

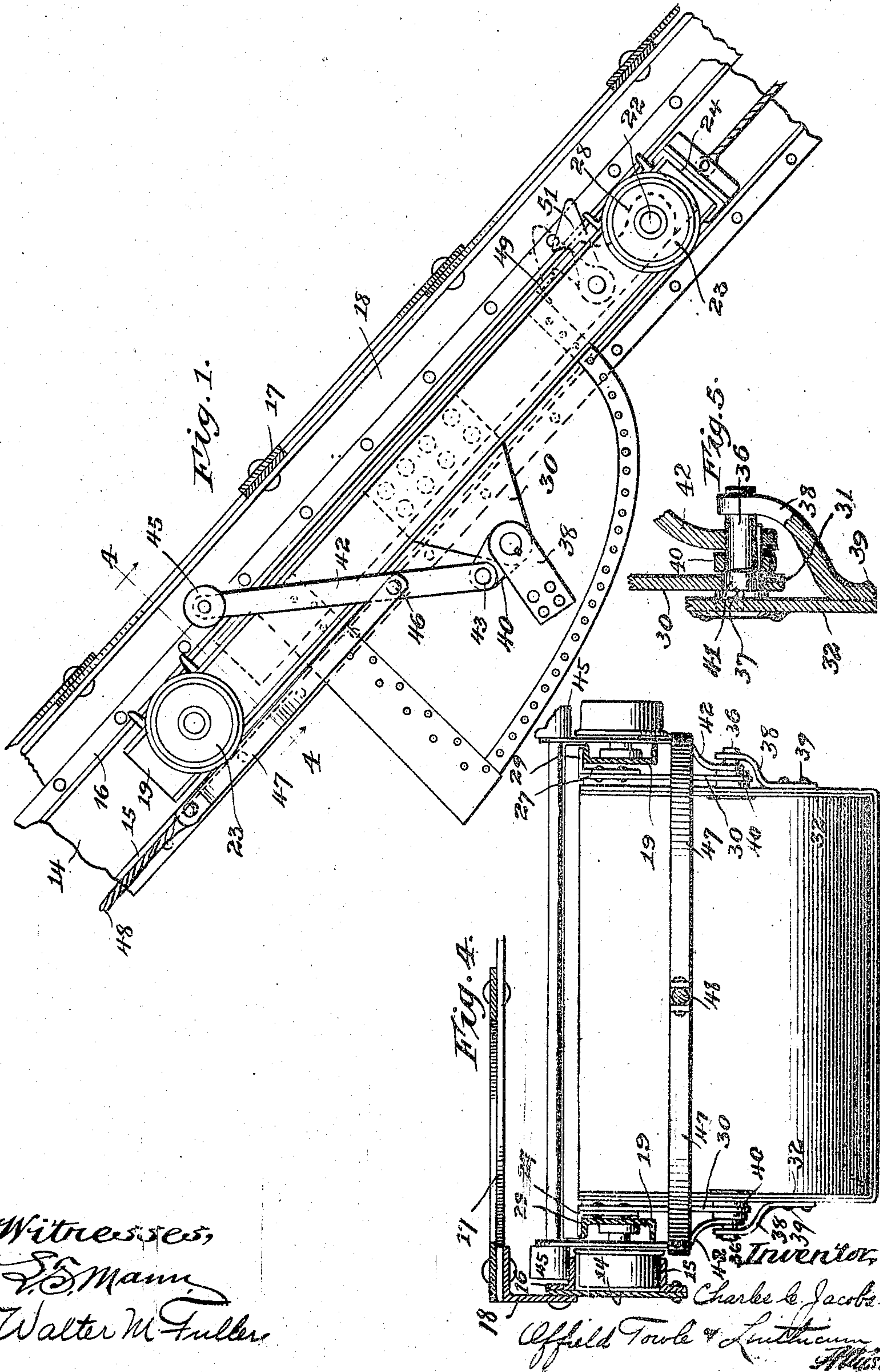
No. 885,756

C. C. JACOBS.  
EXCAVATOR.

PATENTED APR. 28, 1908.

