Oct. 24, 1933. F. W. VODOZ 1,931,745

LOADING MACHINE

Filed Oct. 20, 1930 4 Sheets-Sheet 1

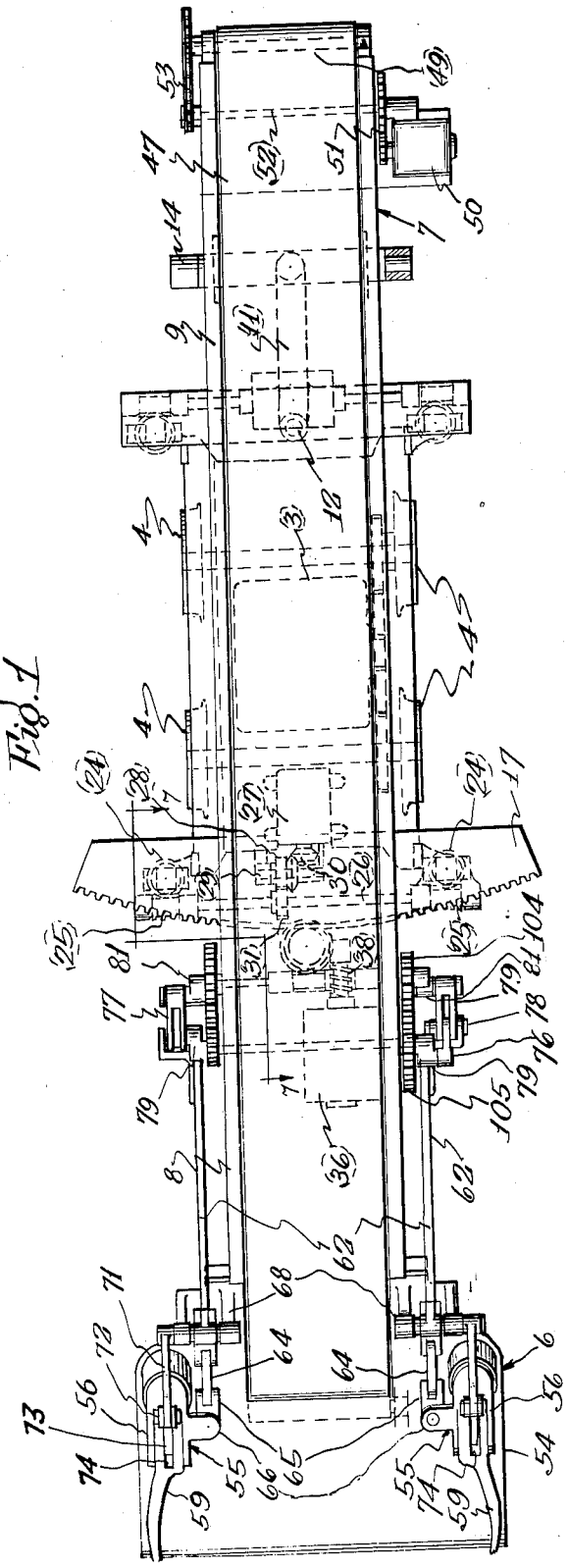


Fig. 1

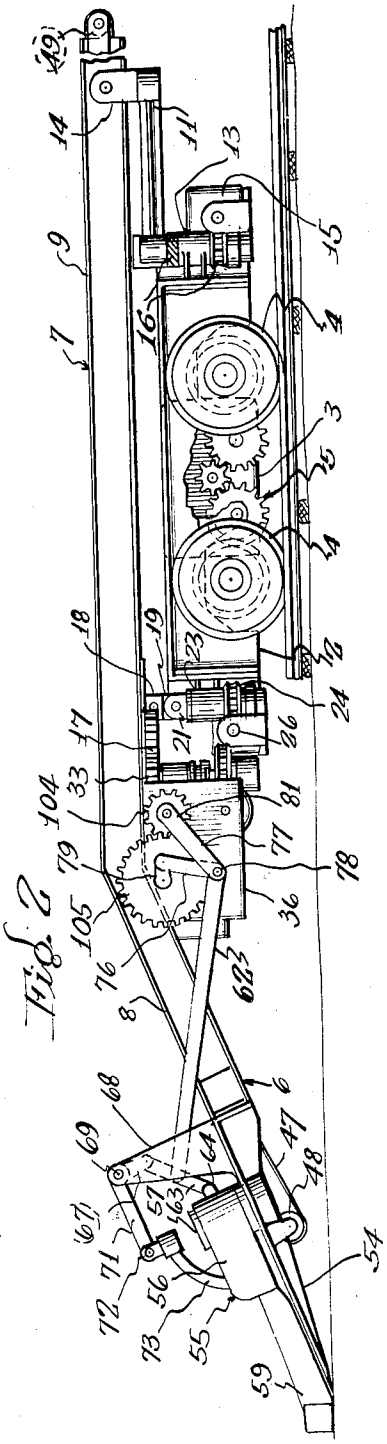


Fig. 2

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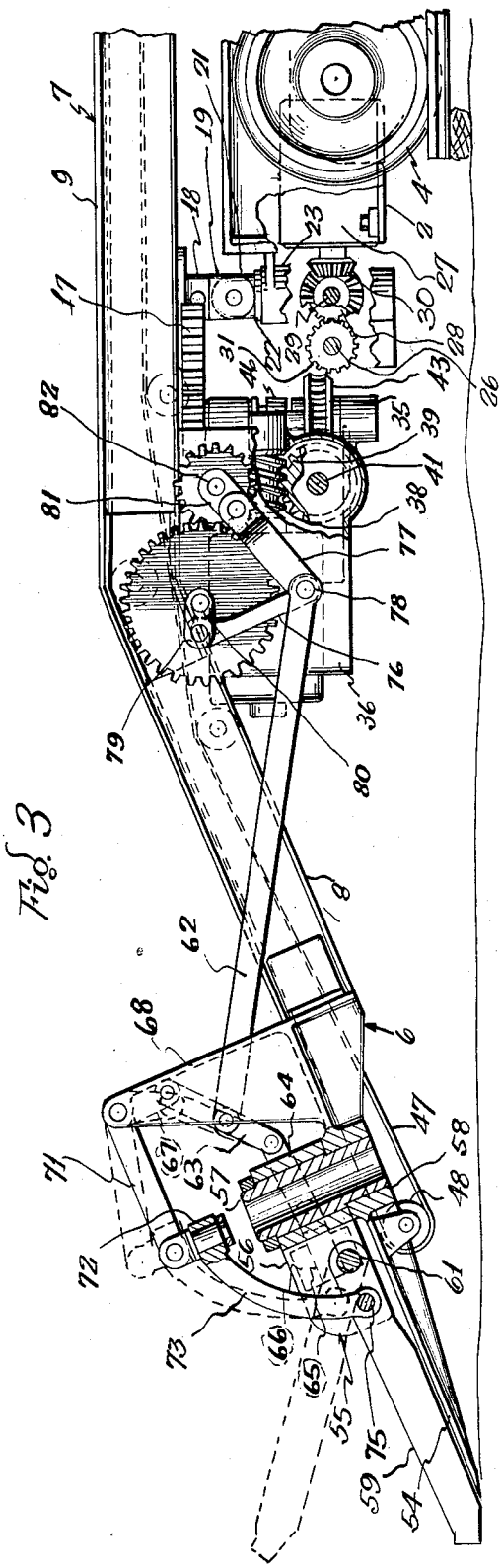


