S. H. HUNT.

ORE LOADER.

APPLICATION FILED JULY 5, 1917.

1,302,046.

Patented Apr. 29, 1919.

5 SHEETS—SHEET 1.

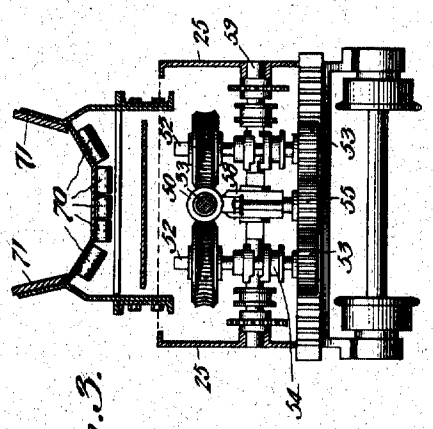


Fig. 3.

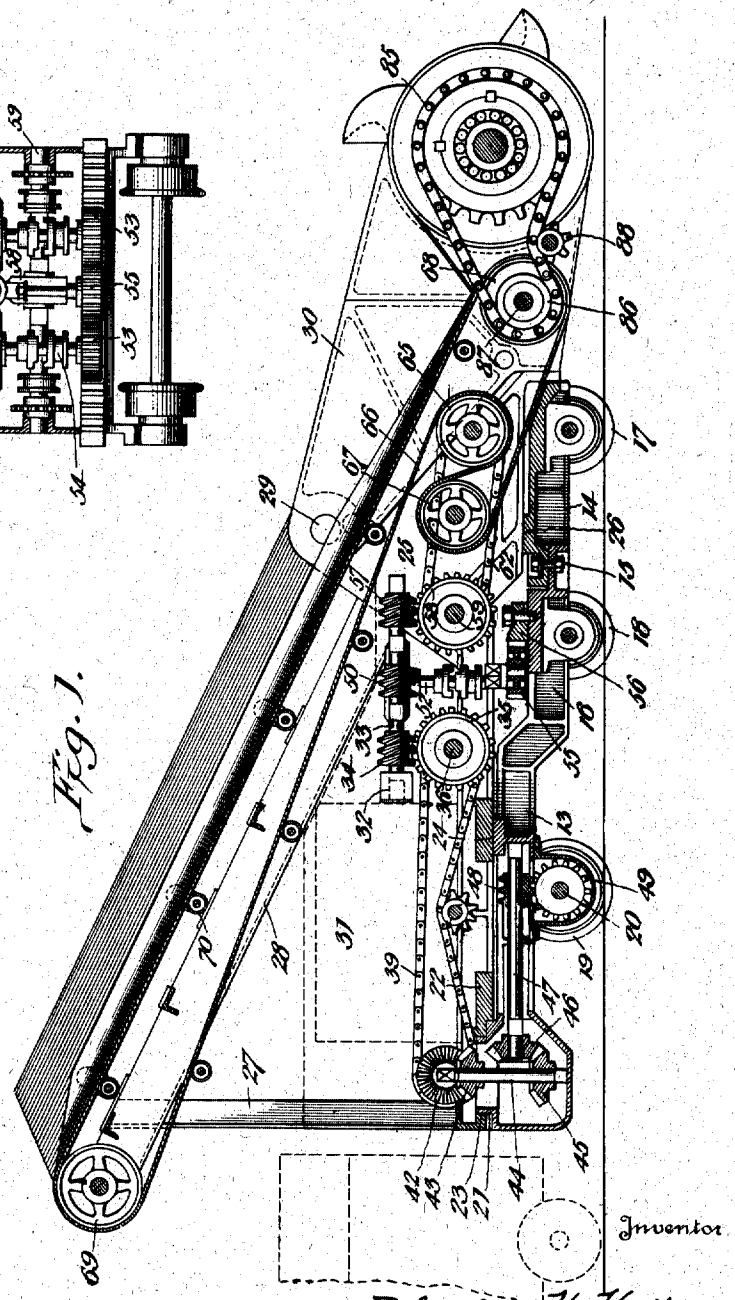


Fig. 1.

