

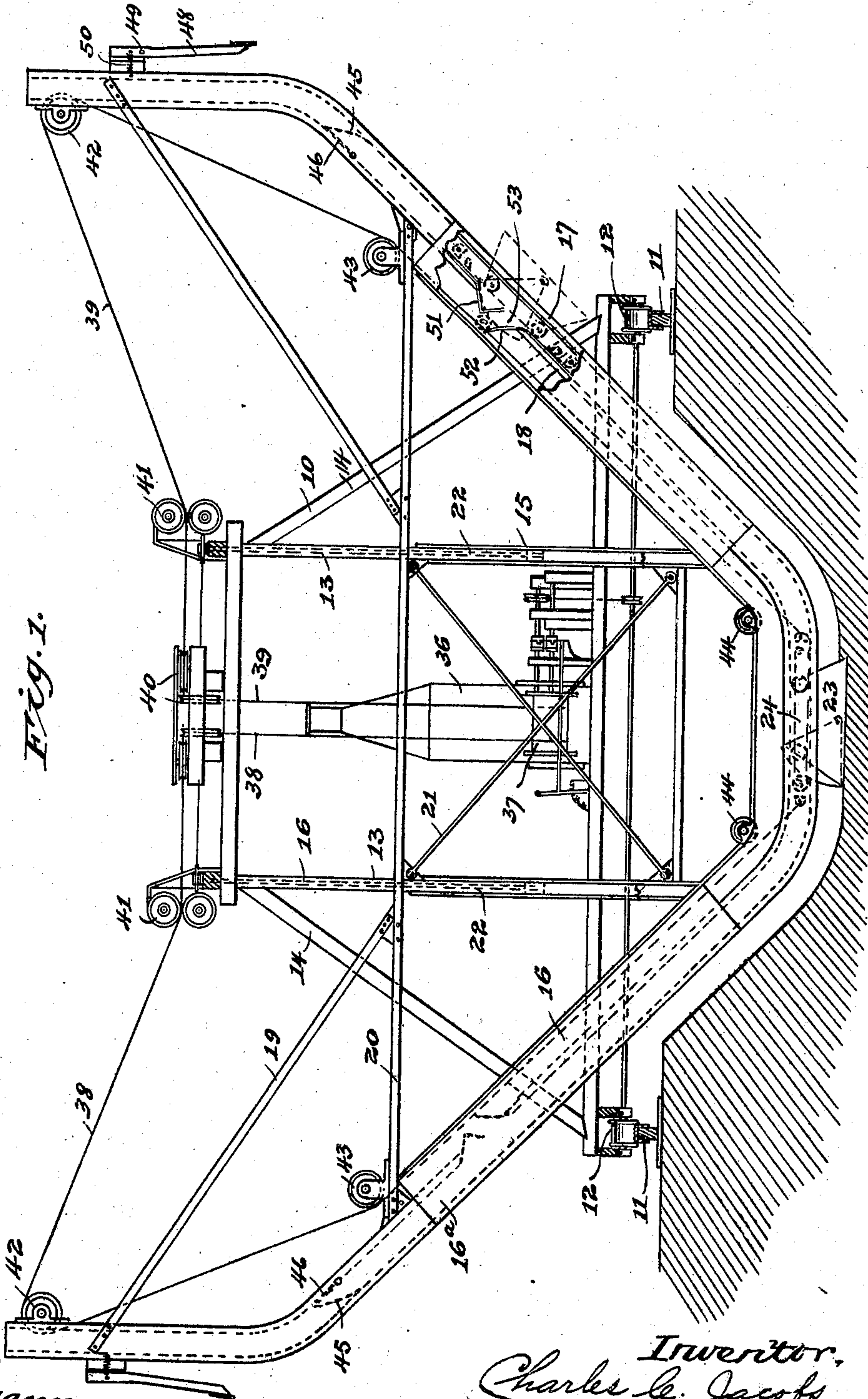
No. 858,721.

PATENTED JULY 2, 1907.

C. C. JACOBS.
EXCAVATOR OR DITCH DIGGING MACHINE.

APPLICATION FILED AUG. 6, 1906.

