F. M. HEWITT.

SHOVELING MACHINE.

APPLICATION FILED JAN. 4, 1915.

1,213,640.

Patented Jan. 23, 1917.

4 SHEETS—SHEET 1.

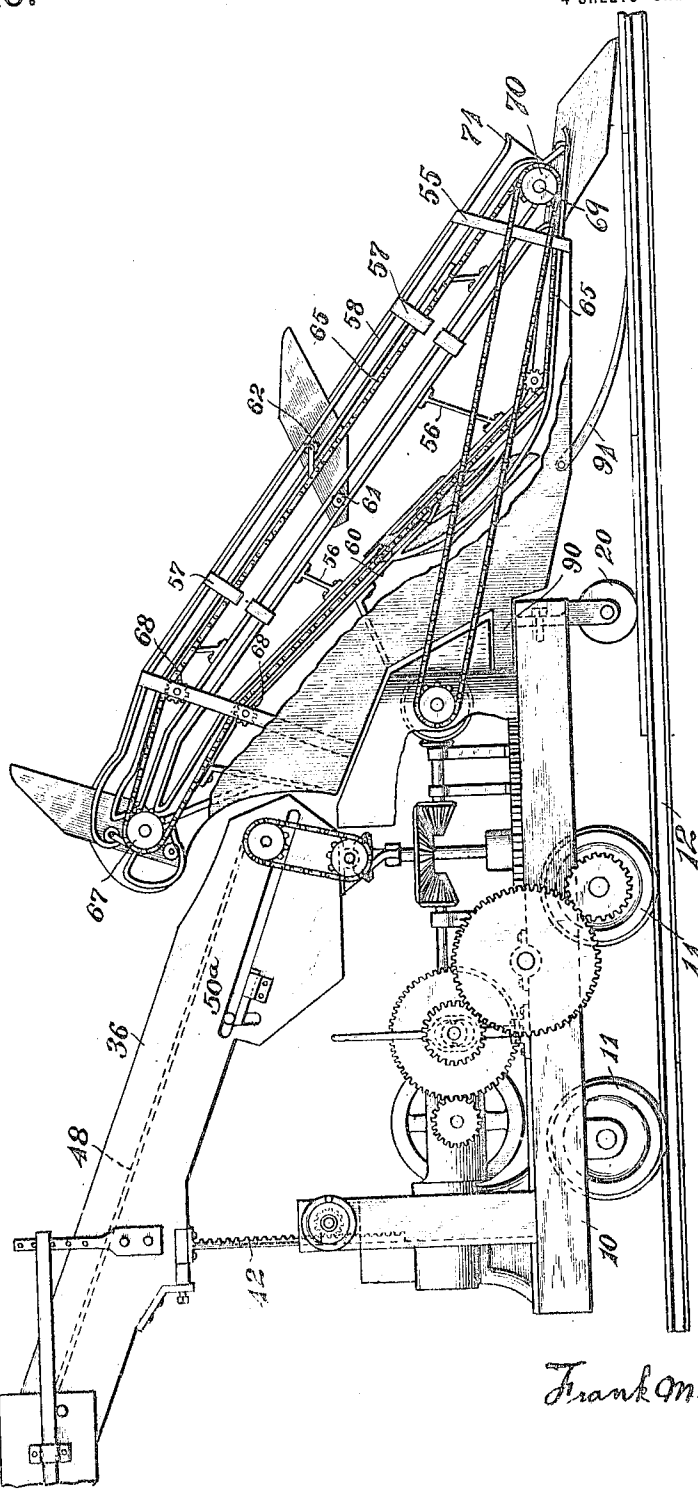


Fig. 1.