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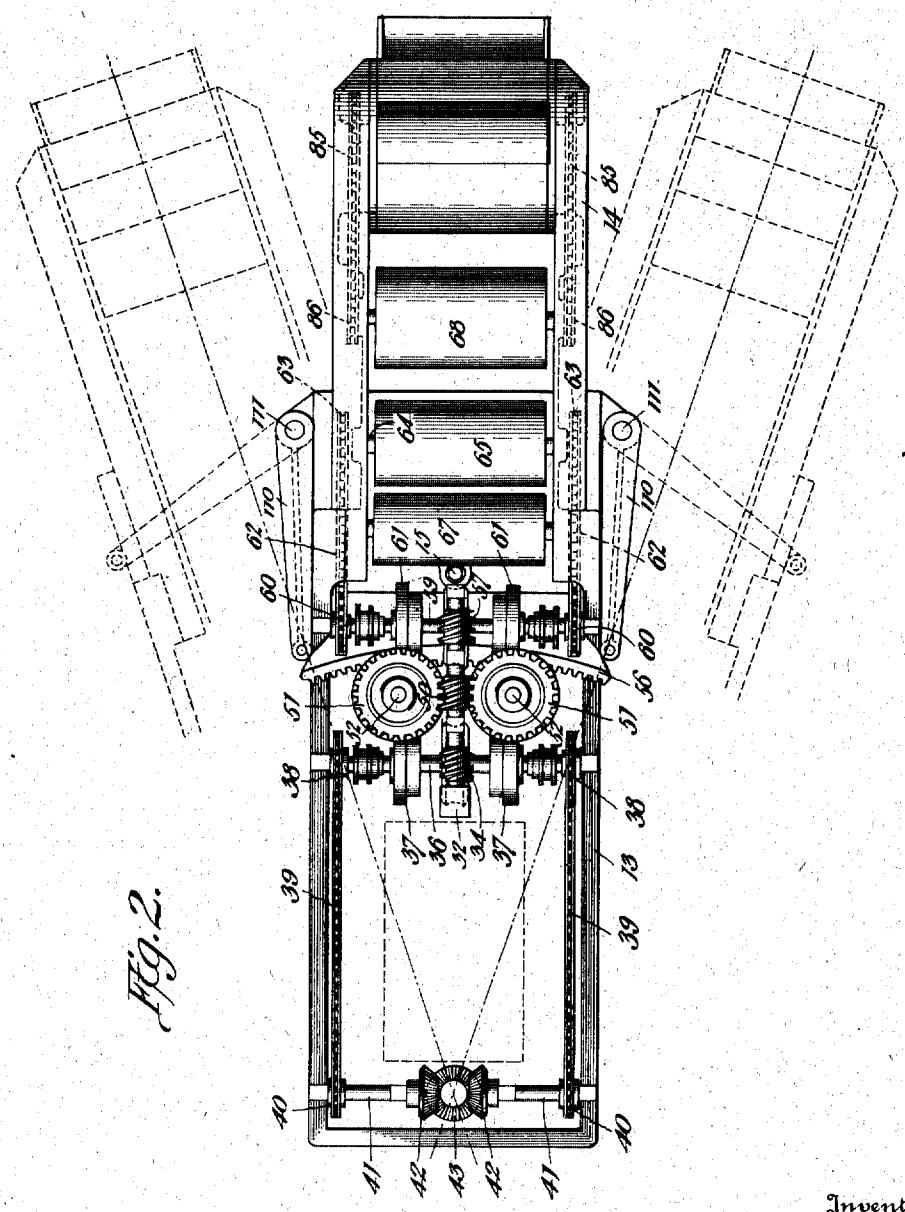


FIG. 2.

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5 SHEETS—SHEET 3.

Fig. 5.