APPLICATION FILED FEB. 28, 1907.

3 SHEETS—SHEET 1.



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Walter M. Fuller

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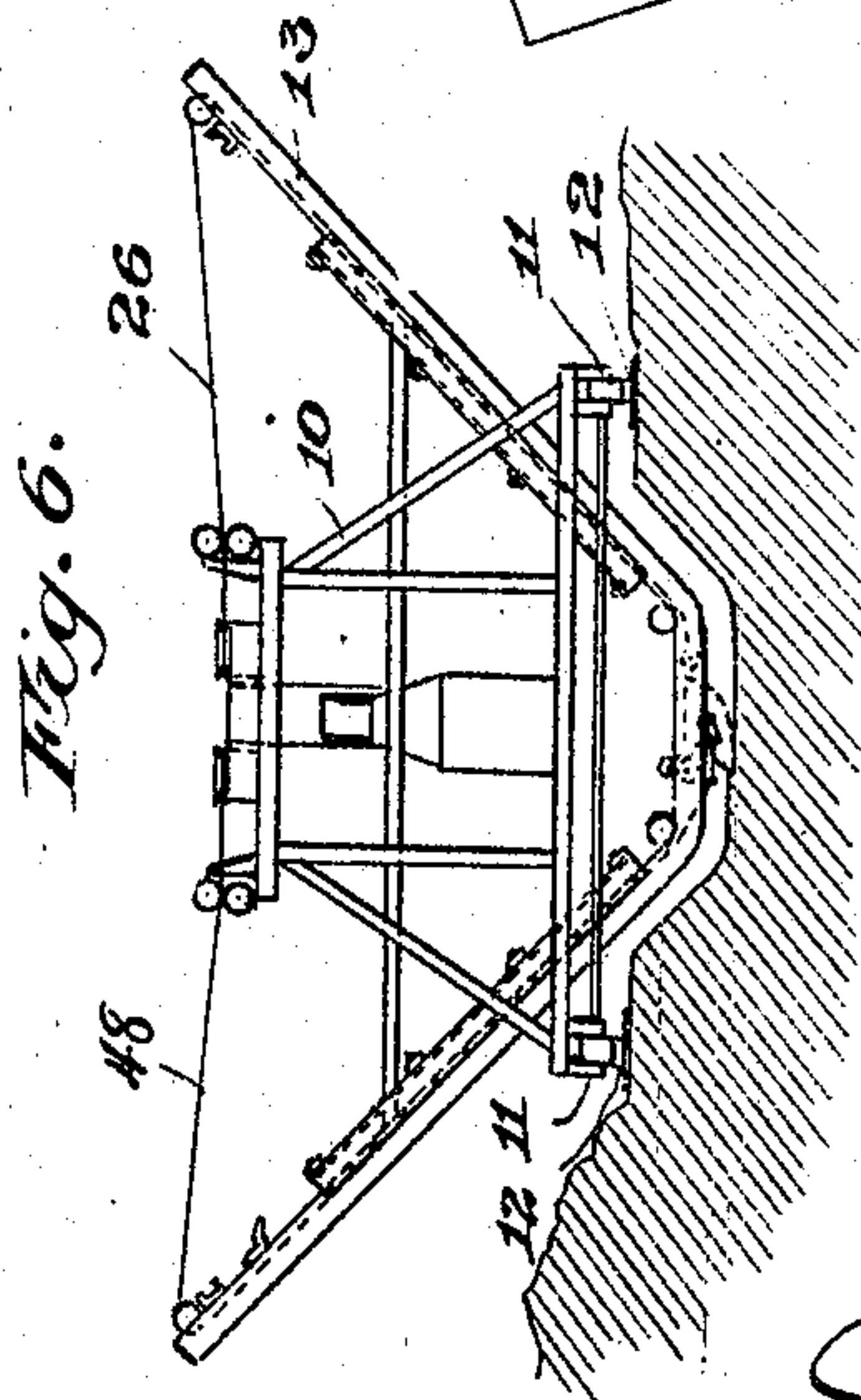
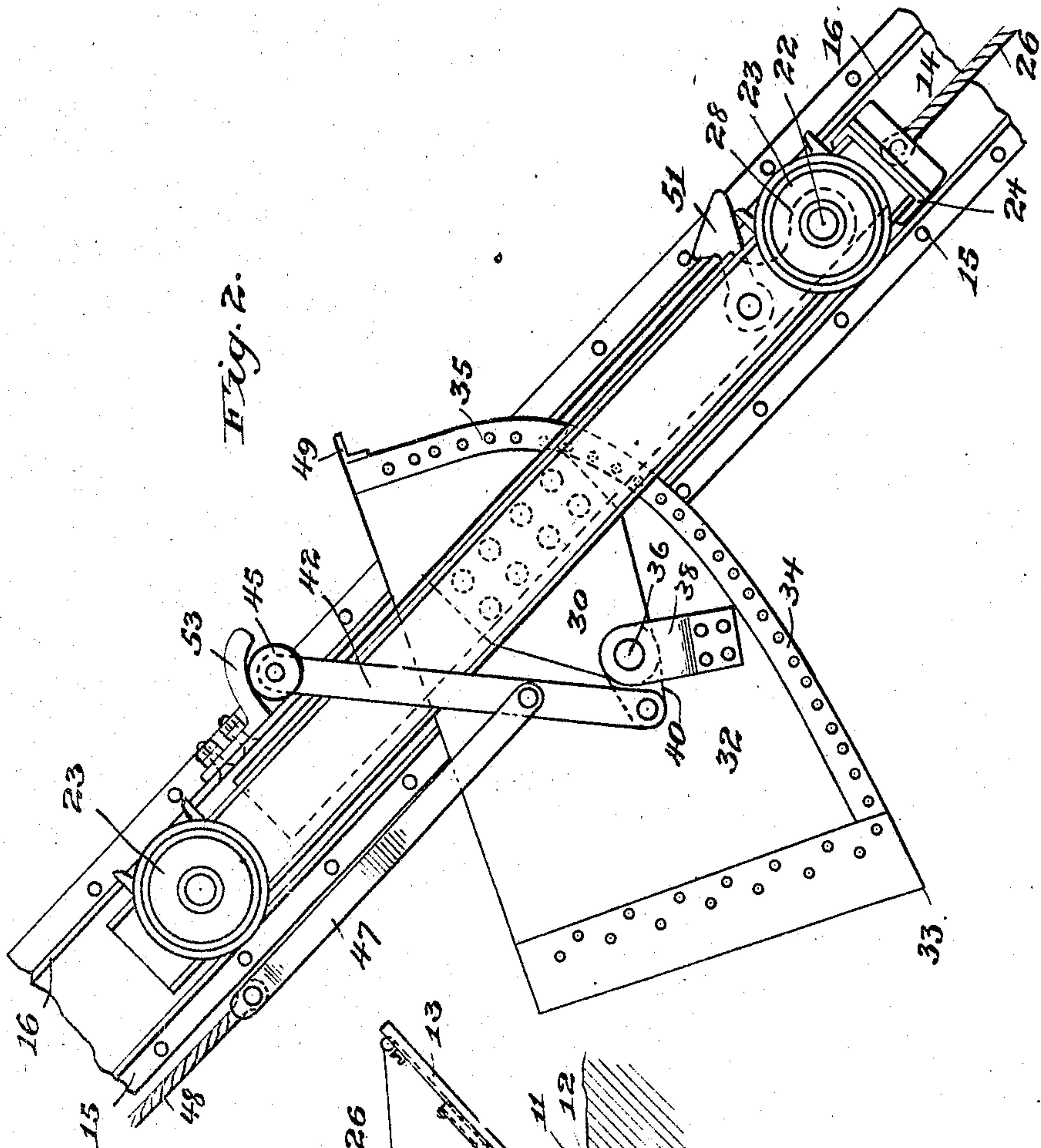
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