F. M. HEWITT.

SHOVELING MACHINE.

APPLICATION FILED MAR. 19, 1917.

1,304,683.

Patented May 27, 1919.

4 SHEETS—SHEET 1.

Fig. 1.

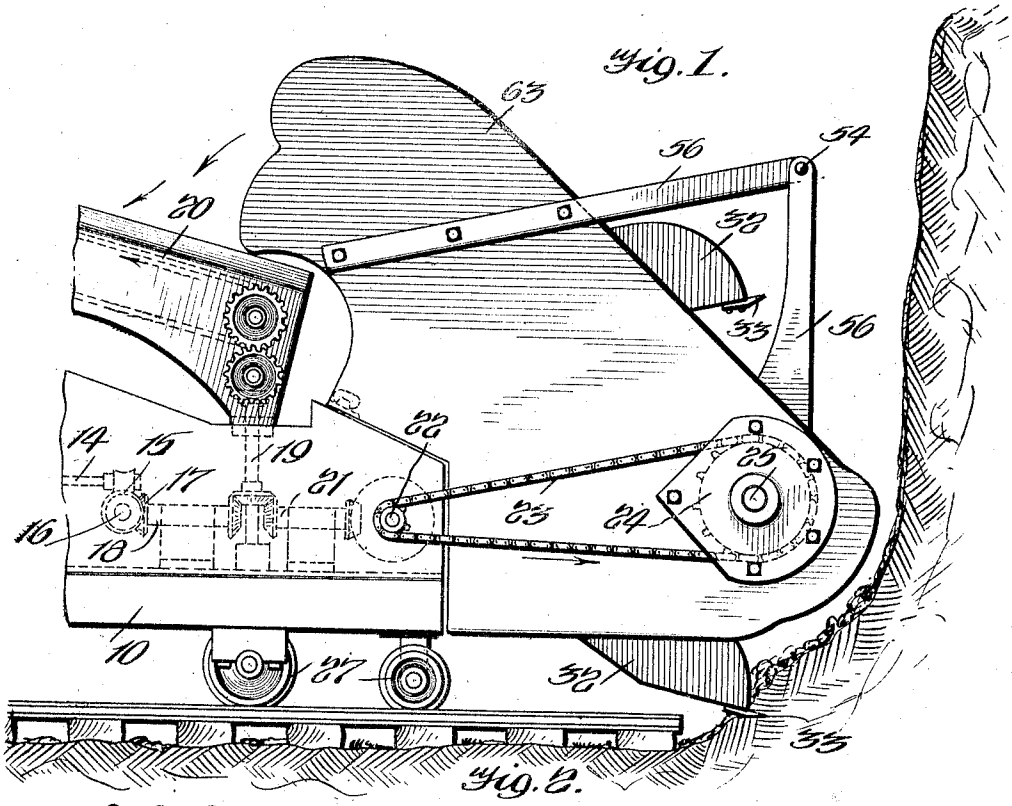


Fig. 2.

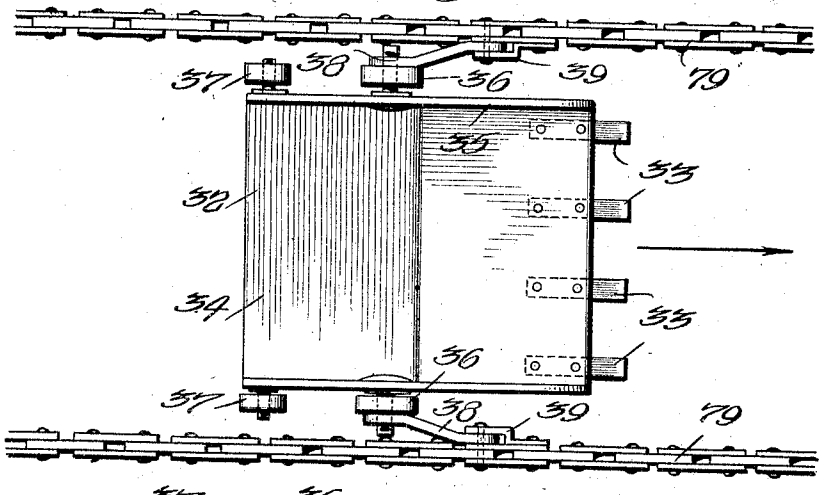
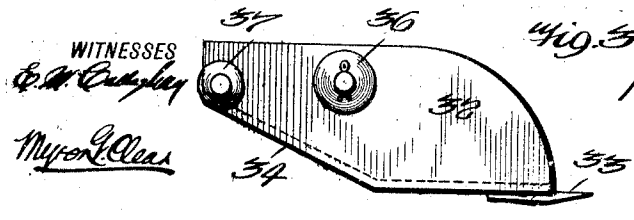


Fig. 3.