Fig. 3

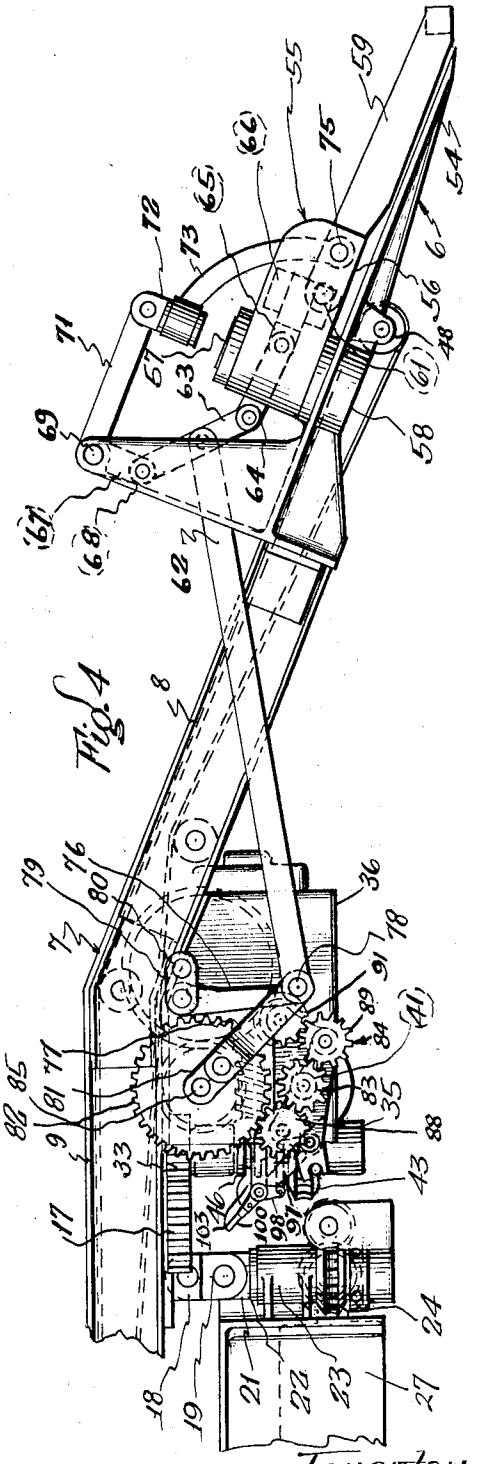


Fig. 4

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Fig. 5

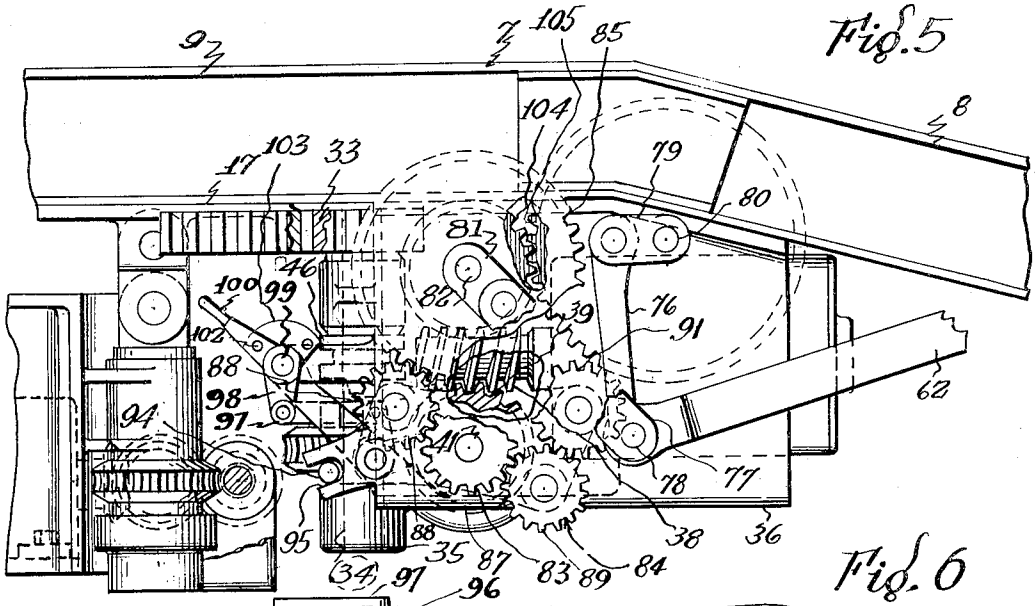


Fig. 6

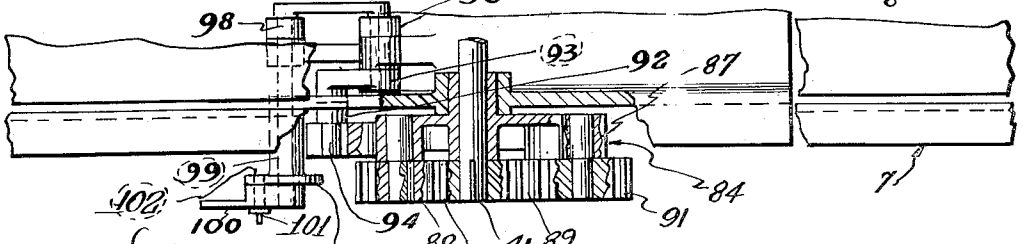
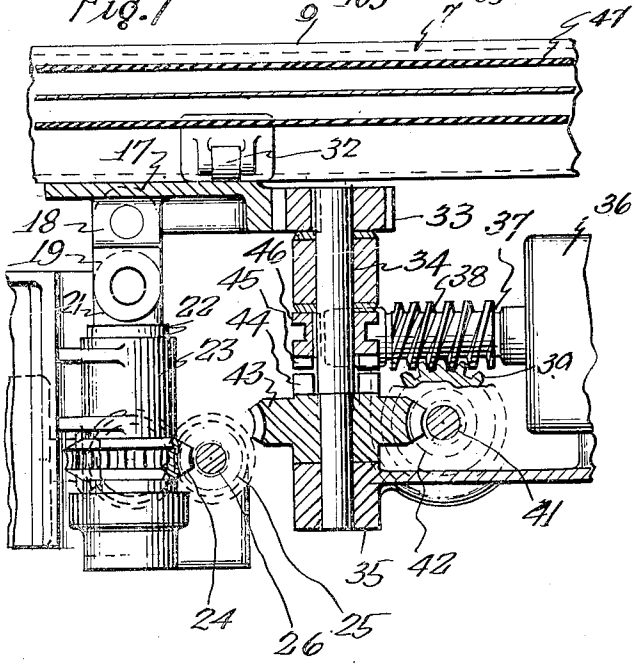