Witnesses:
Chris Jensen
R. Whitney

Inventor:
Frank M. Hewitt

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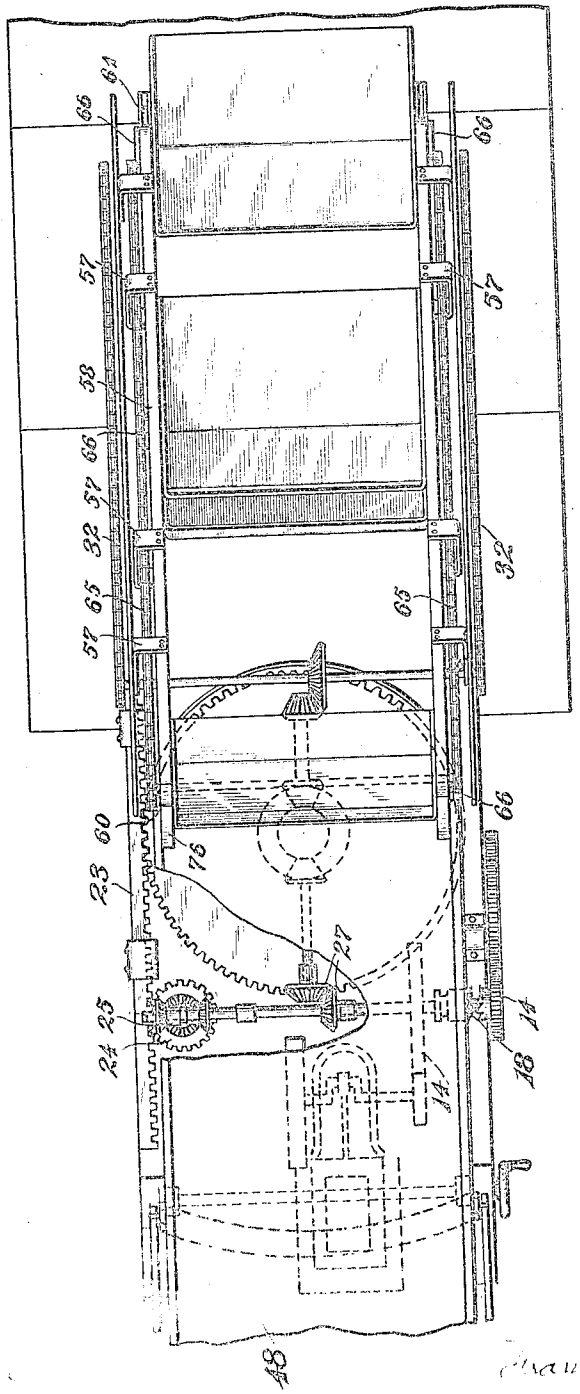


Fig. 2.

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4 SHEETS—SHEET 3.