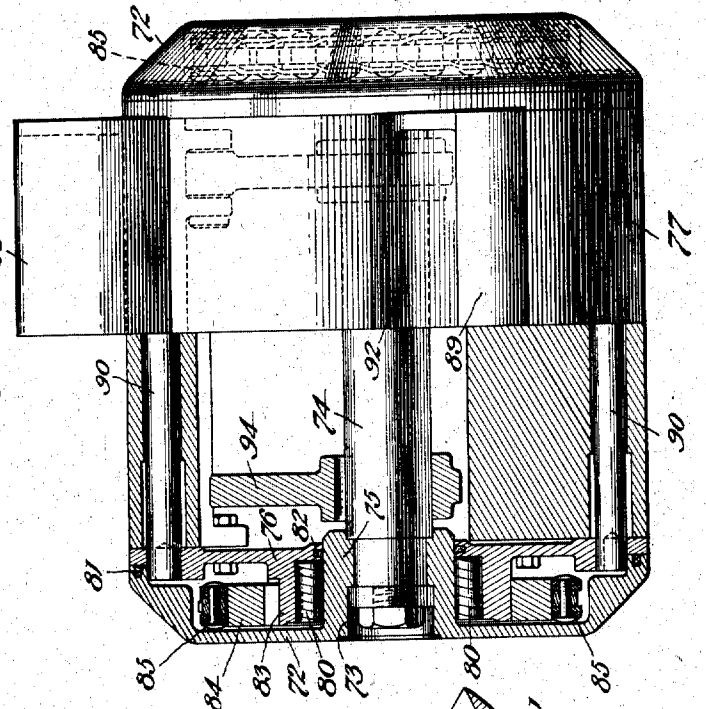
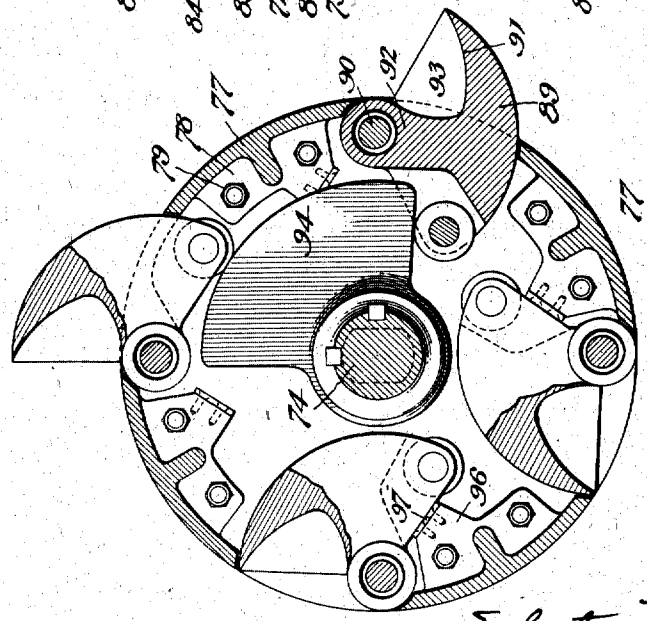


Fig. 4.



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Fig. 6.

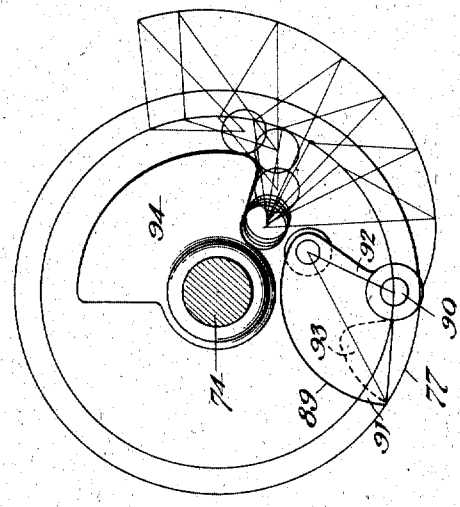


Fig. 8.

Fig. 7.

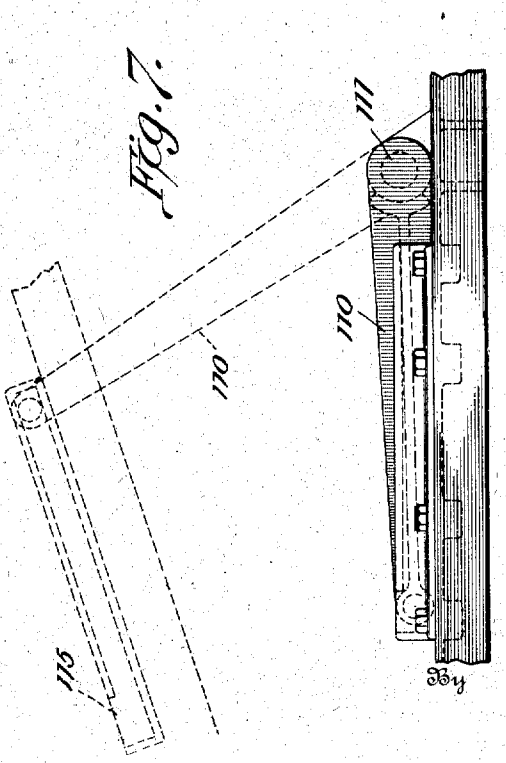
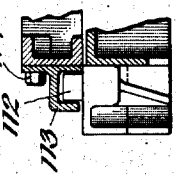


Fig. 9.



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5 SHEETS—SHEET 5.

Fig. 10.

