

C. C. JACOBS.

DUMPING MECHANISM FOR EXCAVATING BUCKETS.

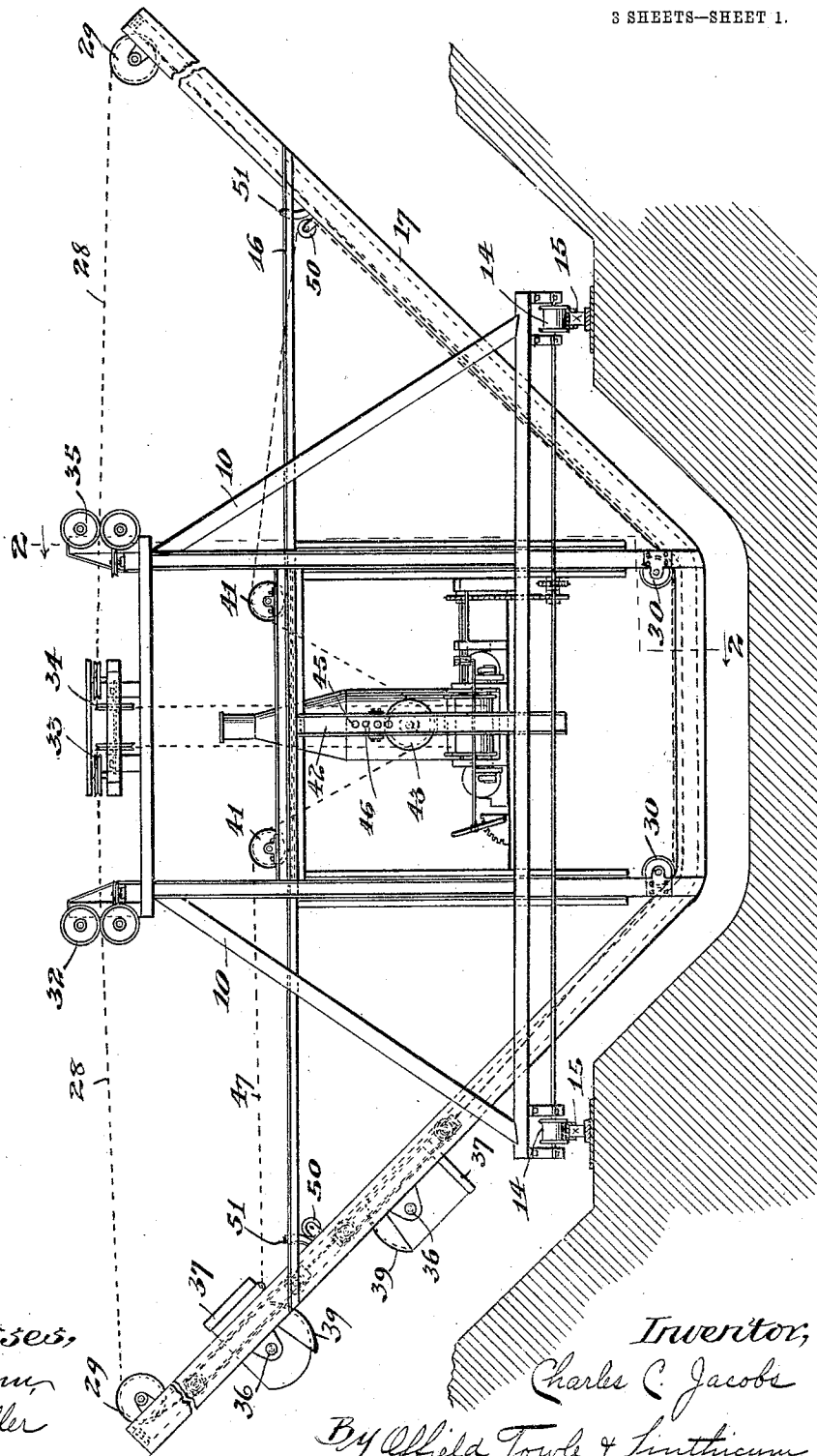
APPLICATION FILED APR. 3, 1908.

906,139.

Patented Dec. 8, 1908.

3 SHEETS—SHEET 1.

Fig. 1.