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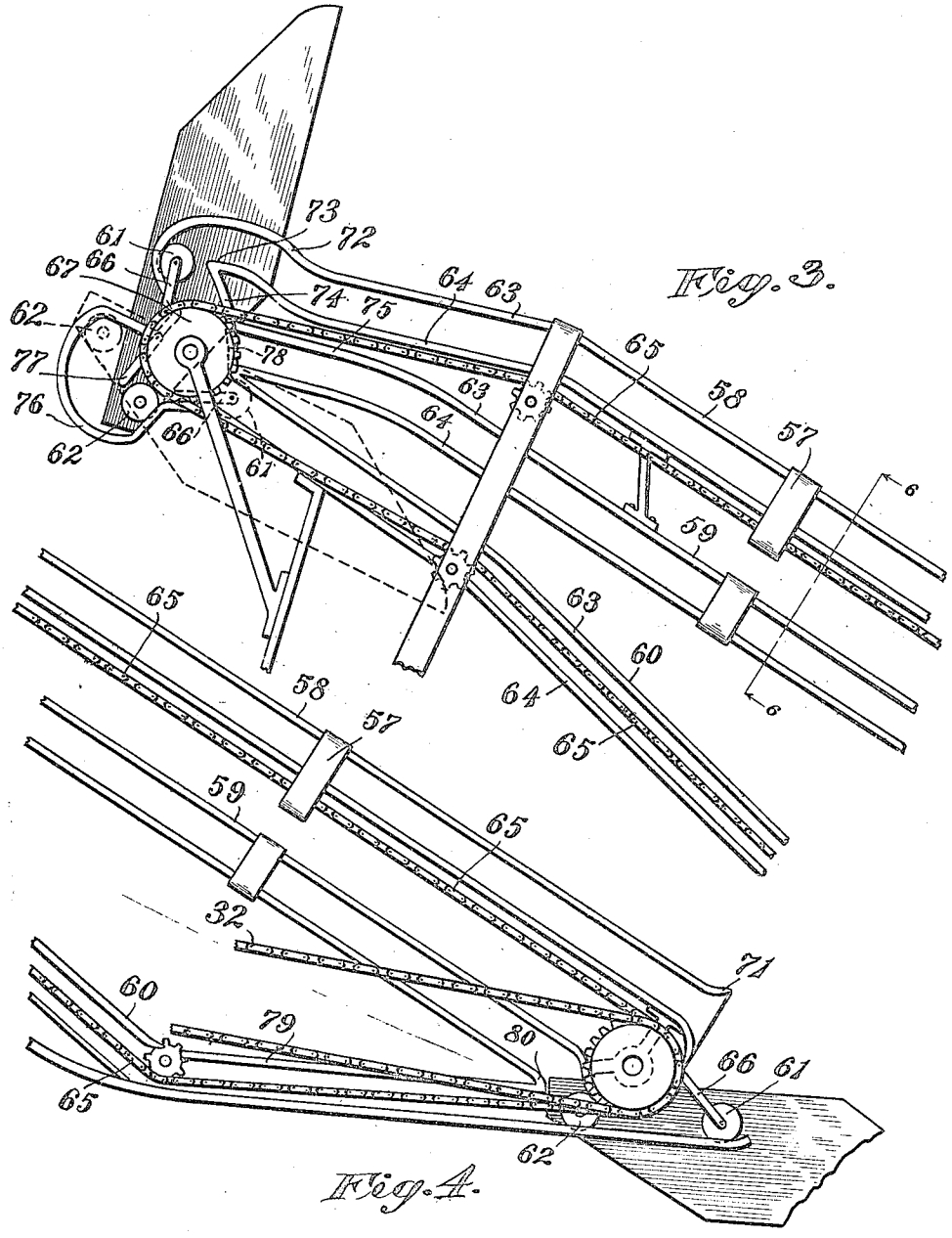


Fig. 3.

Fig. 4.

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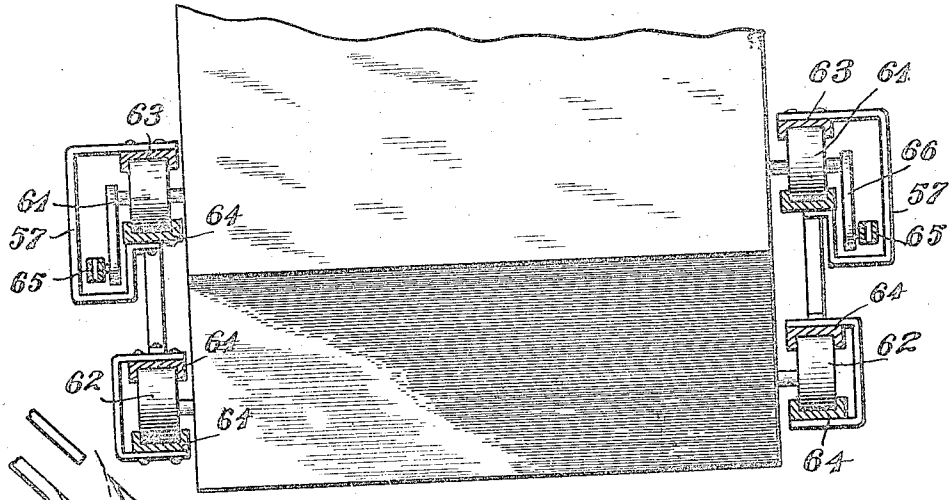


Fig. 5.