WITNESSES

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4 SHEETS—SHEET 2.

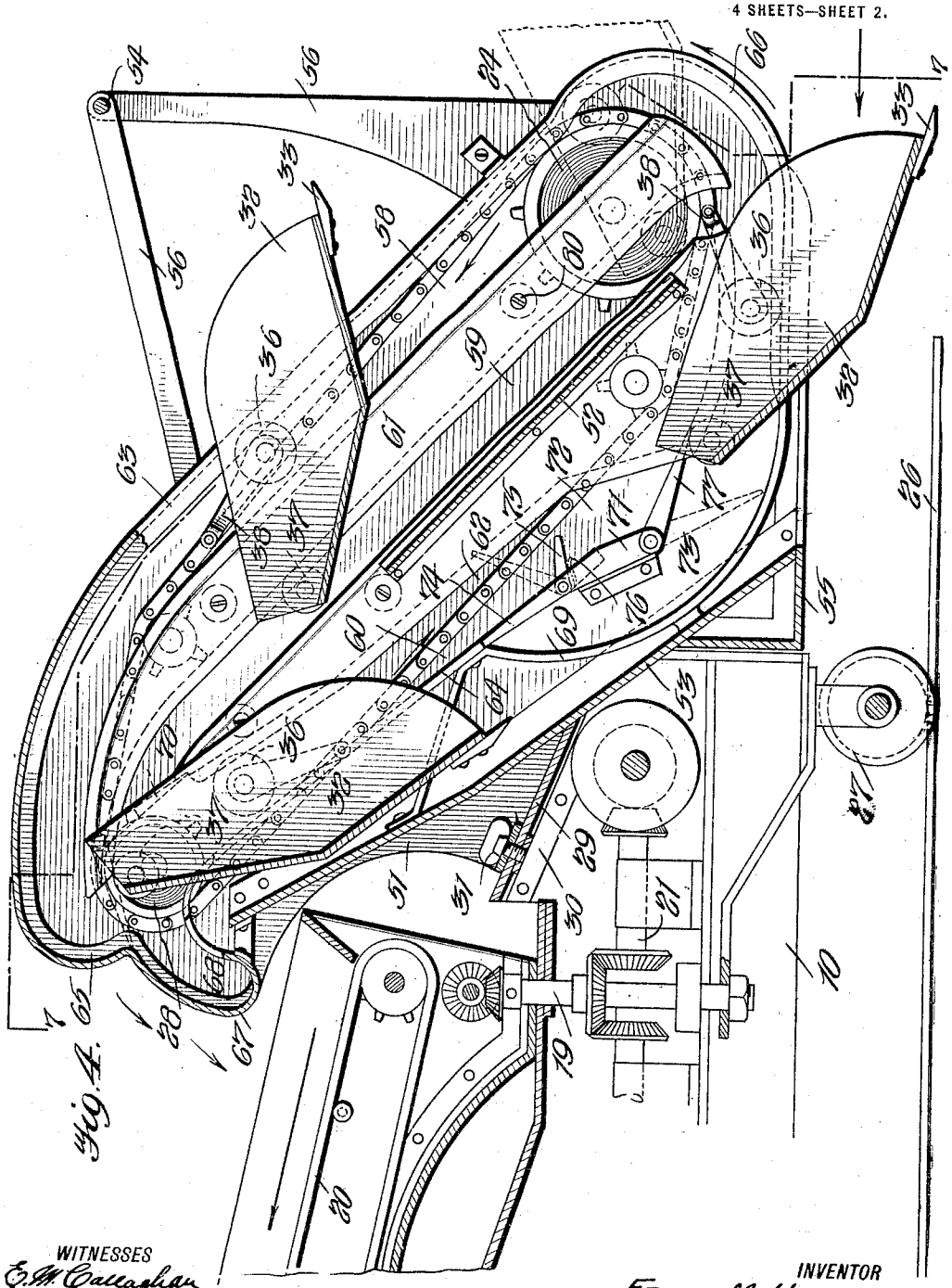


Fig. 4.