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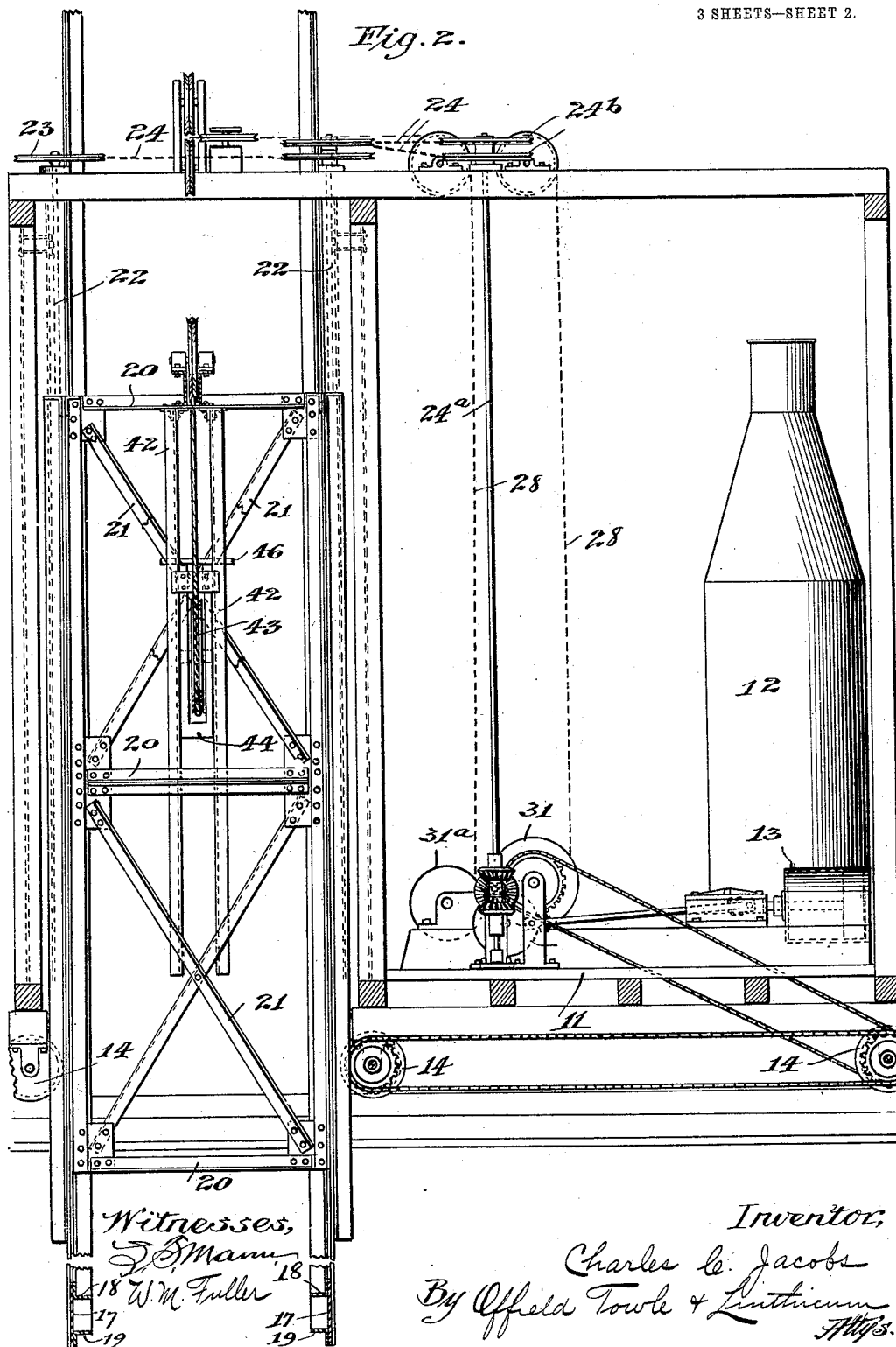
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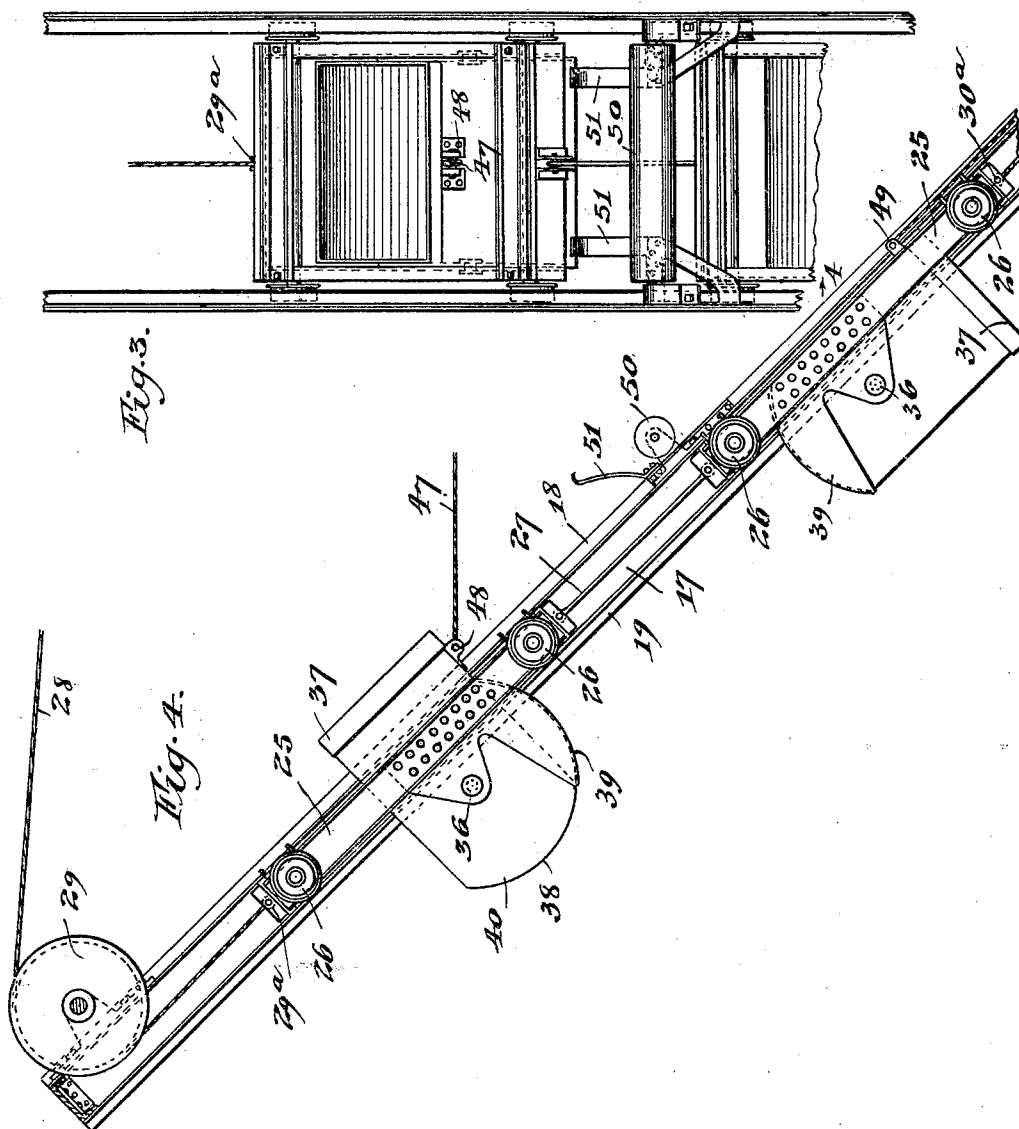
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UNITED STATES PATENT OFFICE.

