

1,049,229.

3 SHEETS—SHEET 1.



Inventor.

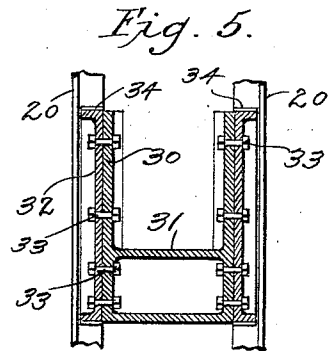
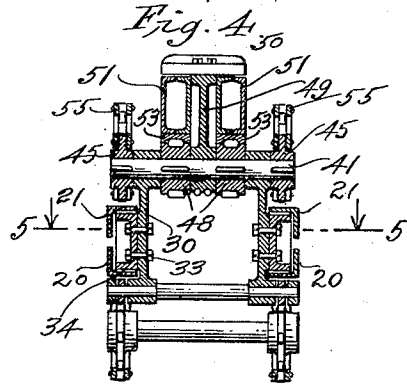
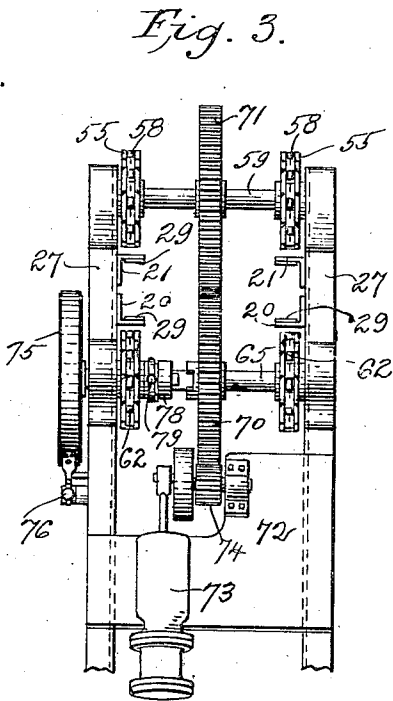
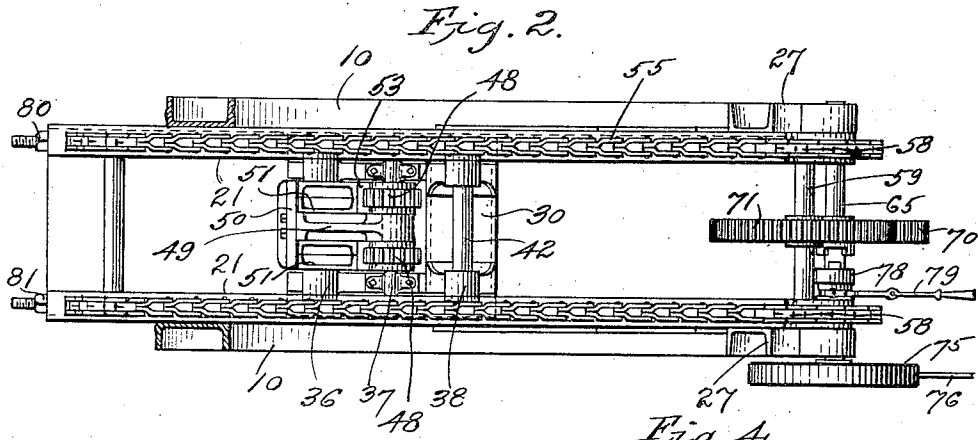
Hollis W. Warner,
By Albert W. Barnes
Atty.

H. H. HARRIS.
EXCAVATING APPARATUS,
APPLICATION FILED JULY 13, 1911.

1,049,229.

Patented Dec. 31, 1912.

3 SHEETS—SHEET 2.



Witnesses:

A. L. Lord
G. K. Smith

Inventor.

Holmes & Harris
By Albert H. Davis
Att'y.

1,049,229.