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4 SHEETS—SHEET 3.

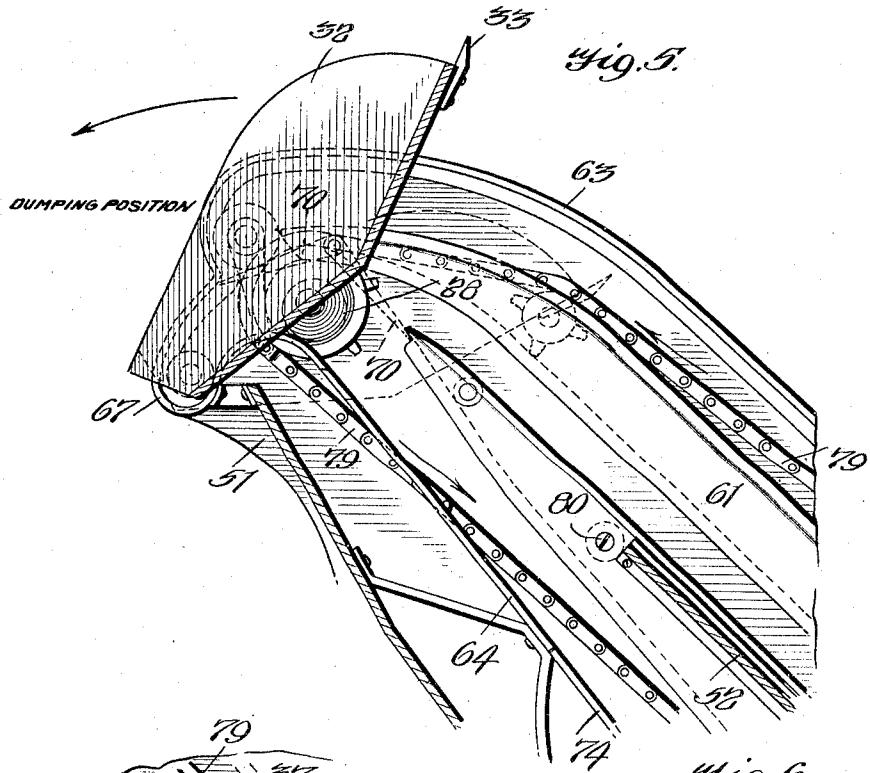


Fig. 5.

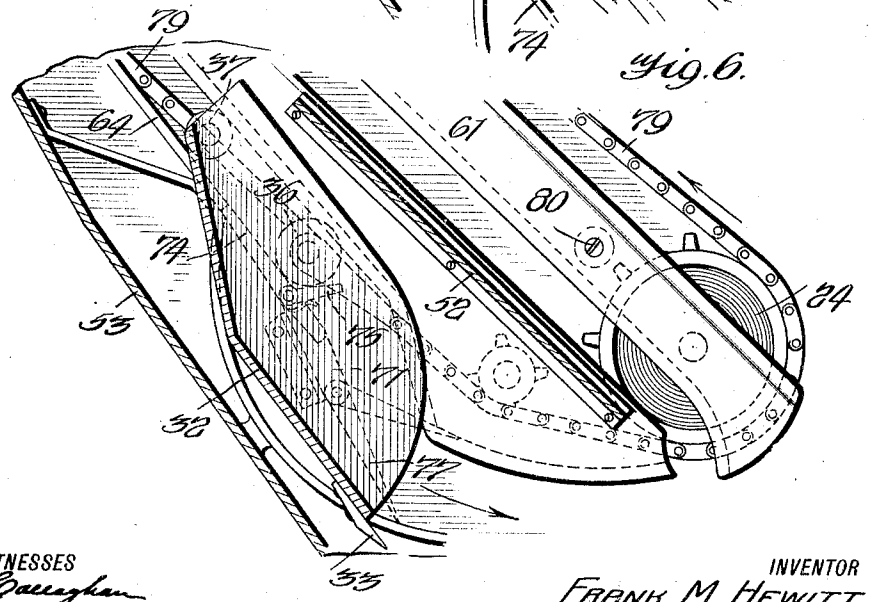


Fig. 6.