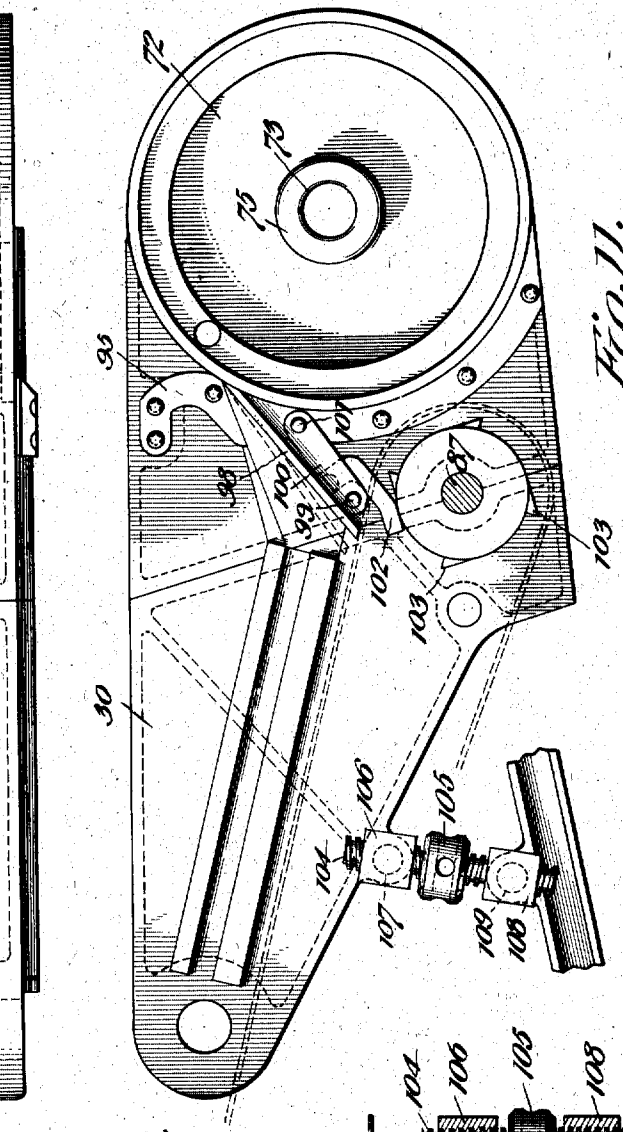


Fig. 11.

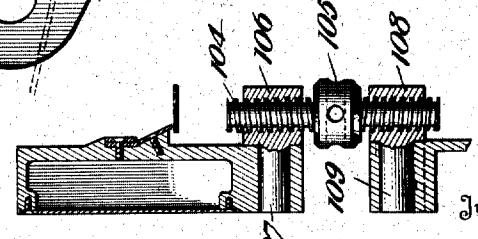


Fig. 12.

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UNITED STATES PATENT OFFICE.

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ORE-LOADER.

1,302,046. Specification of Letters Patent. Patented Apr. 29, 1919.

Application filed July 5, 1917. Serial No. 178,680.

To all whom it may concern:

Be it known that I, SYLVESTER H. HUNT, a citizen of the United States, residing at Bessemer, in the county of Gogebic and State of Michigan, have invented certain new and useful Improvements in Ore-Loaders, of which the following is a specification.

The present invention relates to ore loading apparatus, and one of the primary objects is to provide mechanism of this character that will operate in a confined space and effect the deposit of ore or other material into a common mining buggy. While particularly devised for this use, it will be obvious, however, that it is not limited thereto, but may be utilized in other industries where material in bulk is to be transferred to a vehicle or carrier.

An embodiment of the invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a longitudinal sectional view through the apparatus.

Fig. 2 is a horizontal sectional view.

Fig. 3 is a cross sectional view.

Fig. 4 is a detail sectional view on an enlarged scale through the digging and elevating member.

Fig. 5 is a view partially in elevation and partially in section of the same member, the section being taken at right angles to Fig. 4.

Fig. 6 is a diagrammatic view illustrating the development of the path made by the shovels in entering the material.

Fig. 7 is a detail plan view of one of the supplemental carriage supports.

Fig. 8 is a side elevation of the same.

Fig. 9 is a detail cross sectional view therethrough.

Fig. 10 is a plan view of one of the spaced members of the support.

Fig. 11 is an inner face view of the same.

Fig. 12 is a cross sectional view.

Similar reference numerals designate corresponding parts in all the figures of the drawings.

In the embodiment illustrated, a truck is employed comprising frame sections 13 and 14, the sections being pivoted, as illustrated at 15 so as to permit their relative lateral swinging movement. The section 13 has a depressed front portion 16, and the section 14 is of the same elevation as the portion 16. The front section 14 is carried on suitable wheels 17 and the depressed portion 16 is also supported on wheels 18. The rear portion of the truck frame is mounted on driving wheels 19 fixed to a shaft 20 that is suitably journaled on the truck frame.