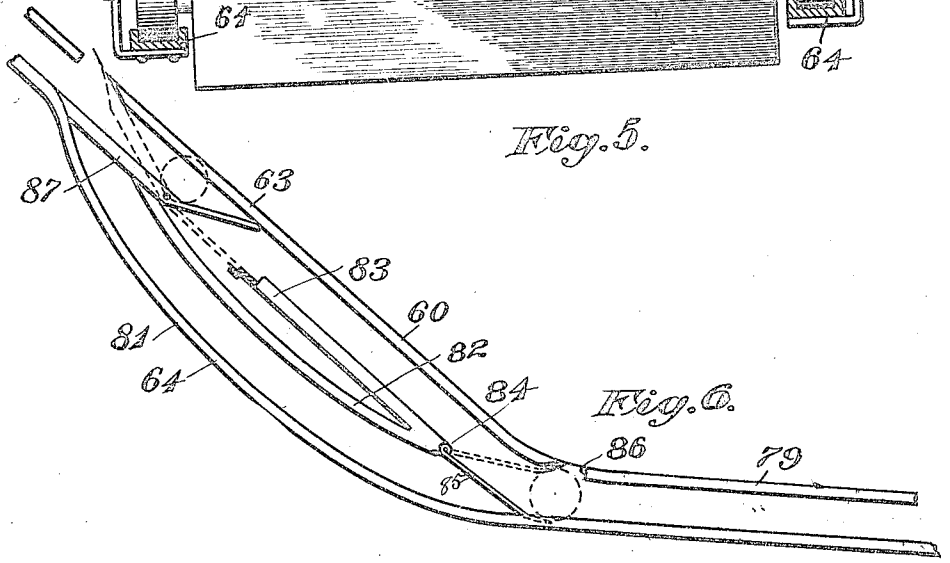


Fig. 6.

Witnesses:

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UNITED STATES PATENT OFFICE.

FRANK M. HEWITT, OF GOLDFIELD, NEVADA.

SHOVELING-MACHINE.

1,213,640. Specification of Letters Patent. Patented Jan. 23, 1917.

Application filed January 4, 1915. Serial No. 511.

To all whom it may concern:

Be it known that I, FRANK M. HEWITT, a citizen of the United States, residing at Goldfield, in the county of Esmeralda and State of Nevada, have invented certain new and useful Improvements in Shoveling-Machines, of which the following is a specification.

This invention relates to machines for excavating, and in particular relates to machines of this type which are adapted to pick up loose material from piles and convey it to some desired place.

As a principal object, this invention contemplates the provision of an excavator of the chain and bucket type so called, which will be particularly adapted for use in mining and the like work in operating in tunnels and drifts to remove the "muck pile" or accumulations of dirt, rock, ore and other loose materials dislodged by blasting charges.

Another object is to provide a plurality of buckets or shovels connected to an endless chain and simultaneously operable thereby, said shovels to perform in the loading process in a manner similar to a manually operated shovel and to remain substantially in the same position except at the moment of unloading and of preparing to load.

The details of construction, arrangement, and operation of parts embodying the invention are as hereinafter described.

Figure 1 is a side elevation of the excavating machine. Fig. 2 is is a top plan view. Fig. 3 is an enlarged detail elevation of the upper portion of the excavator shovel guideway. Fig. 4 is a similar view of the lower portion of the same. Fig. 5 is a sectional view taken through the guideway on the line 6—6 of Fig. 4. Fig. 6 is a view similar to Figs. 3 and 4 but showing a detail of the positioning switch for the guideway.

In the drawing the excavator, which embodies my invention, is shown operatively connected with a conveyer not herein claimed.

The excavator proper is supported and pivoted at 90, see Fig. 1, on the front end of the aforesaid conveyer, the frame 10 of the latter forming part of a truck whose wheels 11—20 are adapted to run on rails 12. The material taken up by the excavator is delivered upon an endless apron 48 arranged in a trough-like frame 36, which is pivoted at its lower or front end, and its rear end supported adjustably on vertical rack bars 42 that engage pinions by means of which the conveyer frame is raised or lowered, as required.

A motor is mounted on the front frame 10, and through the medium of shaft-and-spur gearing it not only propels the excavator, but also drives the apron 48 of the conveyer; likewise, through the medium of chain and sprocket mechanism the motor drives the endless chain of buckets forming part of the excavator. The rear upper end of the excavator overhangs the front and lower end of the conveyer, so that it is adapted to deliver material upon the endless apron 48.

