C. C. JACOBS.

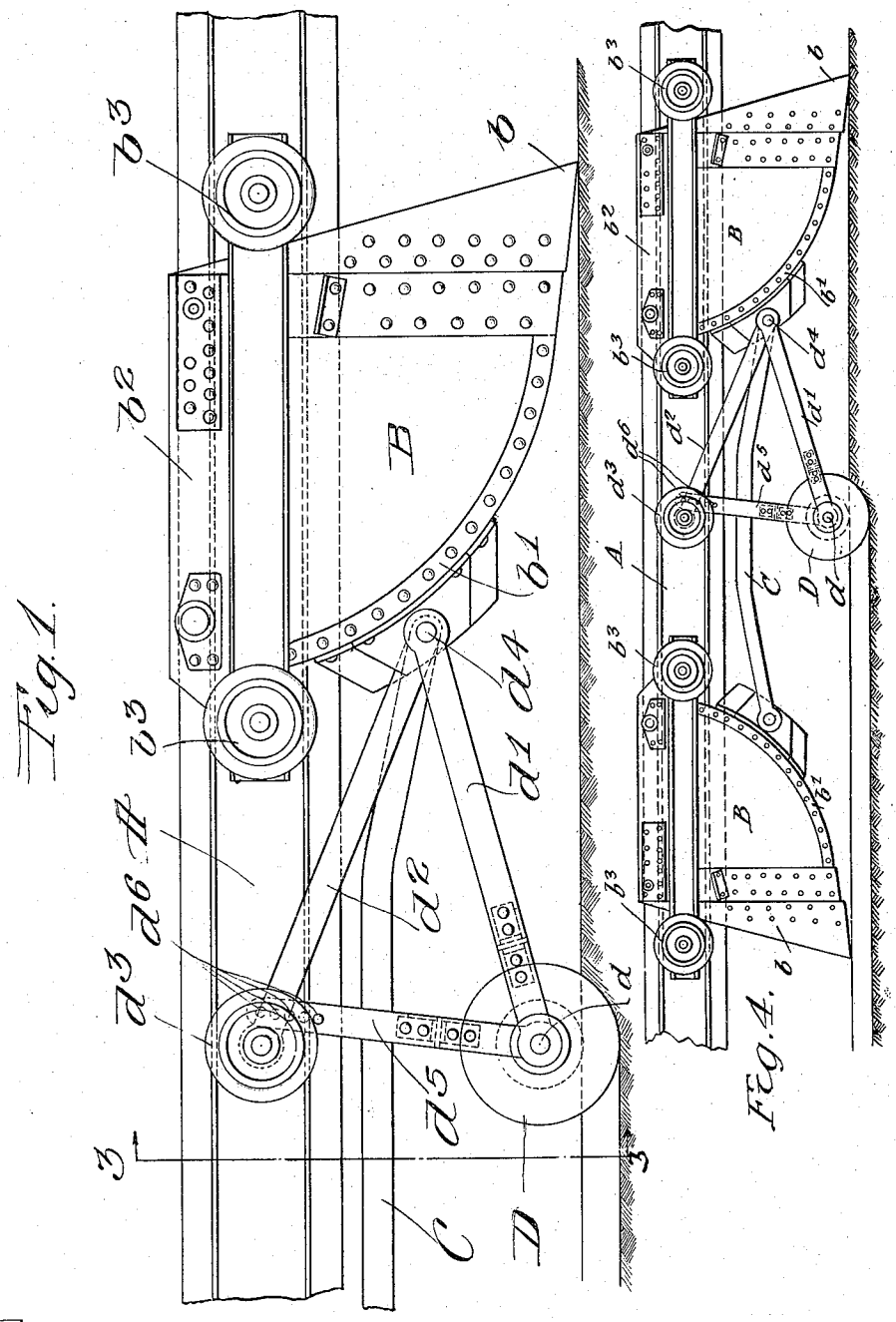
DISINTEGRATOR ATTACHMENT FOR ELEVATOR BUCKETS.

APPLICATION FILED DEC. 1, 1911.

1,156,291.

Patented Oct. 12, 1915.