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DUMPING MECHANISM FOR EXCAVATING-BUCKETS.

No. 906,139.

Specification of Letters Patent.

Patented Dec. 8, 1908.

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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 Dumping Mechanisms for Excavator-Buckets, of which the following is a specification.

My invention has for its object and aim the provision of improved and efficient means for causing the dumping and discharging of the load of one or more excavating buckets or shovels traveling on a trackway and guided thereby to remove the earth and excavate a ditch or trench of the desired cross-sectional shape and size.

Broadly stated, my invention includes the use and employment of a cable or the like attached to the bucket or shovel and so arranged that when the bucket reaches the position where its load should be discharged, the cable will become sufficiently taut, or its direction of pull on the bucket will be such, or both conditions may occur at the same time, as to cause the performance of the dumping operation.

The preferred and desirable embodiment of my invention I have illustrated on the accompanying drawings, forming a part of this specification.

On the drawings Figure 1 is a side elevation of my improved excavator or ditch digging machine, and illustrates one of the pair of excavating buckets or shovels in dumping position; Fig. 2 is a vertical cross-section on line 2—2 of Fig. 1 on an enlarged scale, the vertically adjustable trackway shaped to conform substantially to the cross-sectional profile or outline of the trench being illustrated practically wholly in end elevation; Fig. 3 is a plan view of a part of the trackway, showing one of the buckets in dumping position; and Fig. 4 is a section on line 4—4 of Fig. 3.

On the accompanying drawings I have illustrated an excavator or ditch digging machine of the same general form and kind disclosed in my former patents No. 829,214 and Reissue No. 12,441.