Fig. 7



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Fig. 8

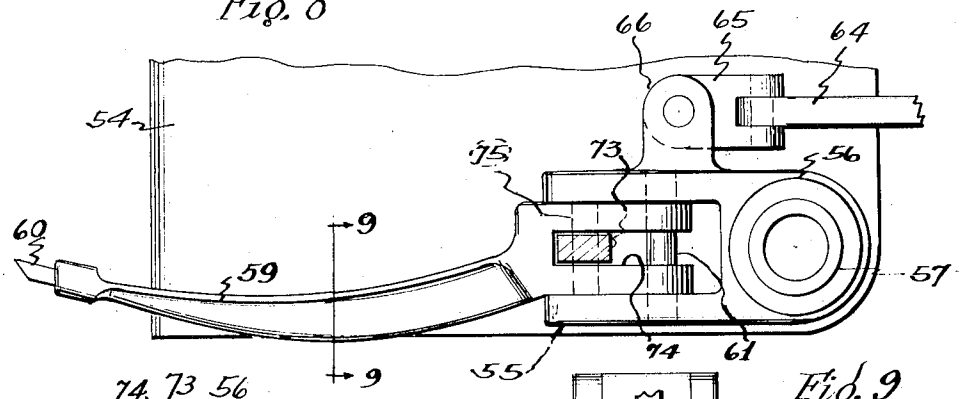


Fig. 9

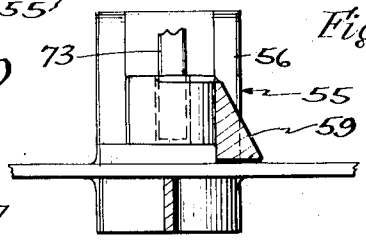


Fig. 10

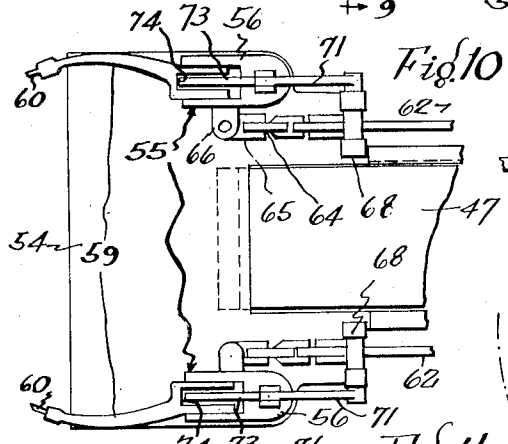


Fig. 11

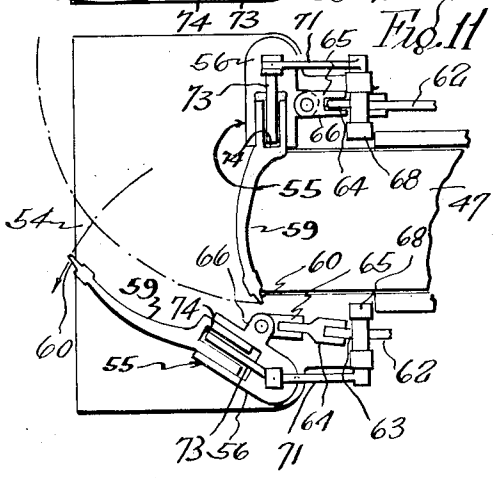
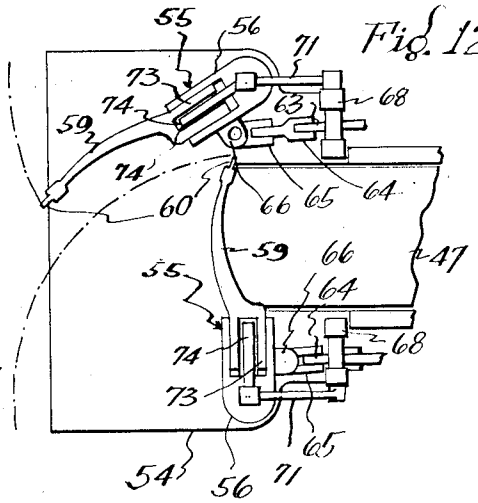


Fig. 12



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Patented Oct. 24, 1933 1,931,745

UNITED STATES PATENT OFFICE

1,931,745

LOADING MACHINE

Frederick W. Vodoz, Wilmette, Ill., assignor to Goodman Manufacturing Company, Chicago, Ill., a corporation of Illinois

Application October 20, 1930. Serial No. 489,760

30 Claims. (Cl. 198—10)

This invention relates to improvements in loading machines and more particularly to track mounted loading machines such as are used in mines and adapted to gather loose material and deposit it upon a travelling conveyor for discharge into cars or the like.

My invention has, among other objects, to provide a new and improved form of loading machine adapted to be mounted on a mobile device, such as an ordinary mine locomotive, to provide a novel means for supporting said loading machine on said mobile device for maximum flexibility of movement of the loading element during the loading operation, and to provide a new and improved form of gathering mechanism for gathering loose material onto a conveyor.

Other objects of my invention will appear from time to time as this specification proceeds.

My invention may be more clearly understood with reference to the accompanying drawings wherein:

Figure 1 is a top plan view of the device embodying my invention;

Figure 2 is a side elevation of the device shown in Figure 1;

Figure 3 is an enlarged fragmentary side elevation of the forward portion of the device shown in Figure 1 with parts broken away and in section;

Figure 4 is an enlarged fragmentary side elevation of the forward portion of the device shown in Figure 1, taken from the opposite side of the machine from Figure 3, with parts broken away and in section;

Figure 5 is an enlarged partial fragmentary side elevation of the machine with parts broken away and in section;

Figure 6 is an enlarged partial fragmentary plan view of the gearing arrangement with parts broken away and in section;

Figure 7 is an enlarged sectional view taken on line 7—7 of Figure 1;

Figure 8 is an enlarged detail plan view of one of the gathering arms with parts broken away and in section;

Figure 9 is a partial sectional view taken on line 9—9 of Figure 8; and

Figures 10, 11 and 12 are diagrammatic views of the gathering mechanism in various operative positions.

Like numerals refer to like parts throughout the various figures.

Referring now to the embodiment of my invention as illustrated in the drawings, a locomotive 2 is provided for supporting the entire gathering and loading mechanism. The locomotive 2 is an electric locomotive of an ordinary low vein construction and is provided with an electric motor 3 which drives track wheels 4 by means of a geared reduction generally indicated at 5 which is provided with means for supporting a conveying and loading mechanism 6 for movement with respect to said locomotive so said conveying and loading mechanism may be manipulated to gather loose material in various parts of the mine remote from the locomotive proper.