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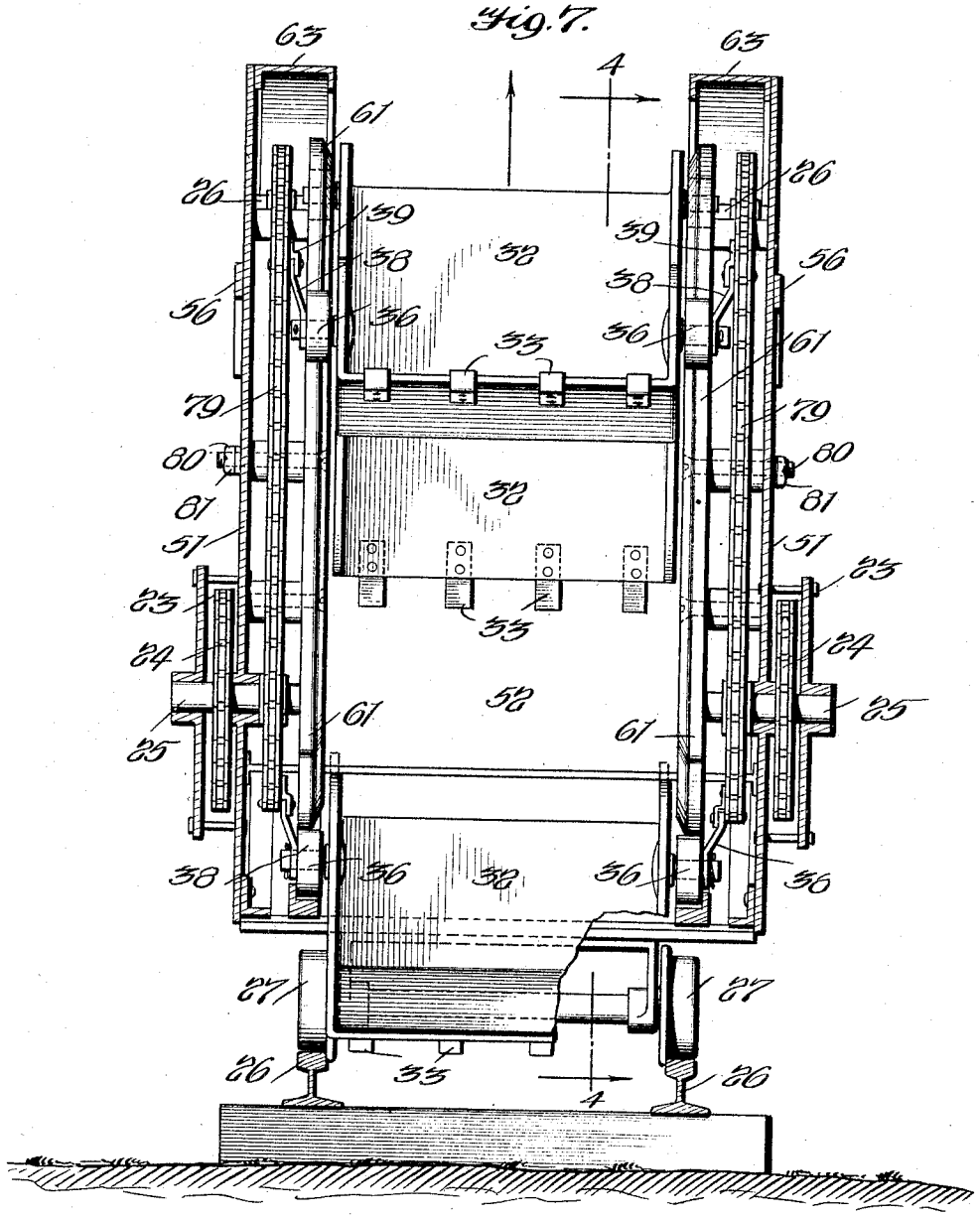
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4 SHEETS—SHEET 4.