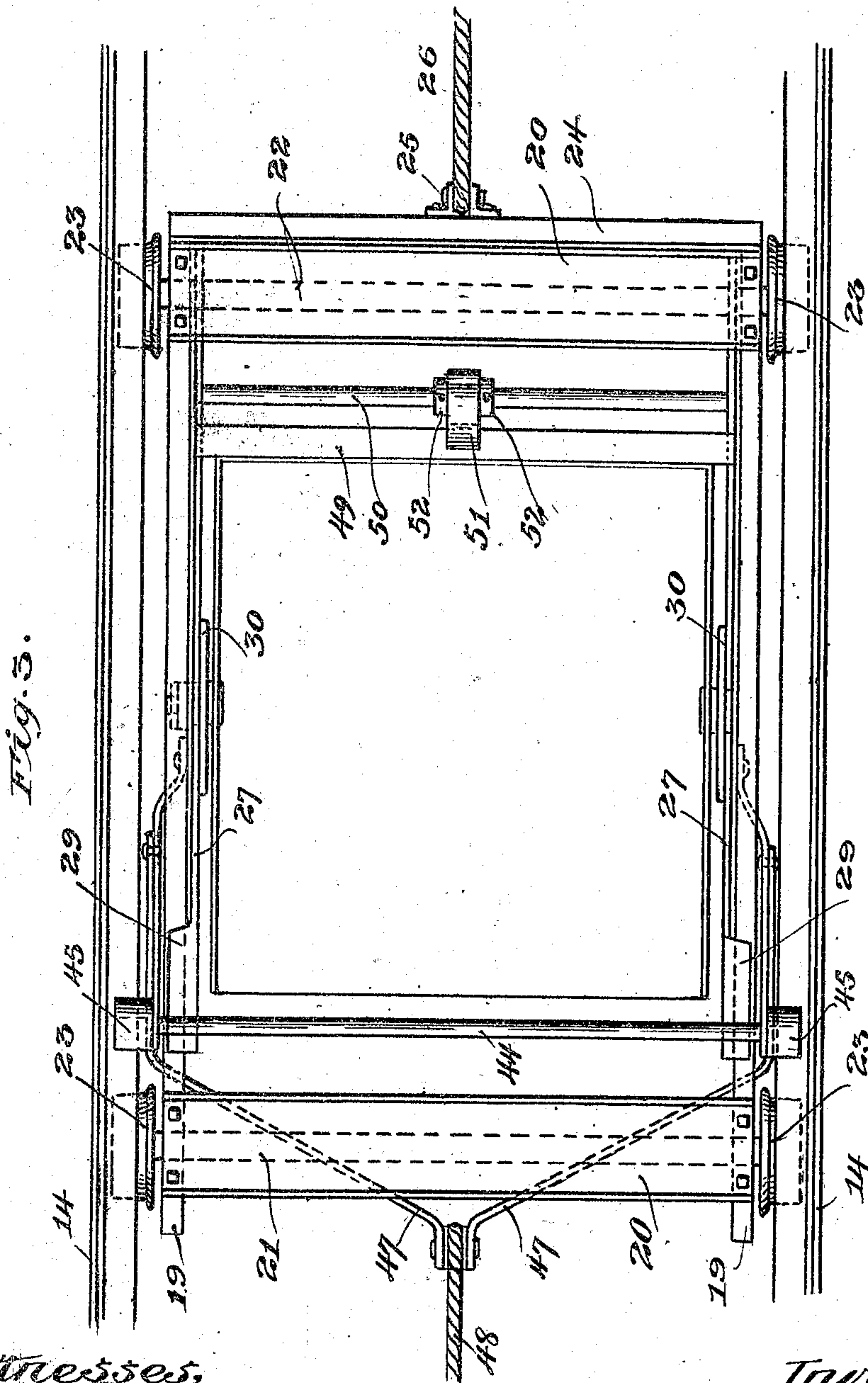
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# UNITED STATES PATENT OFFICE.