The excavator will now be described with special reference to the features embodying my invention.

It should be understood that this invention contemplates a machine of such small dimensions as will successfully operate in the ordinary mining drift or tunnel.

The endless chains and rollers of the excavator portion of machine are incased—the frame of the excavator forming the outer casing, a groove being provided on the inside alongside each guideway for passage of axles of rollers.

As a means to prevent the point of shovel from striking on edge of plat while loading near edge, the adjustable apron 91 is provided. This apron is accurately curved and positioned with the line of travel of empty shovel and extending over the edge of plat allowing the shovel to travel from apron to plat. The small wheels 20 are adjusted to run either on rails or plat.

The numeral 90—see Fig. 1—indicates the point of connection between the excavator and conveyer portions of the machine. In practice, the lapped portions of the excavator and conveyer are secured together by means which enable them to be easily detached or separated.

The excavator is of the familiar chain and bucket type broadly speaking and includes a plurality of scoops or shovels, each provided with a pair of rollers on each of its sides, the forward roller of each pair being pivotally linked to an endless chain which simultaneously operates all of the scoops, while a trackway coöperates with the rollers in properly positioning each of the shovels

at any point in the circuit. This roller guideway includes a pair of trackways for each side of the scoop suitably supported as a whole by the frame 55, being braced in pairs by the I-brackets 56 and being individually supported by substantially C-shaped brackets 57, each trackway of this pair including three vertically alined guides 58, 59 and 60, the first two of which cooperate with a pair of rollers 61 and 62 journaled on each side of each shovel as shown in Fig. 6 when the said shovel or scoop is being raised to the point of dumping into the conveyer when loaded, and the last of which receives both of these rollers 61 and 62 when the scoops are being successively lowered after the dumping process. All of these guides include oppositely disposed U-shaped members 63 and 64 between which a constant space is maintained sufficient to accommodate the various rollers. The axles or trunnions of each pair of rollers 61 which are situated at the forward portion of the scoop sides are extended to connect with the operating sprocket chain 65 of the excavator mechanism by means of the link 66, this chain following the path of the upper and lower guides 58 and 60 since it is in these guides only that the forward roller 61 passes, this chain 65 being trained over the terminal sprockets 67 as well as the smaller intermediate direction-changing sprockets 68 and the lower terminal 70.

In detail the guide 58 is provided with the lower open end 71 and is upwardly and rearwardly inclined toward the conveyer portion 37 being formed at its upper extremity with an arcuate deviation 72 from the straight path of travel, which deviation merges by the abrupt curve 73 into a reversely directed curve 74 which bridges the vertical space between this guide and the upper portion 75 of the second or intermediate guide 59. Similarly the upper guide member 63 of the third and lowermost guide 60 is connected to the lower guide member 64 of the mentioned intermediate guide while the lower member 64 of this said third guide 60 is formed with an extended bight portion 76. Pivotally bridging the outlet of this latterly mentioned bight, and further bridging the upper opening of the intermediate guide 59 are the swinging short guide portions 77 and 78 respectively which serve to control movement of the various rollers in permitting the dumping of the scoops without their complete overturning, as is particularly illustrated in Fig. 3.

The lower portion of the excavator as will be seen in Fig. 4 is so formed that the upper pair of guideways 58 and 59 are parallel and are approached at an angle by the third guide 60 which inclines but slightly downwardly from the horizontal at its lower terminus 79 which the scoops traverse when shoveling up their load from the pile of loose material and which connects with the intermediate guide 59, the mouth of which latter 80 is horizontally spaced from the mouth 71 of the upper conveyer a distance equal to the horizontal space between the rollers 61 and 62 of the scoops so that the latter is permitted to be bodily lifted when loaded to be returned to the conveyer in a substantially horizontal position.