3 SHEETS—SHEET 1.



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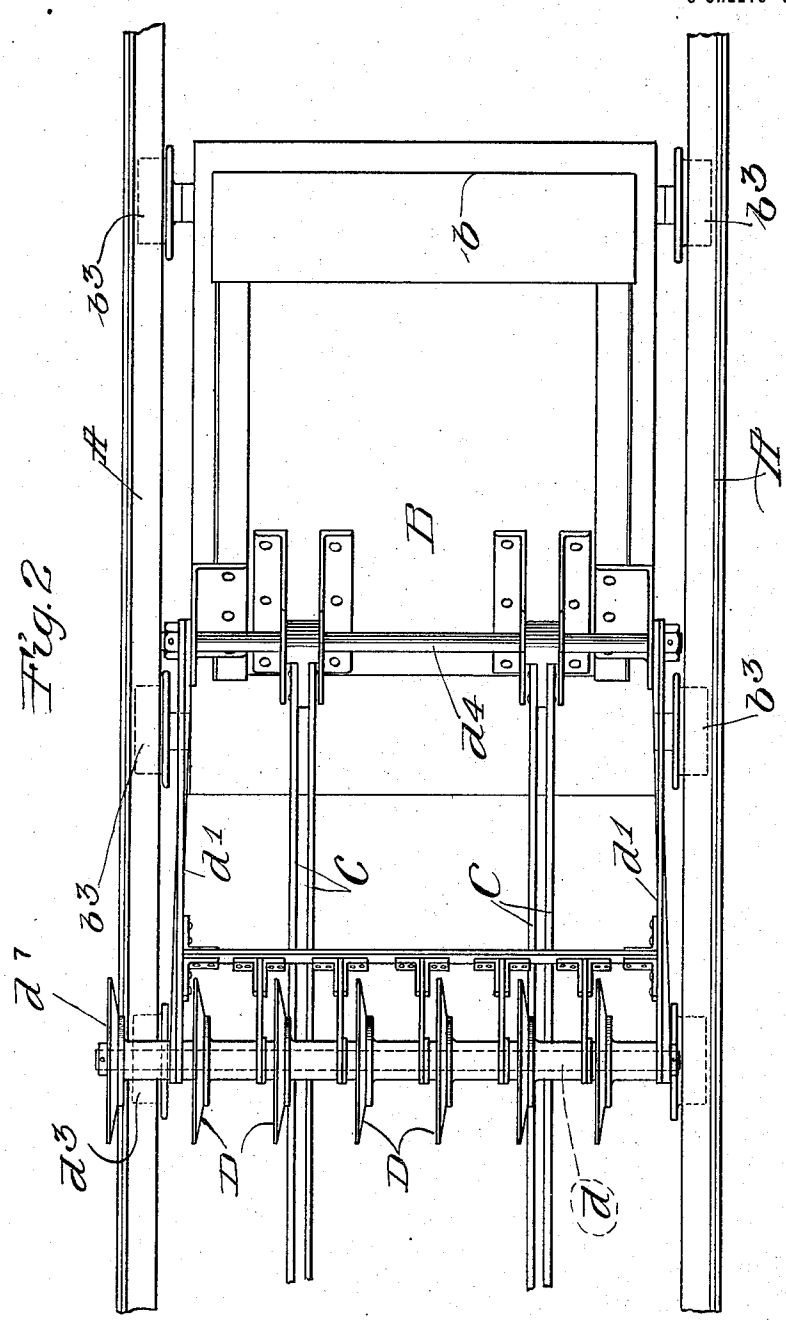
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3 SHEETS—SHEET 2.