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## EXCAVATOR.

No. 885,756.

Specification of Letters Patent.

Patented April 28, 1908.

Application filed February 28, 1907. Serial No. 359,795.

*To all whom it may concern:*

Be it known that I, CHARLES C. JACOBS, residing at Chicago, Cook county, Illinois, have invented certain new and useful Improvements in Excavators, of which the following is a specification.

My invention concerns excavators and relates particularly to the bucket of shovel and means for dumping and righting the same.

10 In the preferred embodiment of my invention the bucket having a sharp cutting edge is pivotally mounted on a truck equipped with rollers adapted to travel on tracks shaped to conform substantially to the cross-sectional profile or outline of the proposed trench. The bucket is provided with a bail, the ends of which are pivoted to crank arms connected to the bucket on either side. The advancing or forwardly pulling cable is fastened to the bail and holds the bucket in load-retaining position, and when rollers on the bail strike fixed abutments or stops further advance of the bucket causes its turning in its bearings to discharge the load.

25 On the accompanying drawings a desirable embodiment of my invention has been illustrated and on the various views like reference characters refer to the same parts throughout.

30 Figure 1 is a side elevation of the improved form of bucket, showing its cooperation with one of the tracks; Fig. 2 is a view similar to Fig. 1, the bucket being in load-discharging position; Fig. 3 is a plan view of the bucket or shovel, and in addition shows fragments of the tracks of the main frame; Fig. 4 is a section on line 4—4 of Fig. 1, as viewed in the direction indicated by the arrows; Fig. 5 is a cross-section on enlarged scale, showing the details of the pivotal mounting at one side of the bucket; and Fig. 6 is a view on a reduced scale of the complete excavator.

Referring to Fig. 6 it will be observed that the main supporting frame, 10, of the machine is equipped with rollers, 11, adapted to travel on rails, 12, laid alongside the opposite edges of the trench. Vertically adjustable in this main supporting frame is the ditch or trench frame, 13, comprising a pair of substantially U-shaped plates, 14, shaped in part to conform substantially to the cross-sectional profile or outline of the trench, as is clearly shown in Fig. 6. Each plate, 14, has fastened to its inner face a lower angle bar, 15, and a similar upper bar, 16. A lattice

work, 17, secured to angles, 18, fastened to the two plates, 14, hold the plates together and space them apart the proper amount. Adapted to travel on these U-shaped tracks is a bucket truck composed of the channel side beams or bars, 19, tied together and spaced apart at their front and back ends by means of two channel bars, 20. This truck is equipped with forward and rear axles, 21 and 22, rotatably mounted in suitable bearings or boxes and provided at their opposite ends with flanged wheels or rollers, 23, of substantially the same diameter as the distance between the parallel inwardly projecting flanges of angle bars 15 and 16.

Across the rear end of the truck extends a bar, 24, to the center of which, at 25, is attached one end of retracting cable, 26. Disposed just inside of channels 19 is a pair of longitudinal side plate members, 27, reduced in depth at their rear ends at 28, as shown in Figs. 1 and 2, and apertured to receive the rear axle, 22, upon which they may turn. At its forward end each member, 27, is bent over outwardly to provide the ear or flange, 29, adapted under normal conditions to rest upon the top flange of the corresponding top channel, 19, thereby limiting the downward turning of member, 27. A downwardly extended plate or bucket support, 30, is riveted to the inner face of each of the members, 27, and at its lower end is circularly apertured, at 31, to accommodate one of the trunnions or short shafts of the bucket. The bucket or shovel, 32, is open at its top and front end, and the lower edge, 33, of its forward mouth is sharp so as to be able to shave off a layer of dirt as the bucket is pulled along on its guiding and supporting tracks. The bottom and rear walls, 34 and 35, of the shovel are completely closed in order to retain the dirt scraped off. On each side of the bucket I provide a short shaft, 36, which is keyed at 37, to the side of the bucket and keyed at its outer end, to a bracket, 38, riveted at 39, to the side of the bucket, and keyed also to a comparatively short crank arm, 40. The center portion, 41, of the shaft, 36, is cylindrical, fits in and is adapted to turn in the opening, 31, at the lower end of the corresponding supporting plate, 30. From this description and illustration it will be apparent that by turning either one of the crank arms on opposite sides of the bucket the whole bucket may be swung or turned in its bearings