The rear end of the truck frame is provided with an upstanding tubular pivot 21 on which is mounted a lateral swinging carriage. This carriage consists of a base frame 22 having an opening 23 that receives the pivot 21, the front portion of said base frame having a sliding bearing 24 on the elevated portion of the truck section 13 adjacent to the rear driving wheels 19. Said frame furthermore is provided at its front end with a pair of spaced standard plates 25 slidably mounted, as shown at 26 in Fig. 1, upon the front truck section 14. Standards 27 rise from the rear end of the base frame 22 and the upper ends of these standards are connected with the standard plates 25 by inclined frame members 28, said members projecting rearwardly beyond the standards 27.

The standard plates 25 are provided at their upper ends with pivots 29 on which are mounted the rear ends of spaced plates 30, constituting a vertically swinging support that projects beyond the front end of the truck, and is of course movable laterally with the carriage.

A motor indicated at 31 is supported on the rear portion of the carriage, and its shaft 32 is suitably coupled to a main driving shaft 33 suitably supported on the carriage in advance of said motor. The supports and bearings for this and the other shafting hereinafter described are not illustrated in order to avoid confusion and to simplify the drawings. Their arrangement will, of course, be readily understood and appreciated by any one skilled in this art. The main driving shaft 33 is provided with a rear worm 34 meshing with a worm gear 35 that is fixed to a counter-shaft 36. The said counter-shaft, as shown in Fig. 2, may be connected by clutches 37 to either of a pair of sprocket wheels 38. Around these sprocket wheels pass sprocket chains 39 that also pass about sprocket wheels 40 mounted on stub shafts 41 journaled on the rear portion of the carriage. The inner ends of the stub shafts 41 are provided with beveled gears 42 meshing with diametrically opposite portions of a horizontal beveled gear 43 that is fixed to the upper end of a vertical

shaft 44. The shaft 44 is disposed axially of the pivot 21, and is provided at its lower end with a beveled gear 45 meshing with a similar gear 46 on a horizontal shaft 47. The shaft 47 is provided with a worm 48 meshing with a worm gear 49 fixed to the axle 20. With this construction, it will be evident that the truck and the mechanism carried by it can be moved in either direction by clutching either of the sprocket wheels 38 to the counter-shaft 36, and that the truck will be at a standstill if both of said sprocket wheels are unclutched from the counter-shaft.

The main driving shaft 33 is provided with a second worm 50, and meshing with opposite sides of the same, are worm gears 51 carried by the upper ends of vertical shafts 52. The lower ends of these shafts have loosely mounted thereon gear wheels 53 which can be connected to and disconnected from said shafts by clutches 54. The gears 53 are in mesh with an intermediate idler gear 55 that is in mesh with a curved rack 56 fixed to the front depressed portion 16 of the rear truck section 13. With this construction, it will be evident that if one or the other of the gears 53 is clutched to its shaft, the carriage and support will be swung in one direction or the other, and may be thus adjusted. When both gears are unclutched from their shafts, the carriage is of course fixed with relation to the truck.

The main driving shaft 33 is furthermore provided with a third worm 57 in mesh with a worm wheel 58 that is fixed to a countershaft 59, and this countershaft can be clutched to or unclutched from a pair of sprocket wheels 60 disposed at the sides of the truck. The clutches for this purpose are indicated at 61 and like the other clutches, may be operated by any well known means, which have not been illustrated to avoid complications of the drawings. The sprocket wheels 60 are engaged with sprocket chains 62 that extend forwardly and pass around sprocket wheels 63 carried by a shaft 64 on which is mounted a driving pulley or drum 65.

Passing around the drum 65, and consequently driven thereby, is an endless conveyer belt 66 that also passes around a tension drum 67 journaled in rear of the drum 65, around a front end drum 68 journaled on the support 30 and around a rear end drum 69 journaled on the rear ends of the frame members 28 in rear of the standards 27. This belt is disposed at an inclination, as clearly shown in Fig. 1, the upper stretch or flight constituting the active or conveying member and being formed into trough-shape or transversely concaved by suitably positioned sets of rollers 70. Extending alongside the upper stretch of the belt are retaining walls 71 that preferably overlap the edges of said belt, as illustrated in Fig. 3, these walls extending from the rear ends of the support plates 30.