Fig. 2



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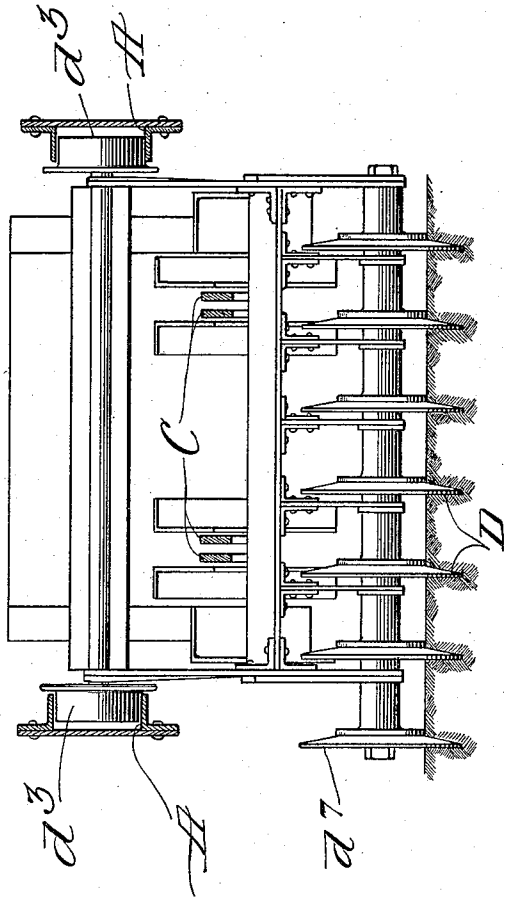
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3 SHEETS—SHEET 3.

Fig. 3.



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UNITED STATES PATENT OFFICE.

CHARLES C. JACOBS, OF AMBOY, ILLINOIS, ASSIGNOR TO FREDERICK C. AUSTIN, OF CHICAGO, ILLINOIS.

DISINTEGRATOR ATTACHMENT FOR ELEVATOR-BUCKETS.

1,156,291. Specification of Letters Patent. Patented Oct. 12, 1915.

Application filed December 1, 1911. Serial No. 663,205.

To all whom it may concern:

Be it known that I, CHARLES C. JACOBS, a citizen of the United States of America, and resident of Amboy, Lee county, Illinois, have invented a certain new and useful Improvement in Disintegrator Attachments for Elevator-Buckets, of which the following is a specification.

My invention relates to excavators in general, but more particularly to excavators having buckets, and especially to excavators provided with a pair of buckets arranged back to back and movable back and forth on a runway. In excavators of this general class, one difficulty very frequently encountered is the inability of the bucket to cut through all kinds of ground. For example, shale and other similar formations are often encountered, and at such times the buckets are either very liable to break, or else practically incapable of cutting through the ground. This, of course, delays the work and reduces the efficiency of an excavator of this type or character.

The object of my invention is, therefore, to provide an arrangement of cutting devices for disintegrating or breaking up the ground preparatory to the same being taken up or collected by the bucket or buckets by which the dirt is gradually removed from the excavation and deposited on the spoil bank.

It is also an object to provide a gang of cutting or disintegrating devices for this purpose which will not be liable to break under severe strain.

A further object is to provide certain details and specific features of construction tending to increase the general efficiency of an arrangement of this particular character.

To the foregoing and other useful ends, my invention consists in matters hereinafter more fully set forth and claimed.

In the accompanying drawings—Figure 1 is a side elevation of a bucket and disintegrator embodying the principles of my invention, showing a portion of the runway upon which the same travel back and forth. Fig. 2 is a plan of the parts shown in Fig. 1. Fig. 3 is a vertical section on line 3—3 in Fig. 1. Fig. 4 is a side elevation of two buckets connected together in a manner embodying the principles of my invention.

As thus illustrated, my invention comprises a runway A of any suitable, known or approved character. For example, this may be the runway of that type of excavator in which the runway serves as a templet for determining the cross sectional contour of the ditch, and upon which two buckets disposed back to back are arranged to travel back and forth. When the buckets move in one direction one bucket is filled and discharges its load when it reaches dumping position. When the buckets travel in the reverse direction, the other bucket is filled and discharges its load when it reaches dumping position at the other side of the ditch. As an excavator of this general character is well known and understood, further description thereof will not be necessary.

The bucket B may be of any suitable, known or approved form, and is one of the above-mentioned buckets, it being understood that the two buckets are exactly alike. This bucket has an open forward end provided at its lower edge with a lip or cutting edge b, and the rear end or bottom b' of the bucket is rounded or curved in the manner shown. The sides of the top of the bucket are provided with longitudinally extending and parallel rigid bars b^2, a pair of track wheels b^3 being mounted on each bar. These track wheels b^3 are adapted to travel in the channels of the runway A, whereby the bucket is adapted to travel back and forth and is held to its work. The links C connect this bucket with the other bucket, the two buckets being arranged back to back, and the said links being pivotally connected at each end thereof. If desired, several of these links C arranged in pairs, as shown more clearly in Figs. 2 and 3, can be employed as the medium of connection between the two buckets.