3 SHEETS—SHEET 3.

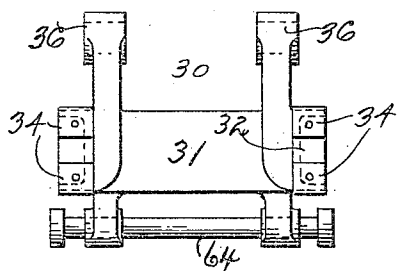
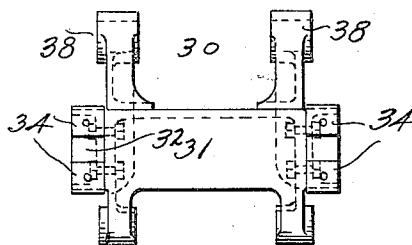


Fig. 8



A. L. Lord
G. K. Smith

Holla H. Harris
By Albert H. Harris,
Atty.

UNITED STATES PATENT OFFICE.

HOLLIS H. HARRIS, OF LORAIN, OHIO, ASSIGNOR TO THE THEW AUTOMATIC SHOVEL COMPANY, OF LORAIN, OHIO, A CORPORATION OF OHIO.

EXCAVATING APPARATUS.

1,049,229.

Specification of Letters Patent.

Patented Dec. 31, 1912.

Application filed July 13, 1911. Serial No. 638,336.

To all whom it may concern:

Be it known that I, HOLLIS H. HARRIS, a citizen of the United States, residing at Lorain, in the county of Lorain and State of Ohio, have invented a certain new and useful Improvement in Excavating Apparatus, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

The object of this invention is to provide an excavating apparatus adapted for performing a wide variety of excavating operations. To this end I have provided a boom carrying a horizontal trackway and I have arranged the dipper handle with mechanism adapted to crowd it along the horizontal trackway or enabling it to move lengthwise of the handle and swing about a suitable pivotal point. I accordingly have combined in one machine the horizontal movement of the handle support characteristic of Thew shovels with the usual radial dipper handle motion. My invention comprises such combination broadly, as well as the embodiment of the combination herein illustrated.

In the drawings, Figure 1 is a side elevation of my excavating apparatus; Fig. 2 is a plan of the trackway and mechanism carried by it, being a section through the boom; Fig. 3 is a rear end view of a trackway and driving mechanism; Fig. 4 is a section through the sliding carriage and dipper handle substantially on an offset line 4-4 of Fig. 1; Fig. 5 is a horizontal section through the carriage on the line 5-5 of Fig. 4; Fig. 6 is an enlargement of a portion of the side elevation of Fig. 1; Figs. 7 and 8 are respectively left hand and right hand end views of the carriage.

In the drawings, 10 indicates the boom which is shown as comprising a pair of outwardly facing spaced channel beams mounted at their lower ends in a suitable platform 11 which is swiveled on the truck 12. The outer end of the boom is shown as held by a tie rod 13 suitably anchored at its other end to the platform. Near the outer end of the boom are shown suitable sheaves 14 over which travels the cable 15 for drawing on the bucket 16. The other end of the cable passes about a suitable winding drum 17 within the house on the platform 11. This much of the construction is of any standard form.

Carried by the two members of the boom, on the inner sides thereof, is a horizontal trackway, consisting, as shown, of angle members 20 and 21 secured to the inner faces of the members 10 and having their flanges projecting inwardly to comprise together substantially a channel shape. Near their forward ends these angle bars are shown as braced by the members 23 and 24 extending upwardly to the boom and a member 25 extending diagonally downwardly to the boom near its lower end. At the rear ends the angle bars are shown as braced by the upwardly extending channel bars 27 connected at their lower ends to the boom. This makes a very rigid construction of horizontal trackway all mounted on the boom.

30 indicates a carriage mounted in the horizontal trackway described and adapted to be shifted in or out thereof. This carriage is shown in side elevation in Fig. 6, in plan in Fig. 2, in section in Figs. 4 and 5, and detached in Figs. 7 and 8. It comprises an intermediate frame 31, which may be of this box-like winged form shown, carrying on opposite sides rectangular box-like shoes 32 which occupy the trackway and are slidable therein. The intermediate frame may be a malleable casting and the shoes may be malleable castings bolted to the intermediate frame by bolts designated 33. The shoes may be provided with rub plates 34 and the channels of the trackway may also have rub plates 29 cooperating therewith. As these rub plates wear they may be replaced without other change in the structure.