to discharge its load. An upwardly extended arm, 42, is pivotally connected at 43 with the free end of each of the crank arms, 40, and the top ends of these arms are apertured to form bearings for a cross shaft, 44, the two opposite ends of which are supplied with rollers, 45, adapted to travel on the top surfaces of angle bars, 16. To each of these arms, 42, at the point, 46, near the middle of the arm, I pivot a bent bar, 47, to the forward ends of which is fastened a forwardly pulling or advancing cable, 48. Across the rear upper edge of the bucket I provide an angle or similar bar, 49, of sufficient length to overlap the top edges of members 27, as is clearly illustrated in Fig. 3. At the rear of the bucket there is provided a shaft or rod, 50, upon which is rotatably mounted a hook, 51, the hooked portion or head of which is adapted to overlie the angle bar, 49, in order to prevent the sharp cutting edge of the bucket sinking too deeply into the ground and discharging the contents of the shovel. A convenient means of retaining the hook, 51 in place is a pair of collars, 52, on either side of the hook and fixed to the shaft or rod, 50. At proper points on the tracks, 14, I bolt a pair of stops or fingers, 53, to the flanges of angle bars, 16, for the purpose of limiting the forward travel of rollers, 45, and arms, 42.

It is to be understood that a suitable engine and boiler is mounted on the main frame, 10, and is adapted to draw in and pay out cables 48 and 26, to cause the reciprocation of the truck and bucket on the tracks. The details of this part of the machine have not been illustrated since they are well understood in this art and may be of any convenient type or form.

When the truck and bucket or shovel are descending on the right hand portion of the tracks, 14, as viewed in Fig. 6, and also while the truck and shovel are traversing the central horizontal portions of the tracks, hook, 51, because of the action of gravity, engages angle bars, 49, and holds the bucket in the position indicated in Fig. 1. During the upward travel of the truck and bucket on the left hand portion of the tracks, this hook drops away from the bar, 49, permitting the bucket to be turned in its bearings as soon as the rollers, 45, strike the stops, 53. As long, however, as the cable, 48, is pulling the combined truck and bucket forwardly and before the rollers have reached the stops, the bucket is maintained in load-retaining position since the forward pull on arms or bars, 47, tends through the crank arm, 32, to keep the bucket righted. Under these conditions downward swinging of arms, 42 and the shaft, 44, which together, in effect, constitute a bail, is prevented by the rollers, 45, riding or traveling on the top surfaces of angle bars, 16. When the rollers meet the stops, 53, further travel of the same in a forward direc-

tion is prevented, and continued pulling on cable, 48, swings the crank arms, 40 downwardly, as shown in Fig. 2, thereby turning the bucket in its bearings so as to discharge its load.

As will be understood, a winding up of cable 26 on its drum on the main frame of the machine causes a backward or rearward travel of the truck and bucket on the tracks, which are so shaped as to produce a trench of the desired cross section. By maintaining a slight pulling action upon cable, 48, during this backward travel of the truck and bucket, the bucket may be caused to right itself because of the turning of the crank arms, 40, caused by the pull of the cable, 48, exerted through bars, 47 and arms, 42. During the backward, rearward travel on the right hand portions of the tracks hook, 51, falls by gravity into place to catch over angle bar, 49, whereby on the next forward travel the bucket is maintained and securely held in proper position for shaving off a layer of dirt of the desired thickness. It will be understood that in this structure as in other similar structures in this art, the frame, 13, is fed downwardly by steps so that during the reciprocations of the bucket it successively shaves or scrapes off layers of dirt and removes the same from the trench, the dirt being dumped on one of the banks by the method described above.