The front end of the support plates 30, as illustrated more particularly in Figs. 10 and 11, are formed into casing heads 72, and are provided with central openings 73 which, as illustrated in Fig. 5, receive the ends of a fixed axle 74 that constitutes a cross stay for the front end of the support. The said head 72 furthermore has gudgeons or hubs 75 surrounding the ends of the axle 74 and on these hubs are rotatably journaled the heads 76 of a drum, comprising said heads 76 and peripheral spaced wall sections 77 having inturned terminal flanges 78 bolted, as shown at 79 to the heads 76. The bearings for the heads 76 are preferably rollers 80, and these bearings are thus housed between the heads 76 and the head 72, suitable packing rings 81 and 82 being provided at the movable joints. The heads 76 also have hub portions 83, to which are fixed sprocket wheels 84. Around these sprocket wheels pass sprocket chains 85 which, as shown in Fig. 1, also pass around sprocket wheels 86 fixed to the shaft 87 that carries the drum 68. Idlers 88 are preferably employed to take up the slack of the chains 85. The sprocket wheels 84 and the associated portions of the sprocket chains, it will be noted, are also housed.

Carried by the drum 76—77 and operating in the spaces between the wall sections 77 are ore or earth receiving and carrying shovels 89, each being pivoted, as shown at 90, within the drum and having blade portions 91 movable into and out of said drums, the blade portions and shanks 92 producing pockets 93. The projection of the shovels during the rotation of the drum is effected by cam members 94 fixed to the axle 74, and their retrocession is secured by cam tracks 95 fixed to the inner sides of the support plates 30, as shown in Fig. 11. The rearward or inward movements of the shovels is limited by stops 96 fixed within the drum, and having suitable wear plates 97.

Interposed between the rear portion of the shoveling and elevating drum and the front lower end of the conveyer belt is a delivery or feeding apron 98 comprising a rearwardly and downwardly inclined plate pivoted at its lower end, as shown at 99, to links 100 that are pivotally mounted as shown at 101 in Fig. 11. The plate is provided with a depending finger 102 fixed thereto, and this finger is engaged by cam teeth 103 carried by the shaft 87.

In order to adjust the support, and consequently the digging and elevating member with respect to the truck any suitable means may be employed. For example, there is illustrated in Figs. 11 and 12 a double ended right and left hand screw 104 having a central turning head 105, the upper end of the

screw being threaded into a nut 106 that is pivotally mounted as shown at 107 upon the plate 30. The lower end of the screw in like manner has a threaded engagement with a nut 108 journaled as shown at 109 on the carriage. It will be understood that one of these screw connections is employed for each support plate 30.

The carriage, as will be evident by reference to Fig. 2 is capable of a very considerable lateral swinging movement beyond the sides of the truck, and in order to properly support the said carriage when moved beyond the truck, the following mechanism is preferably utilized. Swinging arms 110 are pivoted at 111 to the sides of the truck, and their free ends have upstanding pintles 112. These pintles are slidable in flanged guides 113 fixed, as shown at 114 to the opposite sides of the carriage. The rear ends of the guides are open, as indicated at 115. With this construction when the carriage swings beyond one side, it will be evident as indicated in Fig. 7 that the arm 110 on one side will swing outwardly and act as a supplemental support to the carriage, while the arm on the opposite side will remain in its folded position against the truck as the guide will disengage therefrom since the pintle will pass through the open portion 115.

Briefly described, the operation of the apparatus is as follows. The truck with the mechanism thereon is advanced to the pile of ore or other material by suitably operating the driving wheels 19, and in this connection, attention may be called to the fact that the articulated construction of the truck permits the same to operate in confined places and make short turns. When positioned, the driving mechanism for the shoveling and elevating means is thrown into operation. It will be understood that the shoveling drum is rotated so that its lower portion moves forwardly and its advance portion moves upwardly. Consequently, as illustrated in Fig. 6, the shovels will be successively projected from the drum into the material, and at the same time will be elevated, carrying the material upwardly over the drum and depositing it upon the feeding apron. This apron is continuously oscillated so as to spread the material and prevent lodging of lumps and the like, thereby effecting its delivery upon the receiving end of the conveyer belt. The belt in turn transports it upwardly and rearwardly over the carriage and as indicated in Fig. 1 deposits it in a suitable vehicle placed in rear of the same. The mechanism of course can be readily swung from side to side so that it has a wide range of action, and permitting its use under substantially all conditions that prevail.

From the foregoing, it is thought that the construction, operation and many advantages of the herein described invention will be apparent to those skilled in the art, without further description, and it will be understood that various changes in the size, shape, proportion and minor details of construction may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is:—

1. In apparatus of the character set forth, the combination with a truck comprising connected sections relatively movable in a lateral direction, of a carriage pivoted to one section and having a movable bearing on the other, and material shoveling and elevating mechanism mounted on the carriage.