As previously stated, it often occurs that, in the use of an excavator of this character, the bucket encounters shale or hard soil or other substances through which it is unable to cut its way in a satisfactory manner, and sometimes ground of this kind is of such character that the bucket is totally incapable of operating therein, or at least cannot do so without serious danger of breakage. With a view, therefore, to disintegrating or pulverizing or breaking up the ground preparatory to the operation of the bucket, and for the purpose of enabling the bucket to work easily and properly in shale and other

soil or substance of similar character, a gang of disks D is disposed between the two buckets. These disks are similar to those employed on disk cultivators or disk plows, being convex on one side and concave on the other side, and mounted to rotate about a rod or arbor d extending axially through all of them. The disks can be of any suitable number, are spaced apart in any suitable or desired manner, and are held in place on the said rod or arbor by any suitable or desired means. The ends of the said rod or arbor d are connected with the back of the bucket by links or draft connections d', and the similar links d^2 are provided at their upper and rear ends with track wheels d^3 that travel in the tracks or grooves of the runway. It will be observed that the links d', d^2 and C have a common axis d^4 on the back of the bucket. The ends of the rod or arbor d are connected with the upper ends of the links d^2 by means of vertical links or braces d^5, which latter have bolt holes d^6, whereby the gang of disks can be raised and lowered to vary the depth of cut thereof. Furthermore, the strain will, with this arrangement, be very largely upon the bolts inserted in the holes d^6, and through holes in the links d^2, and if the shale or other ground becomes too hard the pressure will cause a shearing of these bolts, thus preventing breakage of the other parts. Preferably, the gang of disks is so arranged that the outermost disk d^7 in the direction of their concavity, is slightly outside of the runway, as shown more clearly in Fig. 3, whereby this end disk will operate on the transverse surface or face of the excavation, and whereby there will always be clearance between this surface and the side of the runway. As the buckets travel in one direction, the bucket ahead will gather up the dirt previously disintegrated or loosened by the gang of disks; at the same time, the surface of the ground in rear of this bucket will be raked and disintegrated to prepare it for the return movement of the buckets. When the motion of the buckets is reversed, the bucket which was previously moving backward will move now forward and gather up the dirt which was pulverized or disintegrated during the first-mentioned forward movement of the buckets in the other direction. Thus each bucket ultimately gathers or collects the dirt which was disintegrated or loosened while it was traveling backward, and while the other bucket was gathering the dirt previously disintegrated or loosened in the same manner. As the concave surface of each disk is in the direction of the vertical end surface or face of the excavation, it follows that the endwise thrust of the gang of disks, which results from the tendency of each disk to move sidewise, is taken advantage of to keep the end disk tight up against the said surface or face of the excavation. In this way the excavating devices tend to hug or bear hard against the end surface or face of the excavation, with the result that the excavating operation is carried on in a satisfactory and proper manner. Moreover, there is always clearance between the side of the bucket and the face or surface of the excavation at the end or breast of the ditch, and also between this surface or face and the side of the runway. Being disposed across the path of the buckets, the gang of disks will disintegrate or break up the soil by a vertical cutting operation, each disk being in the nature of a vertical cutting device, and the sharp edges of the disk will cut through and disrupt many substances that would practically stop the bucket, or at least subject it to the danger of breakage if it had to primarily break up and disintegrate the ground preliminary to gathering a load. With my improved arrangement much of the wear and tear is eliminated, and each bucket while loading finds the ground in such condition that the loading is made easy and certain.

It is obvious that various changes and modifications can be made without departing from the spirit of my invention. It is also obvious that my invention is adapted for use on excavators of different kinds. For these reasons, therefore, I do not limit myself to the particular construction shown and described, nor to the use of my invention on any particular excavator.

What I claim as my invention is:

1. In an excavator, a back and forth operating bucket, means for disintegrating the ground, and mechanism for operating the bucket to gather the dirt loosened by said means, said means comprising a gang of cutting disks having a common axis disposed behind and across the path of travel of said bucket, and means for holding the gang in working position, whereby said disks are maintained at a cutting depth below the said bucket, said bucket having an independent and separate connection with said last mentioned means.