Fig. 7.



WITNESSES

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UNITED STATES PATENT OFFICE.

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SHOVELING-MACHINE.

1,304,683. Specification of Letters Patent. Patented May 27, 1919.

Application filed March 19, 1917. Serial No. 155,773.

To all whom it may concern:

Be it known that I, FRANK M. HEWITT, a citizen of the United States, and a resident of Butte, in the county of Silverbow and State of Montana, have invented a certain new and useful Improvement in Shoveling-Machines, of which the following is a specification.

My present invention relates generally to improvements in shoveling machines, and more particularly to improvements in that type of apparatus described and claimed in my Patent, Number 1,218,640, dated January 23, 1917.

The objects of my present invention are to improve the guiding means for the shovels in respect to the support and positioning of the shovels in the various positions of the latter in use, as well as the shape of the guideways to prevent lodgment of dropping material thereon.

A further object is to provide supporting means in connection with the shoveler, for excavators; together with connecting means permitting of disassociation of the shoveler or excavator from the support when desired.

The above and other objects will be better understood from the following description of the several parts constituting my present improvements, reference being made to the accompanying drawings, forming a part of this specification, and wherein—

Figure 1 is a side elevation of my improved shoveler or excavator, illustrating a portion of the support therefor;

Fig. 2 is a plan view of one of the excavating scoops, with a portion of the excavator chain, and showing the operative connection of the scoop with the said chain;

Fig. 3 is a side elevation of one of the scoops removed;

Fig. 4 is a vertical longitudinal section taken substantially on line 4—4 of Fig. 7;

Fig. 5 is a detail of the upper portion of Fig. 4, illustrating one of the scoops in dumping position;

Fig. 6 is a similar view of the lower portion of Fig. 4, illustrating one of the scoops approaching the digging position, and

Fig. 7 is a vertical transverse section taken substantially on line 7—7 of Fig. 4.

Referring now to these figures, it will be seen that my improvements reside in the shoveling mechanism, consisting generally of digging buckets or scoops connected to and operating with endless chains, the latter mounted and moving in an excavator frame, detachably associated with the forward portion of a main supporting or traveling frame, the latter shown partly at 10 in Fig. 1, and containing the driving mechanism.

Briefly, this driving mechanism which forms no part of my present claims, includes a driving motor (not shown), the shaft 14 of which is provided with a geared connection at 15 with a shaft 16, in turn geared at 17 with a shaft 18. The shaft 18, through gearing 19, drives the upwardly and rearwardly inclined discharge conveyers 20, above the main frame, and over the forward end of which the rear upper end of the excavator frame extends.

Shaft 18 also drives a shaft 21, in turn geared to a forward transverse shaft 22 at the opposite ends of which are sprocket wheels connected by sprocket chains 23 to the end sprocket wheels 24 of the lower forward shafts 25, on opposite sides of the excavator frame, as seen in Fig. 7.

The entire machine is moved in opposite directions in use, upon suitable supports, as for instance tracks 26, and by any suitable mechanism (not shown) connecting its driving parts with its wheels, of which the forward wheels appear at 27 in Fig. 1.

The excavator frame, as proposed by my present improvements, and which is upwardly and rearwardly inclined at the forward portion of the main frame 10, with its upper rear end extending over the forward end of the conveyer 20, as before stated, includes side plates 51 held in spaced apart relation by an intermediate plate 52 and a rear apron 53, said side plates having journals for the lower forward shaft 25 before mentioned, as well as the upper rear shaft 26, the latter having sprocket wheels 28 over which the upper portions of the excavator chains 79 extend, all as plainly seen by a comparison of Figs. 1, 4, and 7.

The side plates 51 are of sufficient thickness to render them rigid, and are further supported in spaced apart relation by a lower bracket 55, and by a rod 54 connecting the braces 56, which latter are secured to the side plates 51 and serve to further increase the rigidity thereof.

Rearwardly of the apron 53, the side plates 51 are connected by an upwardly and rearwardly inclined plate 29 seated upon a conformably shaped portion 30 at the forward

end of the main frame 10, and connected there by clamps 31 providing for ready removal of the excavating frame when desired.