It will be seen that the carriage has three pairs of upwardly projecting ears 36, 37 and 38. Journaled in the intermediate pair 37 is a shaft 41 and on this shaft between the bearings are a pair of pinions 48 (Figs. 2 and 4). Loosely mounted on the shaft between these pinions is an arm 49 which is provided with a T-head or overhanging block 50. Between this block and the pinions extend the two parallel portions or sticks 51 of the dipper handle. Each portion of the handle is shown as made of two channel members facing each other, thus providing a hollow beam, and on the rear edge of these two beams are secured racks 53 which mesh with the pinions 48.

From the above description it will be seen

that the pinion shaft 41, by being held stationary, may hold the dipper handle as a strut between the dipper and shaft, swinging about said shaft or, by being rotated, the pinion may raise or lower the handle, as desired. The means for holding or rotating the pinion will now be described.

The carriage 30 has, in addition to the bearings 37 above explained, two other bearings 36 and 38 in which are mounted shafts 40 and 42. These two shafts, as well as the shaft 41 overhang their bearings and carry on their two ends outside of the bearings sprocket wheels designated 45, 46 and 47, respectively.

55 designates a pair of endless sprocket chains which pass in engagement with the under side of the wheels 46, with the top of the wheels 47, with the under side of the wheels 45, and then around a pair of idlers 57 near the front of the trackway, and then rearwardly and around driving sprockets 58 near the rear of the trackway.

60 designates an endless sprocket chain which loops around an idler 61 near the forward end of the trackway and driving sprockets 62 near the rear and immediately is connected with a rod 64 mounted in the carriage. The sprocket wheels 62 and 58 are of the same diameter. The sprocket chains are maintained taut by adjusting the idlers 57 and 61 by the nuts 80 and 81 on their respective carrying brackets.

The driving sprockets 58 are mounted on a shaft 59 and the sprockets 62 on the shaft 65. Rigid on the shaft 59 is a gear 71 which meshes with the gear 70 of equal diameter loose on the shaft 65. The driving engine or other prime motor 73 is shown as mounted on a plate 72 carried by the braces 27 and carries a pinion 74 (Fig. 3) meshing with the gear 70, loose on the shaft 65. Rigid on this shaft 65 is a brake wheel 75 controlled by a hand brake 76. On the shaft 65 is a sliding jaw clutch 78 which, when operated by the lever 79, may lock the loose gear 70 to the shaft or free it therefrom.

The operation of the mechanism described is as follows: To use the horizontal crowding device, the hand brake is released from the wheel 75 and the jaw clutch 78 is thrown by its lever 79 to engage the loose gear 70. Thereupon the engine drives the two pairs of sprocket chains in unison and the sprocket chain 60 moves the carriage in or out, according to the direction of operation of the engine, and the sprocket chain 55 moving correspondingly acts as if it were anchored to the carriage and holds the pinion shaft 41 against rotation. Accordingly, the dipper handle is racked in or out by this operation as if it were connected with the carriage on a fixed pivot.

To employ the radial crowding device the brake is set on the wheel 75 by means

of the lever 76 and the clutch 78 is released from the wheel 70. The brake now holds the trolley stationary by reason of locking the chains 60 while the gear 70 is driven by the engine, in one direction or the other, and acts as an idler transmitting motion to the gear 71 and shaft 59 and sprocket chains 55. These sprocket chains traveling across the sprocket wheels 46 which now have a fixed axis rotate these wheels, raising or lowering the dipper handle, according to the direction of movement.

It will be seen from the above description that, simply by the operation of the brake and the clutch levers 76 and 79 the excavator may be changed at will from the operation of horizontally crowding the dipper arm to the operation of raising and lowering such dipper arm. This enables the excavation to be instantly varied, according to the requirements, the bucket being caused to travel along horizontally on a level or swing about a center or be raised or lowered, as desired.

Having thus described my invention, what I claim is:

1. In an excavating mechanism, the combination of a scoop and handle, an inclined boom, a horizontal trackway carried thereby, a carriage slidable along the same, a pinion carried by said carriage, a rack on the handle meshing with the pinion, means for holding the carriage stationary and rotating the pinion, means for holding the pinion stationary and moving the carriage, and independent means for raising the scoop.

2. In an excavating mechanism, the combination, with a scoop and handle, of a rotatable device cooperating with the handle, a sprocket wheel for driving such device, a sprocket chain cooperating with the sprocket wheel, mechanism for moving the sprocket chain to rotate the wheel, and mechanism for shifting the sprocket wheel bodily and concurrently and similarly moving the chain, whereby the wheel is held against rotation during such shifting.