4 SHEETS—SHEET 1.



Witnesses
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Water M. Fuller

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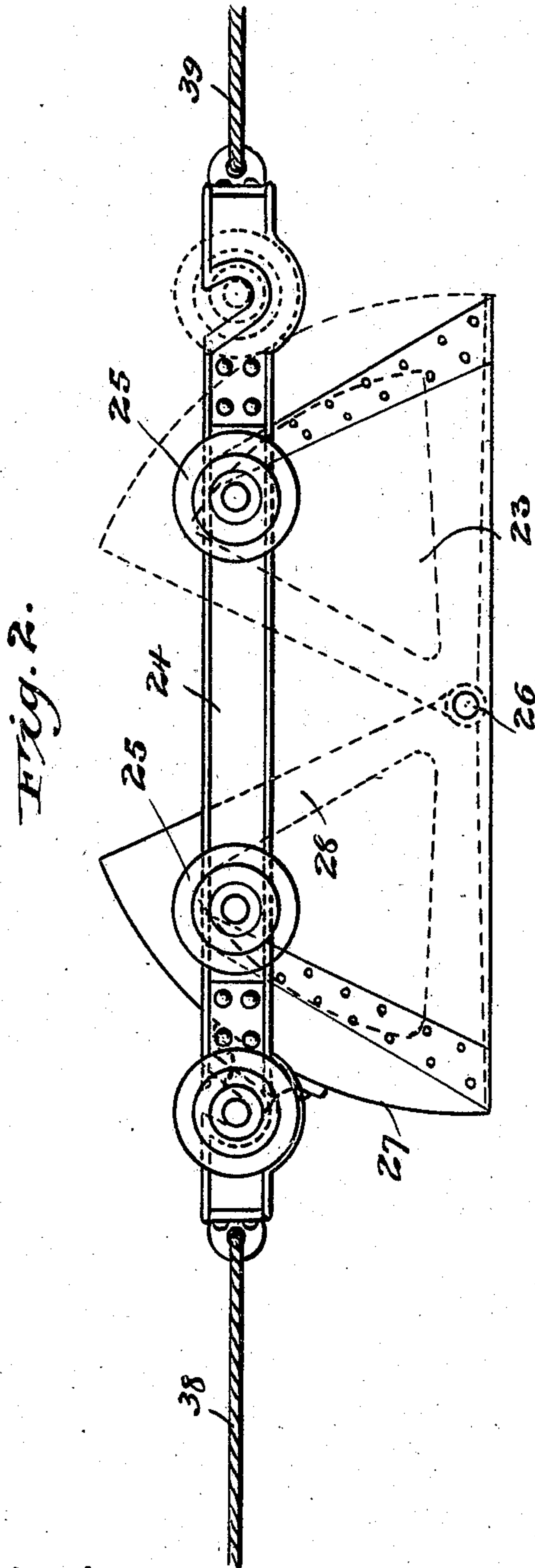
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