The conveying and loading mechanism 6 includes a conveyor frame 7 having a forward inclined portion 8 engageable with the mine bottom at its forward end and a rearward horizontal portion 9 supported on the locomotive 2.

Referring now in particular to the means for supporting the conveyor frame 7 on the locomotive 2, a rearwardly extending arm 11 is provided. This arm is fixed to a vertical shaft 12 supported in a bracket 13 extending rearwardly from the locomotive 2 for pivotal movement with respect thereto. A trunnion support member 14 is pivotally mounted on the rearward end of the arm 11 and extends upwardly therefrom. This trunnion support member extends upwardly along each side of the conveyor frame 7 and provides a pivotal support for the rearward end of said conveyor frame so said conveyor frame may be moved with respect to the locomotive 2 about a horizontal or vertical axis.

Means are provided for moving the rearwardly extending arm 11 about the axis of the vertical shaft 12 which herein comprises an electric motor 15 operatively connected with said shaft by means of a worm and worm gear drive generally indicated at 16. It may thus be seen that pivotal movement of the rearwardly extending arm 11 pivotally moves the rearward end of the conveyor frame 7 so said conveyor frame may be positioned over a mine car in various positions of the conveying and loading mechanism 6 with respect to the locomotive 2.

The forward end of the conveyor frame 7 is slidably supported on a gear sector 17, which gear sector is adjustably supported on the locomotive 2 beyond the forward end thereof for vertical movement with respect thereto (see Figs. 1, 2 and 7). Forked parts 18 depend from the gear sector 17 adjacent each side thereof and have connecting links 19 pivotally mounted thereon. The lower end of the connecting links 19 are forked and are adapted to be pivotally connected to a top flattened portion 21 of a vertical shaft 22. The vertical shafts 22 are sup-

ported in members 23 projecting forwardly from the locomotive 2. The lower end of these shafts are threaded and are engaged by threaded inner peripheries (not shown) of worm gears 24 so that rotation of said worm gears raises or lowers the vertical shafts 22 which moves the entire conveyor frame 7 about the axis of the trunnion support member 14. This raises the forward end of the conveyor frame 7 above the mine bottom so the machine may be transported about the mine on the locomotive 2, or so it may be accommodated to uneven surfaces. The worm gears 24 are driven from worms 25 adjacent opposite ends of a transverse shaft 26. A motor 27 is provided to drive the transverse shaft 26 and is connected thereto by means of a pair of bevel gears 30, a spur pinion 28 on a transverse shaft 29, which shaft is driven by the bevel gears 30, and a spur gear 31 keyed on the transverse shaft 26.

Rollers 32 are provided on each side of the conveyor frame 7 to engage the top surface of the gear sector 17 so the conveyor frame 7 may be moved along said gear sector about the axis of the point of connection of the trunnion support member 14 to the rearwardly extending arm 11. (See Fig. 7.)

Means are provided to move the conveyor frame 7 about the axis of the point of connection of the trunnion support member 14 to the rearwardly extending arm 11, which means herein comprise a spur pinion 33 keyed on the upper end of a vertical shaft 34, which pinion meshes with the teeth on the gear sector 17. The vertical shaft 34 is supported and journaled in a support frame portion 35 having connection with the conveyor frame 7 beneath said conveyor frame.

A motor 36 is provided to drive the vertical shaft 34. This motor is herein shown as an electric motor of an ordinary construction and is supported on the support frame 35. The motor 36 is provided with a motor shaft 37 which has a worm 38 integral therewith. The worm 38 meshes with and drives a worm gear 39 keyed on a transverse shaft 41 for driving said shaft. Another worm 42 is fixed on the transverse shaft 41 and meshes with and drives a worm gear 43 freely mounted on the vertical shaft 34. The upper surface of the worm gear 43 is provided with jaws 44, which jaws may be engaged by jaws 45 on a clutch member 46 feathered on the vertical shaft 34 so said vertical shaft may be selectively connected with the motor 36 to move the conveying and loading mechanism 6, and conveyor frame 7, about the axis of the point of connection of the trunnion support member 14 to the rearwardly extending arm 11.

The conveyor frame 7 is provided with a suitable conveying means which may be of any type well known to the art but which is herein preferably shown as a belt conveyor 47. The belt conveyor 47 is threaded around and over a roller 48 at the forward end of the forward inclined portion 8 of the conveyor frame 7 and extends rearwardly along said conveyor frame and is driven by a roller 49 at the rearward end of said conveyor frame by means of a motor 50, reduction gears 51, transverse shaft 52, and chain and sprocket drive 53.

Referring now in particular to the novel gathering means for gathering loose material and depositing it on the conveyor 47. An inclined pan 54 extends outwardly from and forwardly of the conveyor frame 7 and is disposed adjacent the mine bottom. A plurality of gathering arms 55 are provided to move across the pan 54 and move the loose material onto the belt conveyor 47. One of these arms is provided on each side of the inclined pan 54 and is pivotally mounted near the rearward end thereof and extends forwardly of said pan beyond the forward end thereof.

Since the construction and means of operating each of the gathering arms 55 is substantially the same, only one of said arms will be herein described in detail. The arm 55 includes a member 56 pivotally mounted on a sleeve 57, which sleeve in turn is mounted in a boss 58 in the inclined pan 54 adjacent one side thereof near the rearward end of said inclined pan. The sleeve 57 is perpendicular to the inclined pan 54 so the member 56 is pivotally movable in a plane parallel to the plane of said inclined pan. The forward portion of the member 56 is forked and has a finger 59 pivotally mounted on a pin 61 fixed in said member at its ends for movement about a transverse axis.

A bit 60 is fixed in the forward end of each finger 59 and extends forwardly therefrom to engage the loose material and move said loose material onto the inclined pan 54 and break up said loose material when said fingers become fouled between large lumps of coal.

Means are provided for moving the fingers 59 about the axis of the point of connection of the member 56 to the sleeve 57 and the pin 61 so said fingers may be moved inwardly towards the belt conveyor 47 and outwardly and upwardly away from said conveyor to avoid the loose material in the path of said conveyor. Said means herein comprises a connecting rod 62 pivotally connected to a link 63 near the central portion of said link.

The link 63 has connection with a link 64 at its lower end which in turn has connection with a member 65 pivotally connected to a lug 66 extending inwardly from the member 56. The opposite end of the link 63 is connected to a lever 67 pivotally mounted on an upwardly extending member 68 integral with the inclined pan 54. The lever 67 is fixed on a shaft 69 which is journaled in the upwardly extending member 68. Another lever 71 is fixed on the outer end of the shaft 69 and extends forwardly therefrom. The lever 71 has a member 72 pivotally connected to its outer end. The member 72 has an arm 73 pivotally connected thereto to move about an axis perpendicular to the point of pivotal connection of said member to the lever 71. The arm 73 is of an arcuate shape and extends forwardly and downwardly from the member 72 and has its outer end pivotally connected to the finger 59 forwardly of the pin 61 in a forked portion 74 of said finger by means of a pin 75.