The machine includes a main frame 10 supplied on one side with a platform or floor 11 adapted to accommodate a steam boiler 12 and a steam engine 13 for the operation of the moving parts of the device. This frame

and platform are mounted on carrying or supporting rollers or wheels 14 adapted to travel on a pair of rails 15 laid temporarily on the ground alongside the proposed trench. By means which it is not necessary here to describe, since they form no part of this invention, the engine may be coupled or connected with these rollers so as to cause the frame to travel longitudinally of the trench on the rails to bring the excavating apparatus or portion of the machine over an undug part or section of the trench, in order that the trench or ditch may be dug out or excavated by the removal of dirt forming successive sections.

Vertically adjustable within the frame there is provided another frame 16 having a pair of plates or templets 17 shaped at their central portions to conform substantially to the cross-sectional profile or outline of the proposed trench, while their end portions form booms overhanging the banks of the trench. Each plate 17 has fastened, as by riveting, to its inner surface a pair of upper and lower guiding and supporting angle bars 18 and 19. As will be obvious, these shaped plates 17 and their attached angle bars form a plurality of tracks or a trackway which is adapted to support and guide the excavating shovels or buckets during their reciprocations. The details of the frame of this trackway need not be fully described since their exact construction is quite immaterial. It might be mentioned, however, that the track plates or templets 17 are spaced apart and maintained in parallel relation by a plurality of cross and brace bars 20 and 21. This movable frame may be fed or moved upwardly or downwardly by a plurality of vertical screws 22 each having fixed to its upper end a sprocket wheel 23. These sprocket wheels are suitably connected together and to the engine 13 by sprocket chains 24 and an upright rotatable shaft 24^a equipped at its top end with sprocket wheels 24^b and adapted to rotate forwardly or backwardly at the will of the operator, by means of mechanisms whose full description is deemed unnecessary. The screws by these means may be turned simultaneously to cause an upward or downward feeding of the trackway.

This excavator is equipped with a pair of trucks 25, the wheels 26 of which are adapt-

ed to roll and travel between the supporting and guiding angle bars 18 and 19 of the templet plates 17. The two trucks are jointed together by one or more connecting links 27, while to their outer ends the ends of operating cables 28 are attached at the points 29^a and 30^a. These cables pass around suitable rotatable sheaves 29 at the top ends of the trackway and about other sheaves or rollers 30 at the lower portion of the trackway. They are guided to a pair of drums 31 and 31^a connected to the engine 13 between pairs of cooperating pulleys or sheaves 32, 33, 34 and 35. It will be apparent that as one of these cables 28 is wound upon its drum 31 and the other is paid out from its drum 31^a the pair of trucks will be caused to travel in one direction along the shaped and guided trackway. A reversal of the direction of rotation of the drums 31 and 31^a will cause a reversal of the direction of travel of the connected trucks, as is obvious. On each truck a sharp-edged open-mouthed excavating bucket or shovel is pivoted or hinged at 36, the two buckets being so arranged that their sharp-edged front mouths 37 face in opposite directions. The rear end of each of these buckets is curved at 38 concentric to the pivot or hinge 36, and each truck is supplied with a curved hood or shield 39 adapted normally to close the rear discharge mouth 40 of the bucket when the latter is in its normal excavating position, as is illustrated by the position of the lower bucket in Fig. 4. If the bucket or shovel is turned on its hinge or pivot as illustrated by the upper bucket in Fig. 4 its load is discharged or dropped through its lower open mouth 40.

On the top part of the vertically adjustable frame 16 I provide a pair of sheaves 41, and at the central part of the frame, and adapted to reciprocate vertically between upright channel bars 42, I supply a single rotatable sheave 43 mounted in a sliding frame or carriage 44 so as to be able to revolve. The pair of channel bars 42 have through their webs a plurality of holes 45 in any pair of which may be adjustably fitted a stop 46 against which the carriage 44 containing the sheave 43 strikes during its upward travel. A dumping cable 47 is fastened at its ends to the top front portions of the pair of buckets at 48 and 49, this cable being also fastened over the sheaves 41 and beneath the sheave or pulley 43. In addition to these sheaves the guiding trackway is provided with a pair of rollers 50 over which the cable 47 passes when the linked trucks are traversing the central lower portion of the guiding trackway. Adjacent to these rollers and mounted on the trackway I supply a pair of arms or fingers 51 which, during the downward travel of the recently unloaded bucket on inclined ends of the trackway, engage the top surface of the

bucket so as to tilt or right the same to load-retaining position.