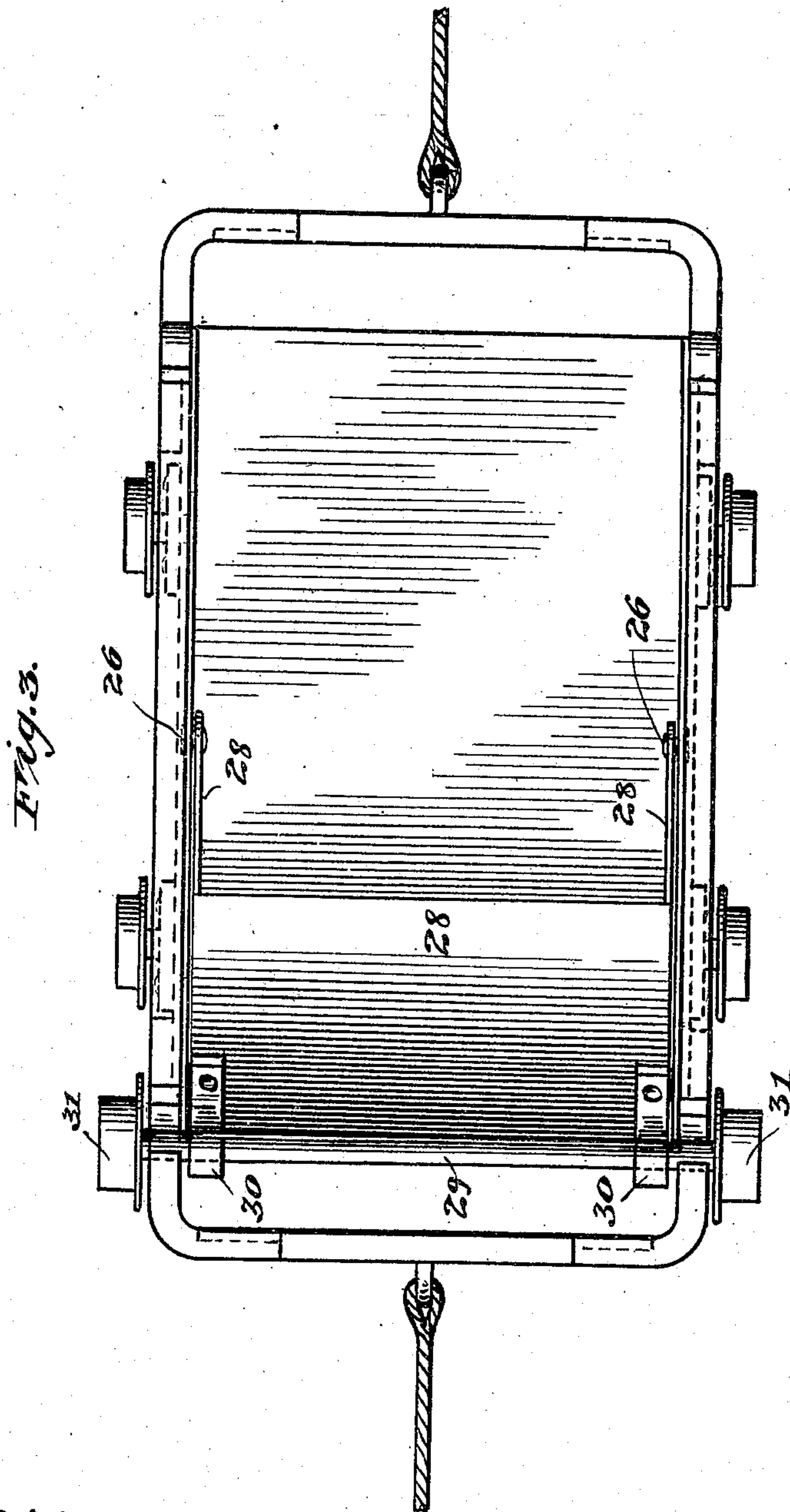
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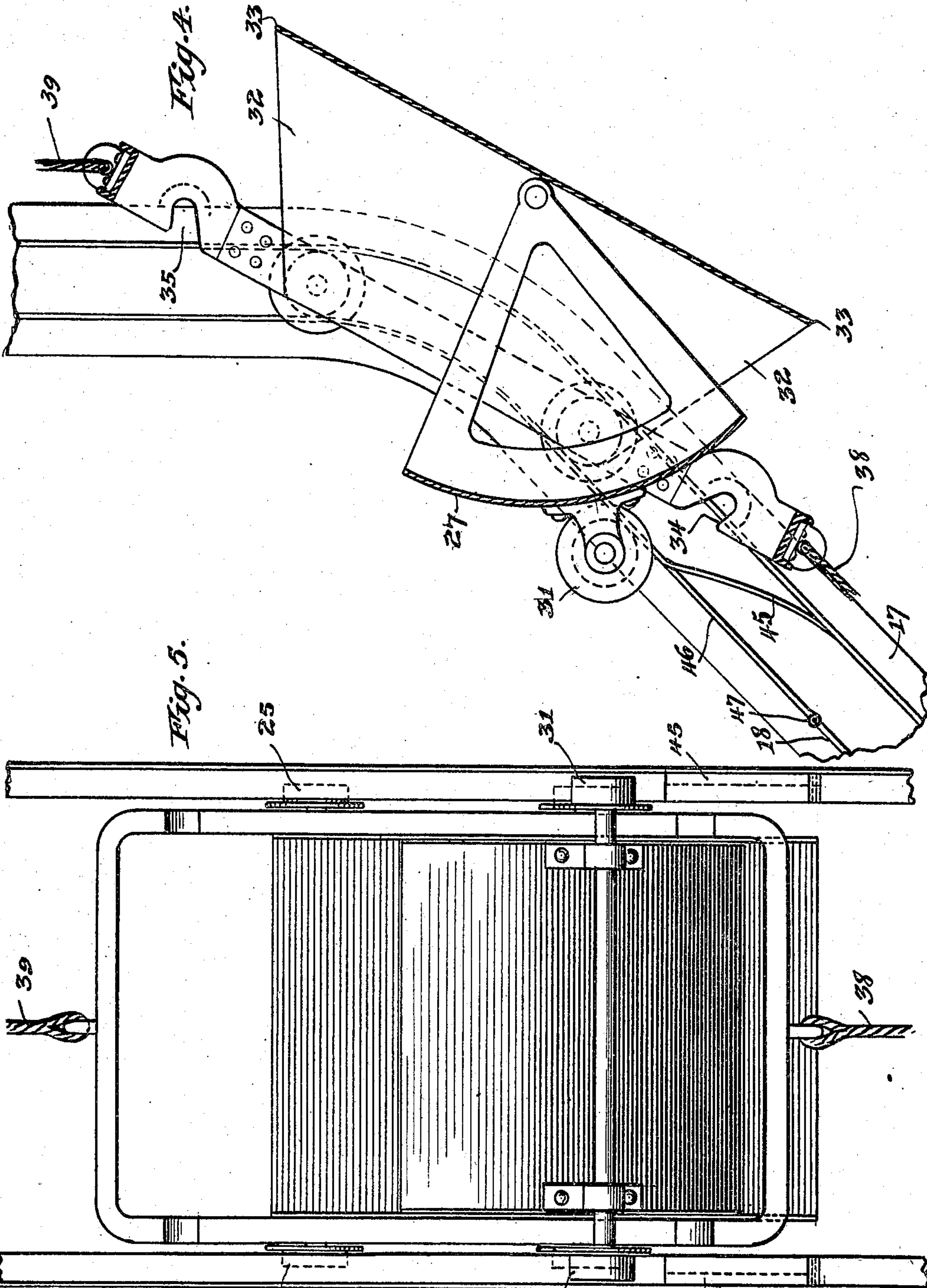
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UNITED STATES PATENT OFFICE.