2. In apparatus of the character set forth, the combination with a truck comprising pivotally connected front and rear wheeled sections capable of relative lateral movement, of a carriage pivotally mounted on the rear section and having a movable bearing on the front section, material shoveling and elevating mechanism mounted on the carriage, and means mounted on the rear section and the carriage for swinging the latter.

3. In apparatus of the character set forth, the combination with a truck comprising pivotally connected front and rear sections capable of relative transverse swinging movement, of a carriage pivotally mounted on the rear section and extending over the front section, said carriage having a transverse sliding movement on said front section to permit relative movement between them and also relative movement between the front section and the rear section, means mounted on the carriage and front portion of the rear section for transversely swinging the carriage and permitting the front section to swing with respect to the rear section and the carriage, and shoveling and elevating means mounted on the front portion of the carriage and overhanging the front truck section.

4. In apparatus of the character set forth, the combination with a truck comprising pivotally connected front and rear frame sections and wheels for respectively supporting the same and permitting their relative lateral swinging movement, of a carriage pivotally mounted on one section and having a transversely movable bearing on the other section, means mounted on one of the sections for transversely swinging the carriage, and shoveling and elevating means mounted on the carriage and extending beyond the truck.

5. In apparatus of the character set forth, the combination with a truck comprising front and rear pivotally connected sections capable of relative transverse swinging movement, of a carriage pivoted to the rear

section and having a bearing thereon, said carriage including spaced bearing members at its front end movably mounted on the front truck section, a support mounted on the spaced bearing members and projecting in advance of the front truck section, and shoveling and elevating means mounted on the support.

6. In apparatus of the character set forth, the combination with a truck comprising front and rear wheeled frame sections one in advance of the other and pivoted together, of a carriage pivotally mounted on the rear section and having a bearing thereon, said carriage overhanging the front section, a vertically swinging support pivoted to the front portion of the carriage and projecting beyond the front section, means mounted on the carriage and engaged with the rear section for swinging the carriage, and shoveling and elevating mechanism mounted on the carriage and support and extending in advance of the front section.

7. In apparatus of the character set forth, the combination with a rotatable carrier having a peripheral wall provided with an opening, of an earth receiving and carrying shovel operating through the opening and pivoted to the carrier, directly adjacent one side of the opening, the length of said shovel being substantially equal to the opening, and said shovel filling the same and having a material engaging blade slidable alongside the wall of said opening opposite to that adjacent to the pivot, means for rotating the carrier, and means for swinging the shovel to cause the said material engaging blade to project from and recede within the opening during the rotation of the carrier.

8. An apparatus of the character set forth, the combination with a hollow rotatable carrier comprising closed end heads and a peripheral wall provided with an opening, of an earth receiving and carrying shovel operating through the opening and pivoted within the carrier at one side of the opening, the body of said shovel comprising a shank and curved rear wall both acting to substantially fill the opening and said curved rear wall being slidable alongside the opposite wall of said opening, means for rotating the carrier, and means located within and housed by the carrier for causing the shovel to project from and recede into the opening during the rotation of said carrier.

9. In apparatus of the character set forth, the combination with a rotatable carrier having a peripheral wall provided with a plurality of openings, of a plurality of shovels having their front ends pivoted adjacent to the front walls of the respective openings and having outwardly projecting blade portions at their rear ends provided with curved rear faces that operate alongside the rear walls of the respective openings, means for rotating the carrier, and means within the carrier for causing the projection of the shovels through the openings during the rotation of the carrier.

10. In apparatus of the character set forth, the combination with spaced side members, of a rotatable carrier located between the same, said carrier having a head coöperating with one of the side members to form a casing, means for rotating the carrier connected thereto and housed within the casing, shovels mounted on and rotatable with the carrier, and means within the carrier for causing the projection of the shovels as the carrier is rotated.

11. In apparatus of the character set forth, the combination with a fixed axle, of a rotary drum comprising heads rotatable around the axle and spaced peripheral wall sections respectively secured to the heads, pivots engaged with the heads and extending along certain edges of the wall sections, swinging earth receiving and carrying shovels mounted on the pivots, said shovels having blades movable into and out of the drum through the spaces between the peripheral wall sections and said shovels being substantially coextensive with and filling said spaces, a cam mounted on the axle within the drum, and rollers journaled on the rear portions of the shovels and engaging the cam to cause the projection of the shovels during the rotation of the drum.