2. In an excavator, a back and forth operating bucket, means for breaking up or disintegrating the ground, and mechanism for operating the bucket to gather the dirt loosened by said means, said means comprising a plurality of cutting disks arranged together in a gang, disposed behind said bucket, and means for holding the gang in working position, whereby said disks are maintained at a cutting depth below the said bucket, said bucket having an independent and separate connection with said last mentioned means.

3. In an excavator, a bucket, means for disintegrating the ground, mechanism for operating the bucket to gather the dirt loosened by said means, said means compris-

ing a gang of rotary cutting disks extending across the path of travel of the said bucket, and a runway for holding said gang to its work, whereby said disks are maintained at a cutting depth below the said bucket, said gang being pivoted on said bucket, together with means for varying the distance between said runway and disintegrating means to regulate the cutting depth of the latter, said bucket having independent and separate connection with said runway.

4. In an excavator, a back and forth operating bucket, means for disintegrating the ground, and mechanism for operating the bucket to gather the dirt loosened by said means, said means having a plurality of devices arranged together in a gang to rake the surface of the ground to be traveled over by said bucket, disposed behind said bucket, operating with the same degree of efficiency when the bucket moves either backward or forward, and means whereby said bucket and devices are held to their work independently of each other.

5. In an excavator, a bucket, means for disintegrating the ground, mechanism for operating the bucket to gather the dirt loosened by said means, said means being disposed behind the bucket, and a runway upon which the bucket is movable back and forth, whereby the ground is disintegrated in rear of the bucket while the latter is collecting the dirt loosened by the previous backward motion thereof, together with means for varying the distance between said runway and disintegrating means to regulate the cutting depth of the latter.

6. In an excavator, a bucket, means for disintegrating the ground, mechanism for operating the bucket to gather the dirt loosened by said means, said means comprising a gang of cutting disks disposed behind the bucket, and a runway on which the bucket is movable back and forth, whereby said disks cut the ground behind the bucket while the latter is collecting the dirt loosened by the previous backward motion thereof, together with means for varying the distance between said runway and disintegrating means to regulate the cutting depth of the latter.

7. In an excavator, a bucket, means for disintegrating the ground, mechanism for operating the bucket to gather the dirt loosened by said means, said means comprising a gang of vertically cutting devices disposed behind the bucket, and a runway for holding the bucket to its work, upon which the bucket is movable back and forth, whereby the ground is raked behind the bucket while the latter is collecting the dirt loosened by the previous backward motion thereof, together with means for varying the distance between said runway and disintegrating means to regulate the cutting depth of the latter.

8. In an excavator, a bucket, means for disintegrating the ground, when the bucket moves either forward or backward, mechanism for operating the bucket to gather the dirt loosened by said means, said means having a draft connection with the rear end of said bucket, and provisions independent of said means for pulling the bucket backward.

9. In an excavator, a bucket, means for disintegrating the ground, mechanism for operating the bucket to gather the dirt loosened by said means, said means having a draft connection with the rear end of said bucket, and a runway for holding the bucket and said means to the ground, upon which the same are movable back and forth, and provisions independent of said means for pulling the bucket backward, together with means for varying the distance between said runway and disintegrating means to regulate the cutting depth of the latter.

10. In an excavator, a bucket, means for disintegrating the ground, mechanism for operating the bucket to gather the dirt loosened by said means, another bucket, the two buckets being arranged back to back, a runway upon which said buckets are movable back and forth, and a connection between the rear ends of said buckets, said means being disposed between the two buckets, and being operative by movement of said buckets, in either direction, whereby each bucket fills while the ground in rear thereof is being prepared for the other bucket, together with means for varying the distance between said runway and disintegrating means to regulate the cutting depth of the latter.

11. In an excavator, apparatus for forming an excavation, comprising a bucket, means for disintegrating the ground, mechanism for operating the bucket to gather the dirt loosened by said means, another bucket, the two buckets being arranged back to back, a runway upon which said buckets are movable back and forth, a connection between the rear ends of said buckets, said means comprising a gang of disks extending across the path of travel of said buckets, disposed between said buckets, and being operative by movement of said buckets in either direction, whereby each bucket fills while the ground in rear thereof is being prepared for the other bucket, one of said disks being disposed in position to trim the vertical face of the excavation, together with means for varying the distance between said runway and disintegrating means to regulate the cutting depth of the latter.