CHARLES C. JACOBS, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE F. C. AUSTIN DRAINAGE EXCAVATOR COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

EXCAVATOR OR DITCH-DIGGING MACHINE.

No. 858,721.

Specification of Letters Patent.

Patented July 2, 1907.

Application filed August 6, 1906. Serial No. 329,424.

To all whom it may concern:

Be it known that I, CHARLES C. JACOBS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Excavators or Ditch-Digging Machines, of which the following is a specification.

My present invention relates to an excavator or ditching machine for digging trenches or building embankments, the device employing for the removal of the dirt from the trench one or more buckets or shovels each having a pair of mouths with sharp cutting edges, and I equip each of such buckets or shovels with means for closing either one of the mouths so that the dirt scraped from the trench may be retained in the shovel until it is purposely opened to perform the dumping operation.

The main frame of the excavator has mounted in it a vertically adjustable track frame having a track or track section shaped to conform substantially to the outline of the trench to be dug, and it is upon this track that the bucket having two mouths reciprocates, the two sharp edges of the bucket operating alternately to shave off layers of earth as the bucket travels along. The dirt caught in the bucket is alternately dumped on the opposite banks of the trench and the pivoted hood or closure mounted on the bucket is automatically shifted so as to close the two mouths in succession to retain the dirt in the bucket until the hood is raised by a suitable track at the proper time so as to discharge its load as will be readily apparent from the following description. By employing such a construction I do away with the necessity of using two buckets or shovels when the dirt is to be removed from the trench in both directions and dumped on both banks. The use of a single bucket and single reversible hood reduces the weight of the dead load so that one shovel performs the digging and excavating equivalent to that of two separate shovels.

The accompanying drawings form a part of this specification and therein

Figure 1 illustrates an elevation of the excavator crosswise the trench, certain parts being broken away to more clearly show the construction; Fig. 2 is a side elevation of the shovel or bucket, its truck, and reversible hood; Fig. 3 is a plan view of the structure shown in Fig. 2; Fig. 4 is a longitudinal section through the bucket showing a certain portion of the track upon which the truck travels; and Fig. 5 is an elevation of the structure illustrated in Fig. 4.