12. In apparatus of the character set forth, the combination with spaced side members having terminal casing portions, of a rotary drum journaled between the casing portions, earth receiving and carrying shovels mounted on the drum and movable into and out of the same, means for causing the movements of said shovels upon the rotation of the drum, and driving means connected to the drum within the limits of the casing portions and protected by the latter.

13. In apparatus of the character set forth, the combination with spaced members having terminal casing portions, of an axle connecting said casing portions, a drum journaled on the axle between the casing portions, earth receiving and carrying shovels pivoted to the drum and movable into and out of the same, a cam fixed to the axle and engaging the shovels to cause their projection, driving wheels connected to the ends of the drum within the casing portions, and driving gear mechanism engaged with said wheels.

14. In apparatus of the character set forth, the combination with a truck, of a carriage pivoted thereto and capable of horizontal swinging movement thereon, a support pivoted to the carriage and projecting in advance of the truck, spaced drums on the carriage, one being located adjacent to the support, a drum on the support, an endless con-

veyer passing around certain of the drums on the support and carriage and looped about the drum on the carriage that is adjacent to the support, a shoveling and elevating member mounted on the front portion of the support, and delivering to the conveyer, and means for continuously and completely rotating the said member.

15. In apparatus of the character set forth, the combination with a truck, of a laterally swinging carriage pivoted thereto and having an upwardly and rearwardly inclined upper portion, a support mounted on the front lower portion of the carriage and projecting beyond the truck, drums on the upper rear end and lower front end of the carriage, a drum on the support, an inclined endless conveyer belt mounted on the drum of the support and the upper drum of the carriage, said belt being looped about the lower drum of the carriage and having its upper stretch delivering from the rear end of said carriage, a rotatable shoveling member journaled on the front end of the support in longitudinal line with the conveyer but out of the path of the same and delivering to the belt, and means for driving the belt and shoveling member.

16. In apparatus of the character set forth, the combination with a conveyer belt having an upper rearwardly movable material carrying stretch, of a rotary member about which the belt passes, a rotatable digging and elevating member mounted on the support in advance of the conveyer, an oscillatory delivery apron interposed between the digging and elevating member and the conveyer belt and having its rear end over the latter, a cam on the rotatable member for actuating the apron, and a driving connection between the rotatable member and the digging and elevating member.

17. In apparatus of the character set forth, the combination with a truck, of a laterally movable carriage pivoted thereto, a support mounted on the front end of the carriage and projecting beyond the truck, means for vertically moving the support with respect to the carriage, a conveyer belt operating longitudinally of the support and carriage and mounted on both, one of said mountings including a shaft journaled on the support and having a roller around which the belt operates and a second driving roller around which the belt passes, means for operating the latter roller, a rotatable digging and elevating drum having shovels thereon journaled on the support in advance of the belt, a driving connection between the shaft and the drum, an oscillating apron interposed between the rear portion of the drum and the front end of the belt, and a cam element mounted on the shaft and operating upon the apron to agitate the same.

18. In apparatus of the character set forth, the combination with a truck, of a laterally movable carriage thereon, supported thereby, and movable beyond the side of the truck, a supplemental support movably mounted on the truck and engaged with the carriage for assisting in the support of the latter when it moves beyond the truck, and conveyer means mounted on the carriage.

19. In apparatus of the character set forth, the combination with a truck, of a laterally movable carriage thereon supported thereby and movable beyond the side of the truck, a supplemental supporting arm pivoted to the truck and having a sliding engagement with the carriage for assisting in the support of the latter when it moves beyond the side of the truck, and conveyer means mounted on the carriage.

20. In apparatus of the character set forth, the combination with a truck, of a laterally swinging carriage pivoted to the rear portion thereof and supported thereby, said carriage swinging beyond the opposite sides of the truck, supplemental supports movably mounted on the truck and engaged with the carriage for assisting in the support of the latter when it moves beyond the sides of the truck, and conveyer means mounted on the carriage.

21. In apparatus of the character set forth, the combination with a truck, of a laterally swinging carriage pivoted thereon and supported thereby, said carriage being movable beyond the opposite sides of the truck, supplemental supporting arms pivoted to the sides of the truck, open ended guideways carried by the opposite sides of the carriage and slidably receiving the ends of the arms to permit said arms to act as supplemental supports accordingly as the carriage is swung beyond the sides of the truck and digger and conveyer means mounted on the carriage.

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

SYLVESTER H. HUNT.

Witnesses:
OTTO J. HABHEGGER,
JOHN J. JAMESON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."