Each of the excavator buckets or scoops 32 is provided at the forward edge of its base with forwardly projecting excavator teeth 33, and has the rear portion 34 of its base rearwardly and upwardly inclined, the forward and rear ends of the scoop being open as shown, and the side walls 35 having forward and rear laterally outstanding studs on which the forward and rear guide rollers 36 and 37 at opposite sides of the scoop are mounted, the studs supporting the forward rollers 36 being connected by links 38 and brackets 39, to the chains 79 as plainly seen in Fig. 2, with the several parts so disposed as that the greater weight of the scoop is forwardly of the forward rollers 36.

Thus the scoops follow the chain 79 in the movement of the latter, the relative positions of the scoops being controlled by guideways in which the rollers 36 and 37 travel.

To this end, adjacent each of the side plates 51, are formed upper, intermediate, and lower guideways 58, 59, and 60, between intermediate track beams 61 and 62, and upper rims 63 and lower ribs 64, the upper rim 63 having upper and lower curved portions 65 and 66 respectively at the upper and lower ends of the side plates 51, and of which the former has a lower bent portion 67 forming a channel 68 adjacent the upper end of the guide rib 64.

At its lower end the lower guide rib 64 has a supplemental rib 69 curved to form the lower enlarged end of the guideway 60, as particularly seen in Fig. 4, the lower end of this rib 69 joining the lower curved portion 66 of the upper rim 63, in spaced relation to the lower curved guiding ends of the beams 61 and 62. The upper end of the beam 62 terminates some distance below the upper extremity of the beam 61, and a guide arm 70 is pivoted at one end to the said upper extremity of the beam 61, to swing from a position in engagement with the upper end of the beam 62, so as to close the upper end of the guideway 59, to a position across and closing the upper end of the channel 68.

A switch block 71 is, furthermore, disposed transversely within the lower enlarged portion of the guideway 60, so as to divide the latter into upper and lower channels 72 and 73, the upper end of the latter of which is normally closed by a switch arm 74 pivoted to the upper portion of the block 71 and having an angular arm 75 normally upstanding within the channel 72, and a controlling spring 76. At the lower end of the switch block 71 is another switch arm 77 pivoted to move to angular positions respectively closing the lower ends of the channels 72 and 73.

Thus, as each scoop 32 travels upwardly with the upper run of the chains 79, with its forward rollers 36 in the guideway 58 and its rear rollers 37 in the guideway 59, as seen in Fig. 4, the bucket will be supported in substantially horizontal position to prevent its contents from spilling. As the bucket reaches the upper end of its travel, its rear rollers 37 engage the arm 70 and move the latter across the upper end of the channel 68 as the said rear rollers proceed into the channel to the position shown in Fig. 5, so that, as the scoop connecting links 38 round the upper sprockets 28, the scoop will be shifted to its vertical dumping position, as shown in Fig. 5, so that the material carried upwardly therein will be dumped in practice upon the discharging conveyer 20, shown in Fig. 1.

As the movement continues from the dumping position, the scoop pivots upon its rear rollers 37 in the lower portion 67 of the rim within channel 68, the upper rollers being drawn downwardly across the upper end of the beam 61 thus forcing the arm 70 across the upper end of the guideway 59, so that, in the further movement of the scoop, both its forward and rear rollers will be guided into the upper end of the lower guideway 60, as shown at the upper portion of Fig. 4. Thus, after dumping the scoop proceeds downwardly in the lower guideway 60 with the lower run of the chains until the rollers 36 strike the angular extension 75 of the switch arms 74, rocking the latter to the dotted line position in Fig. 4, upwardly across the upper portion of the channel 72, so as to force the rear rollers 37 to descend into the channel 73 and pass downwardly therein below the switch blocks 70, as the forward rollers proceed above the said switch blocks in the channel 72. When the forward rollers 36 strike the switch arm 77, the latter is forced downwardly to the dotted line position in Fig. 4, and the said forward rollers then pass into the lower portion of the guideway between the lower ends of the beams 61 and 62, and the lower curved portion 66 of the rim, while the rear rollers 37 in their passage out of the lower end of the channel 73 again elevate the switch arm 77 to the position shown in full lines in Fig. 4, so as to hold the scoop during its downwardly rounding travel, in properly inclined excavating position. As the links 38 round the lower sprocket 24, the forward rollers 36 will start their upward movement in the upper guideway 58, while the rear rollers 37 start their upward movement in the intermediate guideway 59 by virtue of the greater weight of the scoop forwardly of the forward rollers 36.