It may thus be seen that movement of the lever 71 about the axis of the shaft 69 causes movement of the arm 73 which tends to raise the finger 59 about the axis of the pin 61 above the inclined pan 54 and that this movement is caused by the movement of the lever 67 actuated by the link 63 and forward movement of the connecting rod 62.

The rearward end of the connecting rod 62 is pivotally connected to the outer ends of connecting links 76 and 77 by means of a pin 78. The opposite end of the connecting link 76 is pivotally connected to the outer end of a crank 79 fixed on a transverse shaft 80. Likewise, the opposite end of the connecting link 77 is pivotally connected to the end of a crank 81 fixed on the outer

end of a transverse shaft 82. The crank 81 is positioned 45 degrees from the crank 79 and the transverse shafts 80 and 82 rotate in opposite directions to cause movement of the connecting rod 62.

Referring now in particular to means for driving the shafts 80 and 82, said shafts are driven from the motor 36 by means of a suitable gear reduction which includes a pinion 83 fixed on the outer end of the transverse shaft 41 and reversing mechanism generally indicated at 84 for selectively driving a spur gear 85 fixed on the transverse shaft 82 adjacent the inner end of the crank 81 in opposite directions without reversal of said motor.

The reversing mechanism 84 is of an ordinary construction and includes a gear supporting frame 87 pivotally mounted on the transverse shaft 41 and the supporting frame 35 for pivotal movement about the axis of said transverse shaft. A pinion 88 is journaled in the gear supporting frame 87 and driven from the pinion 83. Another pinion 89 is journaled in the gear supporting frame 87 on the opposite side of the pinion 83 from the pinion 88 and driven from the pinion 83 and meshes with and drives a pinion 91. Thus upon movement of the gear supporting frame 87 about the axis of the shaft 41 either of the pinions 88 or 91 may be engaged with the spur gear 85 for reversing the rotation of said spur gear in an obvious manner.

Means are provided for moving the gear supporting frame 87 to engage either the pinion 88 or 91 with the spur gear 85, which means herein comprise a crank member 92 fixed on a shaft 93 journaled in the support frame 35. A pin 94 on the outer end of the crank 92 engages a slot 95 in the gear supporting frame 87 so that movement of said crank causes movement of said support frame. The crank 92 is moved by means of a lever 96 fixed on the inner end of the shaft 93, a connecting link 97, another crank lever 98 having connection with the opposite end of said connecting link and keyed on an outwardly extending shaft 99, and a handle 100 on the outer end of said shaft. The handle 100 is held in a fixed position so that either of the pinions 88 or 91 may be held in engagement with the spur gear 85 by means of a pin 101 engageable with holes 102 in a sector 103.

A spur gear 104 is fixed on the opposite end of the transverse shaft 82 from the spur gear 85 adjacent the inner side of the crank 81. This spur gear meshes with and drives a spur gear 105 fixed on the transverse shaft 80 adjacent the inner side of the crank 79. It may thus be seen that rotation of the transverse shaft 82 causes rotation of the transverse shaft 80 in a direction opposite to the direction of rotation of said first mentioned transverse shaft and that this thus causes the cranks 79 and 81 to rotate in opposite directions.

The cranks 79 and 81 are placed on opposite ends of the shafts 80 and 82 and the crank 79 on one end of the shaft 80 is positioned 180 degrees from the crank 79 on the opposite end of said shaft. As has been before mentioned, the cranks 81 are positioned 45 degrees from the cranks 79 and the crank 81 on one end of the shaft 82 is positioned 180 degrees from the crank 81 on the opposite end of said shaft. Since the cranks 79 and 81 are connected together by the links 76 and 77 at a common point and since these cranks rotate in opposite directions and are positioned 45 degrees apart, rotation of said cranks causes the pin 78, which connects these cranks together, to move in a path shaped like a figure 8 having one small loop and one large loop. This reciprocates the connecting rod 62 and causes said connecting rod to move forwardly and rearwardly a short distance and then move forwardly and rearwardly a greater distance. Such movement causes the finger 59 to move towards the belt conveyor 47 and then move away from said belt conveyor and then move completely into said belt conveyor before returning to the initial starting position. This enables the bit 60 on the end of the finger 59 to loosen the material ahead of the inclined pan 54 and then move said material onto the belt conveyor 47.

Referring now in particular to Figures 3, 10, 11 and 12, it may be seen that since the cranks 79 and 81 on one side of the conveyor frame 7 are positioned 180 degrees apart from the cranks on the opposite side of said conveyor frame, that one gathering arm is moving material towards the belt conveyor 47 while the opposite gathering arm is moving away from said belt conveyor, thus providing a continuous means for loading loose material such as coal onto said belt conveyor. It may also be seen that while one gathering arm 55 is moving a short distance toward the belt conveyor that the opposite gathering arm is moving the entire length of its stroke to move material onto said belt conveyor. Thus one gathering arm agitates the loose material and loosens it so the other gathering arm may move said loose material onto the conveying device.

Figure 3 shows the finger 59, in dotted lines, inclined upwardly from the inclined pan 54. This upward movement is caused by the arm 73 and levers 71 and 67 upon outward movement of the finger 59 towards the outer side of the inclined pan 54 and forward movement of the connecting rod 62 when said finger encounters a lump of coal or other obstructions on its backward path. Thus, as the fingers 59 move away from the conveyor 47, and loose material is encountered on this backward path, said fingers are raised about the axis of the pin 61 to prevent fouling of said fingers.

It may thus be seen that a new and improved form of loading machine has been provided which may be mounted on a standard low vein mine locomotive and which is flexibly supported on said locomotive so that material may be gathered at various points away from the track and locomotive proper, as in corners of the room or entry, and that this loading machine is provided with a new and improved form of gathering mechanism provided with a plurality of gathering arms so arranged that one arm loosens and agitates the material so that it may be gathered by the other arm and so arranged that said arms are moved upwardly upon movement away from the conveyor when obstructions are encountered.

While I have herein shown and described one form of my invention, I do not wish to be limited to the precise details of construction or arrangement of parts herein shown and described, except as specifically limited in the appended claims.

I claim as my invention:

1. In combination with a loading device of the class described, a conveyor, gathering mechanism for gathering and depositing material on said conveyor comprising a gathering arm movable in an inclined plane towards and away from said conveyor including a finger movable

in a plane disposed at a right angle to said conveyor upon movement of said gathering arm away from said conveyor, and means for actuating said gathering arm comprising a pair of cranks rotatable in opposite directions, a separate link connected to each crank adjacent one end, said links being pivotally connected together adjacent their opposite ends and a single connecting member having connection with said links at their common point of connection at one end and having connection with said gathering arm at its opposite end.

