for causing the return or backward motion of the excavating bucket is arranged to travel over this sheave P, and between the sheaves e , whereby it is guided in its back and forth travel. A brace or stay rod Q preferably connects the outer end of the runway with the pivot or axis d , whereby the runway is prevented from getting out of shape.

With the foregoing construction the operation is as follows: The excavator is positioned at one side of the area to be excavated, and the runway is lowered to enable the bucket or scoop to reach the surface of the ground. By operating the cable L, the bucket is then drawn from the outer end of the runway toward the body of the machine, and as it drags along the ground it is caused to fill. When loaded, the bucket is then drawn by the cable N to the outer end of the runway, and upon being pulled on to the upturned outer end portion of the runway the bucket is upset and the contents thereof discharged at the farther side of the excavation. Or, if it is desired to discharge all or a portion of the dirt at the other side of the excavation, then after the bucket is filled the runway is raised and the entire excavator swung around upon the turn table, thus bringing the bucket into position to dump at the other side of the excavation. It will be seen that the back and forth movement of the bucket on the runway results in the cutting of a groove in the ground, which groove is wider than the runway, whereby the bucket and the runway may be allowed to descend to any desired depth—that is to say, to the full depth desired for the ditch or trench. Then the runway can be hoisted out of the groove thus cut, and the excavator can then be moved along one step—that is to say, sufficiently to bring the bucket into line with the ground at one side of the groove which has been cut. In this way the runway and bucket are permitted to descend again to the required depth, resulting in widening the groove cut in the ground, which groove, it will be seen, extends transversely of the direction which the excavation must take in order to form the desired

ditch or trench. The operation above described is repeated, the excavator being moved along step by step until the ditch or trench has been excavated to the desired depth for the full length thereof. It will be seen, however, as explained, that for each position of the excavator the bucket is allowed to descend for the full depth desired for the trench or ditch. With the bent or angular formation of the runway, the bucket is caused to descend into the ground at one side of the trench or ditch, and to then cross the latter and rise at the other side thereof, and by properly manipulating the runway the cross sectional outline of the trench or ditch can be determined. Obviously, the excavator can be used also for operating upon an embankment or ridge of ground, and for transferring the same to the other side of the body of the machine. In other words, my improved excavator is not limited for use in building trenches or ditches, as it may be used for other purposes. It will also be understood that I do not limit myself to the exact construction shown and described, nor to the use of the excavator on land, as it is obvious that it may be

supported upon a boat or scow, and that other changes may be made without departing from the spirit of my invention.

What I claim as my invention is:

1. In a drainage excavator, a body, a runway thereon, a bucket arranged to travel back and forth on the runway, a bail for said bucket, a cable attached to said bail, by which the bucket is filled, and a wheel on the bail adapted to run on the top of the runway.

2. In a drainage excavator, a body, a swinging runway at one side thereof, means for raising and lowering the runway about its axis, a bucket traveling back and forth upon and held to its work by said runway, the bucket being wider than the runway, a draft connection for the bucket, and a wheel on the said connection traveling on the top of the runway.

Signed by me at Chicago, Illinois, this 7th day of December 1908.

MORTON G. BUNNELL.

Witnesses:

CLARENCE E. TAYLOR,
E. H. CLEGG.

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