The operation of this improved excavator is substantially as follows: The operator, by controlling the actuation and direction of rotation of the engine operated drums 31 and 31^a, causes the reciprocation of the linked trucks and their pivoted or hinged excavating buckets through the means of cables 28 which pass around the guiding pulleys or sheaves described above. When the trucks and shovels are traversing or traveling on the central portion of the trackway, the slidable sheave 43, beneath which the dumping cable 47 passes, takes up any slack in this cable and, due to the presence and location of the rollers 50 over which the cable passes, the pulls exerted on the shovels or buckets by the ends of this cable are in a direction substantially parallel to the trucks, so that there is no tendency to turn the buckets about their supporting hinges or pivot pins 36. When the pair of trucks and their attached buckets have traveled up one of the inclined ends of the trackway beyond its guiding rollers 50, the pull of cable 47 on the forward shovel changes direction, as is clearly indicated in Fig. 1, so that the shovel is turned on its pivot and its rear mouth moved away from its hood 39, permitting the discharge or dropping of excavated earth contained in the bucket. This change of direction of pull of the dumping cable 47 on the forward bucket may of itself be sufficient to cause dumping of the bucket's load, but if it is not, it will be apparent that as the buckets continue their upward travel on the trackway the dumping cable 47 is drawn tauter and tauter, thereby causing a lifting of the carriage 44 and the sheave 43. When this carriage strikes the stop 46 it can move no farther, and further movement of the shovels upwardly tightens the cable 47 sufficiently to cause the turning of the forward shovel, thereby compelling a discharge of its load. When the buckets descend the fingers 51 engage the top surface of the forward bucket and right the same to load-retaining position. It is to be understood that when the connected buckets travel in one direction on the trackway, the forward one is operative while the rear one is inactive, and that during the reverse travel of the buckets the formerly inoperative one becomes active and vice versa. The discharging operation of one bucket occurs on one inclined end of the trackway while the corresponding operation of the other bucket takes place on the other inclined end.

As is fully described in my former patents mentioned above, the supporting and guiding trackway upon which the excavating shovels reciprocate is fed downwardly in successive steps so as to compel the

shovels to scrape out successive layers of dirt from the trench and discharge the same upon the opposite banks. After one section of the trench or ditch has been excavated to the proper depth the trackway and shovels are elevated sufficiently to permit the whole machine to be moved longitudinally of the trench over an unexcavated portion of earth so that further action and movement of the trackway and buckets will complete the excavation of another section of the trench.

To those skilled in the art it will be apparent that numerous changes may be made in the structural features of the excavator herein disclosed without departure from the spirit and substance of my invention and without sacrificing its advantages and benefits.

I claim:

1. In a machine of the character described, the combination of a guiding and supporting trackway, an excavating bucket or shovel adapted to travel on said trackway, means to cause said bucket to travel on said trackway, and a dumping cable fastened to said bucket which actuates the bucket to discharge its load when the bucket reaches the dumping position, substantially as described.

2. In a machine of the character described, the combination of a guiding and supporting trackway, a truck adapted to travel on said trackway, an excavating bucket or shovel hinged or pivoted to said truck, means to cause said truck and bucket to travel on said trackway, and a dumping cable fastened to said bucket and adapted to turn the same on its pivot or hinge to discharge its load when the bucket reaches the dumping position, substantially as described.

3. In a machine of the character described, the combination of a guiding and supporting trackway, an excavating bucket or shovel adapted to travel on said trackway, means to cause said bucket to travel on said trackway, a dumping cable fastened to said bucket which actuates the same to discharge its load when the bucket reaches the dumping position, a movable sheave cooperating with said cable, and a stop to limit the move-

ment of said sheave, substantially as described.

4. In a machine of the character described, the combination of a guiding and supporting trackway, a pair of excavating buckets or shovels adapted to travel on said trackway, means to cause said bucket to travel on said trackway, and a dumping cable fastened to said buckets and adapted to cause the loaded one to discharge its load when it reaches the dumping position, substantially as described.

5. In a machine of the character described, the combination of a guiding and supporting trackway, a pair of excavating buckets or shovels adapted to travel on said trackway, means to cause said bucket to travel on said trackway, a dumping cable fastened to said buckets and adapted to actuate the loaded bucket to discharge its load when it reaches the dumping position, and a movable sheave cooperating with said dumping cable, substantially as described.

6. In a machine of the character described, the combination of a guiding and supporting trackway, means adapted to travel on said trackway, a pair of buckets hinged or pivoted to said means, means to cause said traveling means to travel on said trackway, a dumping cable fastened to each of said pivoted excavating buckets, a movable sheave cooperating with said dumping cable, and a stop to limit the movement of said sheave, substantially as described.

7. In a machine of the character described, the combination of a guiding and supporting trackway, a pivoted or hinged excavating bucket or shovel adapted to travel on said trackway, means to cause said bucket to travel on said trackway, a dumping cable fastened to said bucket, and means to change the direction of the pull of said cable on said bucket when the latter reaches the dumping position, substantially as described.

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