As seen particularly in Fig. 7, and also in Fig. 4, the upper edges of the guide beams 61 and 62 are beveled to provide minimum space for the lodgment of falling particles of the material excavated and carried by the

scoops 32, these beams being supported inwardly beyond the sides 51, as seen in Fig. 7, by means of bolts 80 extending through spacing thimbles and the like 81.

It is thus obvious that my present improvements provide for the ready detachment of the excavator frame, seated as above described upon the forward portion 30 of the main frame, by virtue of the clamp 31, and that the means forming the proper guideways for the scoops in their movement, are arranged to constitute a non-shifting pivot for the scoops at the upper end of their travel, by means of the rear rollers 37 of the scoops within the channel 68, so as to obviate pushing of the scoops upon their rear rollers, as in my patent above referred to, the power of the excavating chain 79 being directed wholly to pull upon the forward rollers 36 in drawing the latter downwardly from the dumping position shown in Fig. 5, beyond the upper extremities of the beams 61.

It is furthermore obvious that the upper switch arm 70 effectively guides the rollers of the scoops into the upper end of the lower guideway 60 in the descending movements, by virtue of its particular disposition and action, avoiding all necessity of depending upon gravity to properly position the scoops at the beginning of such movement, as well as all danger of either the forward or rear rollers entering the upper end of the intermediate guideway 59. It is to be understood, of course, that, as in my patent before referred to, the lower switch arms 74 and 77, operating as above described, act in use to shift the scoops to and support the same in properly inclined excavating position.

I claim:

1. In a machine of the type described, an excavator including endless traveling chains, scoops having forward and rear rollers and linked to said chains, adjacent their forward rollers, a frame having upper and intermediate guideways in which the forward and rear rollers are respectively movable in an upward direction toward the dumping position, and lower guideways downwardly in which both the forward and rear rollers are movable, said frame having depending channels at the upper ends into which the rear rollers are movable at the dumping position to dump the scoops without overturning the same, said channels being closed at their lower ends and approximately as wide as the rollers to coöperate with the said rear rollers and form stationary pivots on which the scoops are shiftable to project their forward rollers into the lower guideways, and switch arms pivoted adjacent the upper end of the frame and movable into and out of operative position across and closing the upper ends of the intermediate guideways.

2. In a machine of the type described, an excavator including endless traveling chains, scoops having forward and rear rollers and linked to said chains, adjacent their forward rollers, a frame having upper and intermediate guideways in which the forward and rear rollers are respectively movable in an upward direction toward the dumping position, and lower guideways downwardly in which both the forward and rear rollers are movable, said frame having depending channels at the upper ends into which the rear rollers are movable at the dumping position to dump the scoops without overturning the same, said channels being closed at their lower ends and approximately as wide as the rollers to coöperate with the said rear rollers and form stationary pivots on which the scoops are shiftable to project their forward rollers into the lower guideways, and switch arms pivoted adjacent the upper end of the frame and alternately engaged and shifted by the forward and rear scoop rollers into and out of operative position across and closing the upper ends of the intermediate guideways.

3. In a machine of the type described, an excavator including endless traveling chains, scoops linked to the chains and having guide rollers, and means forming guideways for said rollers, including guide members certain of which are curved to form stationary pivots coöperating with certain of the scoop rollers adjacent the dumping position, and on which the scoops are shiftable.

4. In a machine of the type described, an excavator including endless traveling chains, scoops linked to the chains and having guide rollers, and means forming guideways for said rollers, including guide members, certain of which are curved adjacent the upper ends of the guideways to form channels into which certain of the scoop rollers are movable, said channels being closed at one end and approximately as wide as the rollers to coöperate with said rollers in the formation of stationary pivots upon which the scoops are shiftable.

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