12. In an excavator, a bucket, means for disintegrating the ground, mechanism for operating the bucket to gather the dirt loosened by said means, another bucket, the two buckets being arranged back to back, a runway upon which said buckets are mov-

able back and forth, and a connection between the rear ends of said buckets, said means comprising a gang of vertically cutting devices extending in a row across the path of the said buckets, disposed between said buckets, and wheels traveling on said runway, between said buckets, connected with said devices, together with means for varying the distance between said runway and disintegrating means to regulate the cutting depth of the latter.

13. In an excavator, apparatus for forming an excavation, comprising a bucket, means for disintegrating the ground, and mechanism for operating the bucket to gather the dirt loosened by said means, said means comprising a gang of cutting disks having a common axis disposed across the path of travel of said bucket, said disks being provided with convex sides all facing in the same direction and away from the vertical face of the excavation, when the excavator is in operation, to maintain a side thrust on said gang in the opposite direction.

14. In an excavator, apparatus for forming an excavation, comprising a bucket, means for disintegrating the ground, and mechanism for operating the bucket to gather the dirt loosened by said means, said means comprising a plurality of cutting disks arranged together in a group, said disks being provided with convex sides all facing away from the vertical face of the excavation, when the excavator is in use, to keep the said means from pulling away from said face of the excavation.

15. In an excavator, apparatus for forming an excavation, comprising a bucket, means for disintegrating the ground, and mechanism for operating the bucket to gather the dirt loosened by said means, said means comprising a gang of rotary cutting disks extending across the path of travel of the said bucket, and a runway for holding said gang to its work, said disks being provided with convex sides all facing in a direction away from the vertical face of the excavation, when in use, to prevent side thrust on said runway in this direction, together with means for varying the distance between said runway and disintegrating means to regulate the cutting depth of the latter.

16. In an excavator, apparatus for forming an excavation, comprising a bucket, means for disintegrating the ground, mechanism for operating the bucket to gather the dirt loosened by said means, said means comprising a gang of cutting disks disposed behind the bucket, and a runway on which the bucket is movable back and forth, whereby said disks cut the ground behind the bucket while the latter is collecting the dirt loosened by the previous backward motion thereof, said disks being provided with convex sides all facing in a direction away from the vertical face of the excavation, when in use, to prevent side thrust on said runway in this direction, together with means for varying the distance between said runway and disintegrating means to regulate the cutting depth of the latter.

17. In an excavator, apparatus for forming an excavation, comprising a bucket, means for disintegrating the ground, and mechanism for operating the bucket to gather the dirt loosened by said means, said means comprising a gang of cutting disks having a common axis disposed across the path of travel of said bucket, one of said disks being disposed in position to bear against the vertical face of the excavation.

18. In an excavator, apparatus for forming an excavation, comprising a bucket, means for disintegrating the ground, and mechanism for operating the bucket to gather the dirt loosened by said means, said means comprising a plurality of cutting disks arranged together in a group, one of said disks being disposed in position to bear against the vertical face of the excavation.

19. In an excavator, apparatus for forming an excavation, comprising a bucket, means for disintegrating the ground, mechanism for operating the bucket to gather the dirt loosened by said means, said means comprising a gang of rotary cutting disks extending across the path of travel of the said bucket, and a runway for holding said gang to its work, one of said disks being disposed in position to bear against the vertical face of the excavation, said runway being spaced a distance back from said face of the excavation, together with means for varying the distance between said runway and disintegrating means to regulate the cutting depth of the latter.

20. In an excavator, apparatus for forming an excavation, comprising a bucket, means for disintegrating the ground, mechanism for operating the bucket to gather the dirt loosened by said means, said means comprising a gang of cutting disks disposed behind the bucket, and a runway on which the bucket and disks are movable back and forth, disposed transversely of the horizontal direction of progress of the excavation, whereby said disks cut the ground behind the bucket while the latter is collecting the dirt loosened by the previous backward motion thereof, one of said disks being disposed in position to trim and form the vertical face of the excavation a distance from the formed side of said runway, together with means for varying the distance between said runway and disintegrating means to regulate the cutting depth of the latter.