2. In combination with a loading device of the class described, a conveyor, gathering mechanism for gathering and depositing material on said conveyor comprising a gathering arm movable in an inclined plane towards and away from said conveyor including a finger movable in a plane disposed at a right angle to said conveyor upon movement of said gathering arm away from said conveyor, and means for moving said gathering arm towards and away from said conveyor comprising a pair of cranks rotatable in opposite directions, a separate link pivotally connected to each crank adjacent one end, said links being connected together adjacent their opposite ends, and means for connecting said links with said gathering arm and finger comprising a connecting rod having pivotal connection with said links at their common point of connection at one end and having a separate operative connection with said gathering arm and finger at its opposite end.

3. In combination with a loading device of the class described, a conveyor, gathering mechanism for gathering and depositing material on said conveyor comprising a gathering arm movable in an inclined plane towards and away from said conveyor including a finger movable in a plane disposed at a right angle to said conveyor upon movement of said gathering arm away from said conveyor, and means for moving said gathering arm towards and away from said conveyor comprising a pair of cranks rotatable in opposite directions, a separate link connected to each crank adjacent one end, said links being connected together adjacent their opposite ends, and means for connecting said links with said gathering arm and finger comprising a connecting rod having pivotal connection with said links at their common point of connection and linkage means for operatively connecting said connecting rod with said gathering arm and finger.

4. In combination with a loading device of the class described, a conveyor, gathering mechanism for gathering and depositing material on said conveyor comprising a gathering arm movable in an inclined plane towards and away from said conveyor and in a plane disposed at a right angle to said conveyor upon movement away from said conveyor including a member movable about an axis perpendicular to the plane of movement of said gathering arm, a finger pivotally mounted on said member to move about an axis parallel to the plane of movement of said gathering arm, and means for actuating said gathering arm comprising a pair of cranks rotatable in opposite directions, a separate link connected to each crank adjacent one end, said links being connected together adjacent their opposite ends, and means for connecting said links with said member and finger for moving said member about its pivotal axis and said finger about an axis perpendicular to the pivotal axis of said member upon movement of said member and finger away from said conveyor.

5. In combination with a loading device of the class described, a conveyor, gathering mechanism for gathering and depositing material on said conveyor comprising a gathering arm movable in a plane parallel to said conveyor towards and away from said conveyor and in a plane at a right angle to said conveyor upon movement away from said conveyor including a member movable about an axis perpendicular to the plane of movement of said gathering arm, a finger pivotally mounted on said member to move about an axis parallel to the plane of movement of said gathering arm, and means for actuating said gathering arm comprising a pair of cranks rotatable in opposite directions, a separate link connected to each crank adjacent one end, said links being connected together adjacent their opposite ends, and means for connecting said links with said member and finger for moving said member about its pivotal axis and said finger about an axis perpendicular to the pivotal axis of said member upon movement of said member and finger away from said conveyor comprising a connecting rod having pivotal connection with said links at their common point of connection at one end and having connection with said member and finger at its opposite end.

6. In combination with a loading device of the class described, a conveyor, gathering mechanism for gathering and depositing material on said conveyor comprising a gathering arm movable in a plane parallel to said conveyor towards and away from said conveyor and in a plane disposed at a right angle to said conveyor upon movement away from said conveyor including a member movable about an axis perpendicular to the plane of movement of said gathering arm, a finger pivotally mounted on said member to move about an axis parallel to the plane of movement of said gathering arm, and means for actuating said gathering arm comprising a pair of cranks rotatable in opposite directions, a separate link connected to each crank adjacent one end, said links being pivotally connected together adjacent their opposite ends, and means for connecting said links with said member and finger for moving said member about its pivotal axis and said finger about an axis perpendicular to the pivotal axis of said member upon movement of said member and finger away from said conveyor comprising a connecting rod having pivotal connection with said links at their common point of connection and linkage means for operatively connecting said connecting rod with said member and finger.

7. In combination with a loading device of the class described, a conveyor, gathering mechanism for gathering and depositing material on said conveyor comprising a gathering arm movable in a plane parallel to said conveyor towards and away from said conveyor and in a plane at a right angle to said conveyor upon movement away from said conveyor including a member movable about an axis perpendicular to the plane of movement of said gathering arm, a finger pivotally mounted on said member to move about an axis parallel to the plane of movement of said gathering arm, and means for moving said gathering arm towards and away from said conveyor comprising a plurality of cranks rotatable in opposite directions, a link connected to each crank at one end and connected together at their opposite ends, and means for connecting said links with said member and finger for moving said member about its pivotal axis and said finger

about an axis perpendicular to the pivotal axis of said member upon movement of said member and finger away from said conveyor comprising a connecting rod having pivotal connection with said links at one end at their common point of connection and linkage means for operatively connecting said connecting rod with said member and finger comprising a link having connection with said connecting rod intermediate its ends and having connection with said member at one end and said finger at its opposite end.

8. In combination with a loading device of the class described, a conveyor, gathering mechanism for gathering and depositing material on said conveyor comprising a gathering arm movable in a plane parallel to said conveyor towards and away from said conveyor and in a plane at a right angle to said conveyor upon movement away from said conveyor including a member movable about an axis perpendicular to the plane of movement of said gathering arm, a finger pivotally mounted on said member to move about an axis parallel to the plane of movement of said gathering arm, and means for moving said gathering arm towards and away from said conveyor comprising a plurality of cranks rotatable in opposite directions, a link connected to each crank at one end and connected together at their opposite ends, and means for connecting said links with said member and finger for moving said member about its pivotal axis and said finger about an axis perpendicular to the pivotal axis of said member upon movement of said member and finger away from said conveyor comprising a connecting rod having pivotal connection with said links at one end at their common point of connection and linkage means for operatively connecting said connecting rod with said member and finger comprising a lever supported for pivotal movement above said finger, means for operatively connecting said connecting rod with said lever and means for operatively connecting said lever with said finger.

9. In combination with a loading device of the class described, a conveyor, gathering mechanism for gathering and depositing material on said conveyor comprising a gathering arm movable in a plane parallel to said conveyor towards and away from said conveyor and in a plane at a right angle to said conveyor upon movement away from said conveyor including a member movable about an axis perpendicular to the plane of movement of said gathering arm, a finger pivotally mounted on said member to move about an axis parallel to the plane of movement of said gathering arm, means for moving said gathering arm towards and away from said conveyor comprising a plurality of cranks rotatable in opposite directions, a link connected to each crank at one end and connected together at their opposite ends, and means for connecting said links with said member and finger for moving said member about its pivotal axis and said finger about an axis perpendicular to the pivotal axis of said member upon movement of said member and finger away from said conveyor comprising a connecting rod having pivotal connection with said links at one end at their common point of connection and linkage means for operatively connecting said connecting rod with said member and finger comprising a lever supported for pivotal movement above said finger, a link having connection with said lever at one of its ends and said connecting rod intermediate its ends and means for operatively connecting said lever with said finger.