The excavator or ditching machine includes a main frame 10 mounted so as to travel longitudinally of the trench on temporary rails 11, wheels or rollers 12 being

supplied on the lower portion of the frame to facilitate its movement on the rails. This main frame together with the track frame, described below, is similar to the corresponding parts shown and described in my Reissue Patent No. 12,441 granted January 30, 1906, so that a full description of all of the details of the same is unnecessary. Main frame 10 is supplied with upright posts 13, suitably braced by inclined members 14, and within the main frame and vertically adjustable thereon is a track frame 15 which may be fed up and down by means of screws 16 whose operation will be readily understood from the description set forth in my reissue patent mentioned above. This track frame includes a pair of plate members 16^a [which may be built up of small sections] of substantially U-shape, their inner surfaces being supplied with guiding angle bars 17 and 18, which form the tracks or track section. It will be observed that the U-shaped guiding track 16 on which the bucket or scraping shovel travels is bent or shaped on its lower portion to conform substantially to the outline or cross-sectional profile of the trench or ditch. The various parts of this bucket or shovel supporting and guiding frame 15 are bound together and cross-connected by the bars or rods 19, 20 and 21, while the upright posts 22 of the track frame have guiding members to co-operate with the vertical posts 13 of main frame 10 so as to guide the track frame in its up and down movement.

Adapted to travel on the guiding track 16 is a bucket 23 depending from and fastened to a truck 24, the latter being equipped with suitable wheels or rollers 25 which travel between and co-operate with the track angle bars 17 and 18. Pivoted to the sides and centrally of the bucket at the points 26 is a curved mouth closing hood 27 mounted on sectors 28 disposed inside of the sides of the bucket, as is clearly shown in Fig. 3. On the outer curved surface of this hood I rotatably mount a transverse shaft 29 in bearings 30, the ends of this shaft having the rollers or wheels 31 affixed thereto. As will be observed the hood may be reversed by turning upon its pivots 26 so as to close either mouth of the bucket, the mouths referred to being the open portions 32, each of which has a lower sharp cutting edge 33. In order to accommodate the shaft 29 when the hood is in either of its mouth closing positions the truck frame is notched at 34 and 35, as is clearly shown. In order to reciprocate this scraping bucket 23 upon the guiding track 16 I provide on the platform of the main frame 10 a steam boiler and engine 36 which operate a drum 37 so that the latter winds up and pays out two cables 38 and 39 which are fastened, respectively, to the rear and front portions of the shovel truck 24. Each of these cables co-oper-

ates with guiding sheaves 40 on top of the main frame, passes between guiding rollers or sheaves 41, over one of the sheaves 42 at the top end of one of the legs of the track frame and beneath similar sheaves 43 and 44 on other portions of the track frame.

In order that the hood may be raised so as to open the rear or lower mouth of the bucket as the latter travels upwardly on one leg of the track, so that the contents of the bucket may be discharged or dropped out of the rear mouth, I provide an inclined track or plate 45 connecting the flange of angle bar 17 with the parallel flange of the upper angle bar 18, this inclined track 45 being of less width than the flanges of the angle bars, as is clearly shown in Fig. 5, and just above this track 45 the flange of angle bar 18 is interrupted and in its place is mounted a door or pivoted track plate 46 hinged at 47 so that it may open upwardly. It is to be understood that the rollers or wheels 31 on the hood travel up the inclined tracks 45 as the shovel moves upwardly on its track, that is—between the flanges of angle bars 17 and 18, and to accomplish this result the tread of wheels 31 is made wider than that of the truck wheels 25 so that as the shovel travels upwardly the hood 27 is raised because its rollers 31 move up the tracks 45 opening the doors 46 which again close, the rollers 31 then traveling on the upper surfaces of angle bars 18. When the hood opens the rear or lower mouth, as stated above, the greater portion of its load is discharged, and whatever earth remains within the bucket is dislodged by a pivoted scraper 48, one of which is provided at each of the upper ends of the track. Each scraper is pivoted at 49 and spring-pressed into operative position by a spring 50.

It is obvious that before the bucket descends to the trench so as to remove therefrom another layer of earth it is necessary to reverse the position of the hood so that it will close the other mouth of the bucket, and to accomplish this result I provide on each one of the inclined legs of the track means for automatically reversing the position of the hood, this means including an inverted V-shaped member 51 and an adjacent inclined plate 52 below which the flange of angle bar 18 is omitted leaving the space 53 so that the hood will not only be reversed but will be brought into position to completely close the bucket's mouth.