21. In an excavator, apparatus for forming an excavation, comprising a bucket,

means for disintegrating the ground, mechanism for operating the bucket to gather the dirt loosened by said means, said means comprising a gang of cutting disks having a common axis disposed across the path of travel of said bucket, each disk being concave on one side and convex on the other side, the disks all having their concave sides facing toward the end wall of the excavation, and one of said disks being disposed in position to bear with its concave surface against the face of said end wall.

22. In an excavator, apparatus for forming an excavation, comprising a bucket, means for disintegrating the ground, mechanism for operating the bucket to gather the dirt loosened by said means, said means comprising a plurality of cutting disks arranged together in a group, each disk being concave on one side and convex on the other side, the disks all having their concave sides facing toward the end wall of the excavation, and one of said disks being disposed in position to bear with its concave surface against the face of said end wall.

23. In an excavator, apparatus for forming an excavation, comprising a bucket, means for disintegrating the ground, mechanism for operating the bucket to gather the dirt loosened by said means, said means comprising a gang of rotary cutting disks extending across the path of travel of the said bucket, and a runway having wheels traveling thereon for holding said gang to its work, each disk being concave on one side and convex on the other side, the disks all having their concave sides facing toward the end wall of the excavation, and one of said disks being disposed in position to bear with its concave surface against the face of said end wall outside of said runway, together with means for varying the distance between said runway and disintegrating means to regulate the cutting depth of the latter.

24. In an excavator, apparatus for forming an excavation, comprising a bucket, means for disintegrating the ground, mechanism for operating the bucket to gather the dirt loosened by said means, said means comprising a gang of cutting disks disposed behind the bucket, and a runway on which the bucket is movable back and forth, whereby said disks cut the ground behind the bucket while the latter is collecting the dirt loosened by the previous backward motion thereof, each disk being concave on one side and convex on the other side, the disks all having their concave sides facing toward the end wall of the excavation, and one of said disks being disposed in position to bear with its concave surface against the face of said end wall outside of said runway, together with means for varying the distance between said runway and disintegrating means to regulate the cutting depth of the latter.

25. An excavator comprising a pair of buckets arranged back to back, mechanism for operating said buckets back and forth, and means between said buckets for loosening the ground, operative in both directions of travel thereof, whereby each bucket is adapted to load while the said means are preparing the ground for the return travel of the other bucket, and members whereby said buckets and means are guided independently of each other over a definite path of travel.

26. An excavator comprising a pair of buckets arranged back to back, mechanism for operating said buckets back and forth, means between said buckets for loosening the ground, operative in both directions of travel thereof, said means including a gang of cutting devices, a pivotal connection between said gang and one of said buckets, wheels for said gang, a runway for said wheels, and an adjustable connection between said wheels and gang, movable about the axis of said pivotal connection.

27. An excavator comprising a bucket, a gang of cutters therefor, a pivotal connection between said bucket and gang, wheels for said gang, an adjustable connection between said wheels and gang, movable about the axis of said pivotal connection, and a runway for said wheels.

28. An excavator comprising a bucket, a gang of cutters therefor, a pivotal connection between said bucket and gang, wheels for said gang, an adjustable connection between said wheels and gang, movable about the axis of said pivotal connection, and a runway for said wheels, said gang comprising a plurality of disks disposed in rear of said bucket.

Signed by me at Chicago, Illinois, this 25th day of November, 1911.

CHARLES C. JACOBS.

Witnesses:
E. H. CLEGG,
GEO. F. SCHMIDT.

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

Correction in Letters Patent No. 1,156,291.

It is hereby certified that in Letters Patent No. 1,156,291, granted October 12, 1915, upon the application of Charles C. Jacobs, of Amboy, Illinois, an error appears requiring correction as follows: In the grant, in the printed specification, and in the headings of the drawings the title of the invention was erroneously given as "Disintegrator Attachments for Elevator-Buckets," whereas said title should have been given as *Disintegrator Attachments for Excavator Buckets;* and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 7th day of December, A. D., 1915.

[SEAL.]

Cl. 37—39.

R. F. WHITEHEAD,

Acting Commissioner of Patents.