10. In combination with a loading device of the class described, a conveyor, gathering mechanism for gathering and depositing material on said conveyor comprising a gathering arm movable in a plane parallel to said conveyor towards and away from said conveyor and in a plane at a right angle to said conveyor upon movement away from said conveyor including a member movable about an axis perpendicular to the plane of movement of said gathering arm, a finger pivotally mounted on said member to move about an axis parallel to the plane of movement of said gathering arm, and means for moving said gathering arm towards and away from said conveyor comprising a plurality of cranks rotatable in opposite directions, a link connected to each crank at one end and connected together at their opposite ends, and means for connecting said links with said member and finger for moving said member about its pivotal axis and said finger about an axis perpendicular to the pivotal axis of said member upon movement of said member and finger away from said conveyor comprising a connecting rod having pivotal connection with said links at one end at their common point of connection and linkage means for operatively connecting said connecting rod with said member and finger comprising a lever supported for pivotal movement above said finger, a link having connection with said lever at one of its ends and said connecting rod intermediate its ends, means for operatively connecting said lever with said finger and means for operatively connecting the opposite end of said link with said member.

11. In combination with a loading device of the class described, a conveyor, gathering mechanism on each side of said conveyor for gathering and depositing material on said conveyor comprising a pair of alternately movable gathering arms each having an alternate agitating and gathering movement towards and away from said conveyor in an inclined plane, each of said gathering arms including a finger movable in a plane disposed at a right angle to said conveyor upon movement of said gathering arms away from said conveyor, and means for actuating said gathering arms comprising a pair of cranks rotatable in opposite directions on each side of said conveyor and a separate link connected to each crank at one end, said links being pivotally connected together at their opposite ends.

12. In combination with a loading device of the class described, a conveyor, gathering mechanism on each side of said conveyor for gathering and depositing material on said conveyor comprising a pair of alternately movable gathering arms each having an alternate agitating and gathering movement towards and away from said conveyor in an inclined plane, each of said gathering arms including a finger movable in a plane disposed at a right angle to said conveyor upon movement of said gathering arms away from said conveyor, and means for actuating said gathering arms comprising a pair of cranks rotatable in opposite directions on each side of said conveyor, a separate link connected to each crank at one end, means for pivotally connecting said links together at their opposite ends and means for connecting said links with said gathering arms and fingers comprising a connecting rod having pivotal connection with each pair of links at their common point of connection and having operative connection with said gathering arms and fingers at their opposite ends.

13. In combination with a loading device of

the class described, an inclined conveyor, an inclined pan forwardly of said conveyor and disposed adjacent the mine bottom, and gathering mechanism on said inclined pan disposed adjacent each side of said conveyor and extending forwardly of said inclined pan for gathering and depositing material on said conveyor comprising a pair of alternately movable gathering arms each having an alternate agitating and gathering movement towards and away from said conveyor in an inclined plane, each of said gathering arms including a finger movable in a plane disposed at a right angle to said conveyor simultaneously upon movement of said gathering arms away from said conveyor and means for actuating said gathering arms comprising a pair of cranks rotatable in opposite directions disposed on each side of said conveyor.

14. In combination with a loading device of the class described, an inclined conveyor, an inclined pan forwardly of said conveyor and disposed adjacent the mine bottom, and gathering mechanism on said inclined pan disposed adjacent each side of said conveyor and extending forwardly of said inclined pan for gathering and depositing material on said conveyor comprising a pair of alternately movable gathering arms each having an alternate agitating and gathering movement towards and away from said conveyor in an inclined plane, and means for actuating said gathering arms comprising a pair of cranks rotatable in opposite directions disposed on each side of said conveyor, means for operatively connecting each pair of cranks together comprising a link connected to each crank at one end, said links being pivotally connected together adjacent their opposite ends and means for connecting said links with said gathering arms and fingers.

15. In combination with a loading device of the class described, an inclined conveyor, an inclined pan forwardly of said conveyor and disposed adjacent the mine bottom, and gathering mechanism on said inclined pan disposed adjacent each side of said conveyor and extending forwardly of said inclined pan for gathering and depositing material on said conveyor comprising a pair of alternately movable gathering arms each having an alternate agitating and gathering movement towards and away from said conveyor in an inclined plane, each of said gathering arms including a member pivotally mounted on said inclined pan for movement about an axis perpendicular to the plane of said inclined pan, a finger extending forwardly of said member and pivotally mounted thereon for movement about an axis perpendicular to the pivotal axis of said member, and means for actuating said gathering arms comprising a pair of cranks rotatable in opposite directions on each side of said conveyor, a link connected to each crank at one end, means for pivotally connecting said links together at their opposite ends, and means for connecting said links with said members and fingers for alternately agitating and moving said gathering arms towards and away from said conveyor and moving said fingers about an axis perpendicular to the pivotal axis of said members upon movement of said gathering arms away from said conveyor comprising connecting rods having pivotal connection with said links at one end of their common point of connection and having connection with said members and fingers at their opposite ends.

16. In combination with a loading device of the class described, an inclined conveyor, an inclined pan forwardly of said conveyor and disposed adjacent the mine bottom, and gathering mechanism on said inclined pan disposed adjacent each side of said conveyor and extending forwardly of said inclined pan for gathering and depositing material on said conveyor comprising a pair of alternately movable gathering arms each having an alternate agitating and gathering movement towards and away from said conveyor in an inclined plane, each of said gathering arms including a member pivotally mounted on said inclined pan for movement about an axis perpendicular to the plane of said inclined pan, a finger extending forwardly of said member and pivotally mounted thereon for movement about an axis perpendicular to the pivotal axis of said member, and means for actuating said gathering arms comprising a pair of cranks rotatable in opposite directions on each side of said conveyor, a link connected to each crank at one end, means for pivotally connecting said links together at their opposite ends, and means for connecting said links with said members and fingers for alternately agitating and moving said gathering arms towards and away from said conveyor and moving said fingers about an axis perpendicular to the pivotal axis of said members upon movement of said gathering arms away from said conveyor comprising connecting rods having pivotal connection with said links at one end of their common point of connection, and linkage means for operatively connecting said connecting rods with said members and fingers comprising a pair of links, each link having connection with one of said connecting rods intermediate its ends and having operative connection with said member at one end and said finger at its opposite end.

17. In a loading device of the class described, a conveyor, gathering mechanism for gathering and depositing material on said conveyor comprising a gathering arm movable in a plane parallel to said conveyor, and means for actuating said gathering arm comprising a pair of power driven cranks rotatable in opposite directions, a pair of links connected together at a common point, each of said links being operatively connected with one of said cranks, and a connecting rod having connection with said gathering arm at one end and said links at its opposite end at their common point of connection.