The operation of this device is as follows:—Assuming that the bucket is descending the inclined left-hand portion of the track, as viewed in Fig. 1, cable 38 being paid out while cable 39 is correspondingly wound up on drum 37, and also assuming that the track frame 15 has been fed down sufficiently so that when the shovel reaches the trench the sharp edge of its forward mouth shaves off a layer of earth the full width of the trench, the dirt is retained in the bucket on its upward movement on the right-hand portion of the track because the hood closes the rear mouth of the bucket or shovel. When the rollers 31 of the hood reach the inclined tracks 45 they travel outwardly on the same opening the doors 46 and then pursue their course on the upper surfaces of the flanges of angle bars 18. This operation opens the bottom mouth of the bucket, permitting the dropping or discharge of its load, and whatever dirt adheres to the interior of the bucket is scraped out or loosened so that it will fall out by the scraper 48. The

rotation of drum 47 is then reversed, cable 38 being drawn in and cable 39 being paid out to enable the bucket to travel downwardly on the right-hand part of the track, and during this operation the rollers 31 ride over the doors 46 continuing their travel on the flanges of the angle bars 18 until they reach the inverted V-shaped members 51, up one incline of which they travel. While they are moving up these inclines the bucket is continuing its forward movement, and owing to the retardation of these rollers 31 by the members 51, and by the members 52, which they engage immediately upon leaving members 51, the hood is thrown so as to close the upper mouth of the bucket, the rollers 31 passing through the spaces 53 down on to the flanges of angle bars 17. When the bucket reaches the other portion of the track, that is—the left-hand part shown in Fig. 1, the operation of dumping and hood reversal is repeated whereby the bucket or shovel reciprocates back and forth each time shaving off a layer of earth and discharging it upon the adjacent bank, the track frame 15 being fed down step by step as is required. When this section of the trench has been excavated to the proper depth the shovel or bucket supporting and guiding track is elevated by means of screws 16 and moved with the frame longitudinally of the trench on the temporary rails 11 over an unexcavated portion of ground which is scraped out, as will be readily understood, to form an extension or additional section of the trench or ditch.

To those skilled in the art it will be apparent that various minor mechanical changes may be made in my improved device without sacrificing any of the advantages of or departing from the substance of my invention.

I claim:

1. A bucket for an excavator having two mouths each having a sharp cutting edge, and means to close either of said mouths to retain dirt in the bucket, while the cutting edge of the other mouth is operative substantially as described. 100
2. A bucket for an excavator having a plurality of mouths each having a sharp cutting edge, and a single means adapted to close any one of said mouths to retain dirt in the bucket, substantially as described. 105
3. A bucket for an excavator having two mouths each with a sharp cutting edge, and a pivoted hood adapted to close either of said mouths to retain dirt in the bucket, substantially as described. 110
4. In a device of the character described, the combination of a truck, a bucket having two mouths each with a sharp cutting edge mounted on said truck, and a hood pivoted to said bucket substantially at its longitudinal center and adapted to close either of said mouths to retain dirt in said bucket, substantially as described. 115
5. In an excavator, the combination of a track, a bucket support mounted to travel on said track, means to traverse said support on said track, a bucket mounted on said support, said bucket having two mouths with sharp cutting edges, a single means to close either one of said mouths, and means to shift said closing means from one mouth closing position to the other, substantially as described. 120
6. In an excavator, the combination of a track shaped to conform substantially to the cross-sectional profile of the trench to be dug, a bucket support mounted to travel on said track, means to traverse said support on said track, a bucket mounted on said support, said bucket having two mouths with sharp cutting edges, a single means to close either one of said mouths, and means to automatically shift said closing means from one mouth closing position to the other, substantially as described. 125

7. In an excavator, the combination of a main frame adapted to be moved longitudinally of the trench to be dug, a bucket or shovel supporting and guiding track vertically adjustable on said main frame, and shaped to conform substantially to the cross-sectional profile of the trench to be dug, a bucket support adapted to travel on said supporting and guiding track, means to reciprocate said support on said track, a bucket mounted on said bucket support, said bucket having a mouth with a sharp cutting edge at each end, a hood pivoted to said bucket adapted to close either mouth, a roller mounted on said hood, and a track with which said roller co-operates to automatically shift said hood from one mouth closing position to the other as said bucket and its support travel along on said bucket supporting and guiding track, substantially as described. 15

CHARLES C. JACOBS.

Witnesses:

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