3. In an excavating mechanism, the combination of a scoop, a handle having a rack, a trackway, a carriage slidable along the trackway, a pinion mounted in the carriage and meshing with the rack, a sprocket wheel connected with the pinion, an endless sprocket chain passing in engagement with said pinion, a second endless sprocket chain connected with the carriage, means for driving both sprocket chains in unison to shift the carriage without rotating the pinion, and means for driving the first mentioned sprocket chain alone to rotate the pinion without shifting the carriage.

4. In an excavating mechanism, the combination, with a scoop and handle, of a rack on the handle, a trackway, a carriage mov-

able along the same; a pinion carried by the carriage meshing with the rack, two pairs of sprocket wheels adjacent to the opposite ends of the trackway respectively, two endless sprocket chains passing over said pairs of wheels from one end of the track to the other, one of the sprocket chains being connected to the carriage and the other passing in engagement with the teeth of the rotatable sprocket wheel connected with the pinion, means for driving the sprocket chains in unison to shift the carriage without rotating the pinion, and means for driving the first mentioned sprocket chain alone to rotate the pinion without shifting the carriage.

5. In an excavating mechanism, the combination of a scoop, a handle connected therewith, a rack on the handle, a trackway, a carriage slidable along the trackway, a pinion mounted in the carriage and meshing with the rack, a sprocket wheel connected with the pinion, two endless sprocket chains, one anchored to the carriage and the other passing in engagement with the teeth of said sprocket wheel, two sprocket wheels over which such chains respectively pass, means for rotating both the last mentioned wheels in unison to shift the carriage without rotating the pinion, and means for holding one of said wheels against rotation and rotating the other wheel.

6. In an excavating mechanism, the combination, with a scoop and handle, of a trackway, a carriage therein, a rotatable device mounted in the carriage connected with the handle, a sprocket chain connected with the carriage, a sprocket chain connected with said rotatable device, a pair of rotatable shafts for driving the sprocket chains respectively, a pair of connecting gears on said shaft, means for driving them, means for connecting one of said gears with its shaft including a clutch, and a brake for one of the shafts.

7. In an excavating mechanism, the combination of a boom, a horizontal trackway carried thereby, a carriage movable in and out on the trackway, two pairs of sprocket wheels adjacent to the forward and rearward ends of the trackway, two sprocket chains passing over said wheels, one of said chains being anchored to the carriage, a rotatable device mounted in the carriage with which the other chain drivingly connects, driving mechanism, gearing between the same and the two sprocket wheels near the

rear of the trackway, a clutch for disconnecting the sprocket wheel which shifts the carriage from the driving mechanism, and a brake for controlling the rotation of such sprocket wheel and thereby locking the carriage, a scoop, and a handle connected therewith and cooperating with the rotatable device.

8. In an excavating apparatus, the combination of a trackway, a carriage slidable along the same, a scoop and handle, a rotatable device mounted in the carriage and engaging the handle, a flexible member mounted independently of the carriage for rotating said rotatable device, a member connected with the carriage for moving it, and means for moving said last mentioned member and said flexible member in the same direction and at the same speed, and means for moving the said flexible member independently of the stationary member.

9. In a device of the character described, the combination of a trackway, a carriage slidable along the trackway, a pinion mounted in the carriage, a scoop and handle, a rack on the handle meshing with the pinion, mechanism for shifting the carriage in and out of the trackway, a flexible member for driving the pinion, means for moving said flexible member concurrently with the in and out shifting to shift the carriage without raising the scoop, and means for moving the flexible member without shifting the carriage to raise or lower the scoop.

10. In a device of the character described, the combination of an inclined boom, a horizontal trackway carried thereby, a carriage slidable on the trackway, a pinion rotatably mounted in the carriage, a scoop, a handle therefor having a rack meshing with the pinion, an elevating cable connected with the scoop independently of the carriage, independent bodily movable members for moving the carriage and for rotating the pinion, and means for moving said members in unison in either direction to shift the carriage without raising the scoop, and means for independently moving the member which rotates the pinion to raise the scoop without shifting the carriage.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses.

HOLLIS H. HARRIS.

Witnesses:

E. M. PIERCE,
C. A. WEBER.