Attention is directed to the fact that the bucket is not pivoted or hinged directly to the truck, but rather to the members, 27, these members at their back ends being hung on axle, 22, so that the whole bucket may be swung upwardly around this axle as a center during the rearward travel of the same, permitting the bucket to ride over any inequalities or obstructions. As soon as the obstacle is passed, however, the bucket and members, 27, drop to their original positions with the flanges, 29 resting on the top flanges of channels, 19.

To those skilled in the art it will be apparent that numerous minor mechanical changes may be made in the construction shown and described without departing from the heart of my invention or sacrificing any of its advantages or benefits.

I claim:

1. In an excavator, the combination of a truck bucket rotatably mounted on said truck, an arm pivotally connected to said bucket, and means connected to said arm whereby the bucket may be pulled along, substantially as described.

2. In an excavator, the combination of a rotatably mounted bucket, an arm pivotally connected to said bucket, a stop cooperating with said arm to limit its travel, and means connected to said arm whereby the bucket may be pulled along, substantially as described.



3. In an excavator, the combination of a rotatably mounted bucket, an arm pivoted thereto, a roller mounted on said arm, a track upon which said roller travels, a stop to  
5 limit the travel of said roller, and means connected to said arm whereby the bucket may be pulled along, substantially as described.

4. In an excavator, the combination of a  
10 truck, a bucket rotatably mounted on said truck, a crank arm adapted to turn with said bucket, an arm pivotally connected to said crank arm and a cable fastened to said arm whereby the bucket may be pulled along,  
15 substantially as described.

5. In an excavator, the combination of a truck, a bucket, a bail pivotally connected at its opposite ends to said bucket, and means fastened to said bail whereby the  
20 bucket may be pulled along, substantially as described.

6. In an excavator, the combination of a rotatably mounted bucket, a bail pivotally connected at its ends to said bucket, a stop  
25 cooperating with said bail, and means fastened to said bail whereby the bucket may be pulled along, substantially as described.

7. In an excavator, the combination of a track, a truck, one or more wheels of said  
30 truck adapted to travel on said track, a bucket rotatably mounted on said truck, an arm pivotally connected to said bucket, a roller on said arm adapted to travel on said track, and means fastened to said arm where-  
35 by the bucket may be pulled along, substantially as described.

8. In an excavator, the combination of a track shaped to conform substantially to the cross-sectional profile of the proposed trench,

a truck, one or more wheels on said truck 40 traveling on said track, a bucket rotatably mounted on said truck, an arm pivotally connected to said bucket, a roller on said arm adapted to travel on said track, a stop co-  
operating with said roller to limit its travel, 45 and means fastened to said arm whereby the bucket may be pulled along, substantially as described.

9. In an excavator, the combination of a pivoted bucket, an arm pivotally connected  
50 to said bucket, means fastened to said arm whereby the bucket may be pulled along, and means to prevent said bucket from turning to discharge its contents during a por-  
tion of its travel, substantially as described. 55

10. In an excavator, the combination of a truck, a bucket rotatably mounted on said truck, a bail pivotally connected to said bucket, a cable fastened to said bail and  
60 affording means for pulling said bucket along, and a hook on said truck cooperating with said bucket to prevent turning of the latter to discharge its load during a portion of its travel, substantially as described.

11. In an excavator, the combination of a  
65 bucket adapted to turn, an arm pivotally connected to said bucket, a track, said arm cooperating with said track and a cable adapted to pull said bucket along fastened to said arm between its pivotal connection  
70 with said bucket and that portion of the arm cooperating with said track, substantially as described.

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