Since the downward incline of the lower guide 60 is too steep to permit of the proper positioning of the scoop with reference to the movement of the entrant portion into the loose material a switching means is interposed on this lower guide to remedy this fault as illustrated in Fig. 7. This switch is designated by the numeral 81 having its lower portion formed by the lower guide member 64 of the mentioned guide upon which it is formed, this member 64 being arcuately bent for this purpose. An intermediate portion forms one portion of both the main trackway and the switch, having the member 82 arcuately forming the inner switch line and meeting the main trackway inner line member 83 at the point 84 to which is pivoted a swinging gate 85 adapted to fit into the cut out portion 86 formed in the member 63 of the main trackway when the switch is being traversed by the rear rollers 62 of each scoop. The ends of the inner line members of both switch and main trackway 82 and 83 are spaced at the opposite extremity to the terminal 84 and this space is adapted to be bridged by the substantially L-shaped lever 87, the arms of which are at an angle so that the switch is normally closed for the travel of the forward rollers 61 of each scoop until the latter contacts with the other arm of the lever which in being depressed to bridge the mentioned space elevates the first arm in the manner illustrated in dotted lines in Fig. 6 to open the switch for the second or following roller 62 of the successive scoops.

In operation the foregoing description of the specific construction taken in connection with the detailed and assembled views shown in the drawings is believed to necessitate little enlargement. It should be understood, however, that when blasting or drilling, sectional platforms are laid across the rails of mine trackways to form a smooth bottom from which is shoveled the loose materials dislodged by blasts of an explosive or other means. Accordingly when the excavator comprehended by this invention is directed toward a pile it is desired to remove, the small balance wheels 20 provided on the forward portion of the frame 10 are adapted to rest upon these platform sections or "plats" and progresses over these sections until they are successively cleared at which time they may be

removed. It should also be understood that the height of the excavator and the conveyer when in its lowered position, above the rail, shall not exceed the height of the cars used in any particular mine, thus permitting the machine to pass under chutes when being moved from one part of mine to another, the short pivoted rear section of conveyer extending far enough over the car to allow the load to be evenly distributed in same, this short pivoted section of conveyer 37 being placed in vertical position flush with rear end of frame of machine after excavator has been removed, the main portion of conveyer being moved forward and brought into line with the forward part of frame 10. As the loaded scoops reach the top of the guideway the rear roller 62 forces the gate 78 into reverse portion 74 forming a continuation of the upper portion 75 of the intermediate guide 59. The scoop is dumped by action of forward roller on the curved guides 72 and 73 and the action of the rear rollers on guide portion 77, which bridges the outlet of the bight 76. Subsequently, the weight of the scoop forces the forward roller 61 downwardly through the reverse portion 74 until the upper open mouth of the lower guides 60 is reached thereby where the continuous action of the moving chain on the shovel will again cause forward progression of the scoop.

It will be seen, from a consideration of the foregoing that means have been definitely disclosed whereby the objects previously presented are capable of attainment and it is accordingly manifest that this invention may be claimed as possessing the desirability and advantages set forth in such objects.

While in the foregoing, however, there has thus been illustrated in the drawings and described in the specification such combination and arrangement of elements as constitute the preferred embodiment of this invention, it is desired to emphasize the fact that such minor changes in the matters of proportion and degree may be made in later adaptations of this device as shall not alter the spirit of the invention as defined in the appended claims.

What is claimed is:—

1. In a machine of the type described, an excavator element including an endless traveling chain, scoops linked to said chain, a pair of rollers for each side of each scoop, and means coöperating with said rollers for dumping said scoops without causing the overturning thereof.

2. In a machine of the type described, an excavator element including an endless traveling chain, scoops linked to said chain, a pair of rollers carried by each side of each scoop, and guideways comprising oppositely disposed portions for coöperating with said rollers in dumping said scoops without causing the overturning thereof.

3. In a machine of the type described, an excavator element including an endless traveling chain, scoops linked to said chain, a pair of rollers carried by each side of each scoop, a pair of guideways, each independently coacting with one roller of a side between the loading and dumping points for said scoops, converging portions formed on said guideways adjacent said dumping point, arcuate and reversely arcuate portions connecting said guides to alter the path of said rollers and to dump each scoop, and a third guideway connected to one of the first said guideways at the dumping and loading points for returning said scoops to the latter point without causing their overturning.

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

FRANK M. HEWITT.

Witnesses:

PATRICK J. CARMODY,

JOHN TRELOW.