18. In a loading device of the class described, a conveyor, gathering mechanism for gathering and depositing material on said conveyor comprising a pair of gathering arms disposed adjacent the forward end of said conveyor on each side thereof and movable in planes parallel to said conveyor and means for actuating said gathering arms comprising a pair of power driven cranks on each side of said conveyor rotatable in opposite directions, a pair of links having connection with each pair of cranks, said links being pivotally connected together at a common point, and connecting rods having connection with said gathering arms at one end and said links at their opposite end at the common point of connection of said links.

19. In combination with a loading device of the class described, a conveyor, gathering mechanism for gathering and depositing material on said conveyor comprising a gathering arm movable in a plane parallel to said conveyor towards and away from said conveyor including a finger movable in a plane disposed at a right angle to said

conveyor upon movement of said gathering arm away from said conveyor, and means for moving said gathering arm towards and away from said conveyor and simultaneously moving said finger in a plane disposed at a right angle with respect to said conveyor upon movement of said gathering arm away from said conveyor comprising a crank, a connecting rod driven thereby, and lever mechanism disposed above said finger having connection with said connecting rod and finger.

20. In combination with a loading device of the class described, a conveyor, gathering mechanism for gathering and depositing material on said conveyor comprising a gathering arm movable in a plane parallel to said conveyor towards and away from said conveyor including a finger movable in a plane disposed at a right angle to said conveyor upon movement of said gathering arm away from said conveyor, and means for moving said gathering arm towards and away from said conveyor and simultaneously moving said finger in a plane disposed at a right angle with respect to said conveyor upon movement of said gathering arm away from said conveyor comprising a crank, a connecting rod driven thereby, a lever supported for pivotal movement above said finger, means for operatively connecting said connecting rod with said lever and means for operatively connecting said lever with said finger.

21. In combination with a loading device of the class described, a conveyor, gathering mechanism for gathering and depositing material on said conveyor comprising a gathering arm movable in a plane parallel to said conveyor towards and away from said conveyor including a finger movable in a plane disposed at a right angle to said conveyor upon movement of said gathering arm away from said conveyor, and means for moving said gathering arm towards and away from said conveyor and simultaneously moving said finger in a plane disposed at a right angle with respect to said conveyor upon movement of said gathering arm away from said conveyor comprising a crank, a connecting rod driven thereby, a lever supported for pivotal movement above said finger, a link having connection with said lever at one of its ends and said connecting rod intermediate its ends and means for operatively connecting said lever with said finger.

22. In combination with a loading device of the class described, a conveyor, gathering mechanism for gathering and depositing material on said conveyor comprising a gathering arm movable in a plane parallel to said conveyor towards and away from said conveyor including a finger movable in a plane disposed at a right angle to said conveyor upon movement of said gathering arm away from said conveyor, and means for moving said gathering arm towards and away from said conveyor and simultaneously moving said finger in a plane disposed at a right angle with respect to said conveyor upon movement of said gathering arm away from said conveyor comprising a crank, a connecting rod driven thereby, a lever supported for pivotal movement above said finger, a link having connection with said lever at one of its ends and said connecting rod intermediate its ends, means for operatively connecting said lever with said finger and means for operatively connecting the opposite end of said link with said gathering arm.

23. In combination with a loading device of the class described, a conveyor, gathering mechanism for gathering and depositing material on said conveyor comprising a gathering arm movable in a plane parallel to said conveyor towards and away from said conveyor and in a plane disposed at a right angle to said conveyor upon movement of said gathering arm away from said conveyor, said gathering arm including a member movable about an axis substantially perpendicular to said conveyor and a finger pivotally connected to said member to move about an axis parallel with said conveyor and means for moving said member and finger towards and away from said conveyor and simultaneously moving said finger upwardly about its axis of pivotal connection to said member upon movement of said member and finger away from said conveyor comprising a crank, a connecting rod driven thereby, lever mechanism disposed above said finger having connection with said connecting rod and finger and other lever mechanism having connection with said member and connecting rod.

24. In combination with a loading device of the class described, a conveyor, gathering mechanism for gathering and depositing material on said conveyor comprising a gathering arm movable in a plane parallel to said conveyor towards and away from said conveyor and in a plane disposed at a right angle to said conveyor upon movement of said gathering arm away from said conveyor, said gathering arm including a member movable about an axis substantially perpendicular to said conveyor and a finger pivotally connected to said member to move about an axis parallel with said conveyor and means for moving said member and finger towards and away from said conveyor and simultaneously moving said finger upwardly about its axis of pivotal connection to said member upon movement of said member and finger away from said conveyor comprising a crank, a connecting rod driven thereby, and linkage means for operatively connecting said connecting rod with said member and finger comprising a link having connection with said connecting rod intermediate its ends and having connection with said member at one end and said finger at its opposite end.

25. In an apparatus of the class described, an inclined conveyor, gathering mechanism for gathering and depositing material on said conveyor comprising a gathering arm movable about an axis inclined with respect to a horizontal plane across the forward end of said conveyor towards and away from said conveyor, and means for actuating said gathering arm comprising a pair of power driven cranks rotatable in opposite directions, a pair of links connected together at a common point, each of said links being operatively connected with one of said cranks, and a connecting rod having connection with said gathering arm at one end and said links at its opposite end at their common point of connection.

26. In an apparatus of the class described, an inclined conveyor, gathering mechanism for gathering and depositing material on said conveyor comprising a pair of gathering arms disposed adjacent the forward end of said conveyor and movable about an axis inclined with respect to a horizontal plane across the forward end of said conveyor towards and away from said conveyor, and means for actuating said gathering arms comprising a pair of power driven cranks on each side of said conveyor rotatable in opposite directions, a pair of links having connection with each pair of cranks, said links being

pivotally connected together at a common point, and connecting rods having connection with said gathering arms at one end and said links at their opposite end at the common point of connection of said links.

27. In an apparatus of the class described, an inclined conveyor, gathering mechanism for gathering and depositing material on said conveyor comprising a gathering arm movable about an axis inclined with respect to a horizontal plane across the forward end of said conveyor towards and away from said conveyor including a finger movable in a plane disposed at a right angle to said conveyor upon movement of said gathering arm away from said conveyor, and means for moving said gathering arm towards and away from said conveyor and simultaneously moving said finger in a plane disposed at a right angle with respect to said conveyor upon movement of said gathering arm away from said conveyor comprising a crank, a connecting rod driven thereby, and lever mechanism disposed above said finger and having connection with said connecting rod and finger.

28. In an apparatus of the class described, an inclined conveyor, gathering mechanism for gathering and depositing material on said conveyor comprising a gathering arm movable about an axis inclined with respect to a horizontal plane across the forward end of said conveyor towards and away from said conveyor including a finger movable in a plane disposed at a right angle to said conveyor upon movement of said gathering arm away from said conveyor, and means for moving said gathering arm towards and away from said conveyor and simultaneously moving said finger in a plane disposed at a right angle with respect to said conveyor upon movement of said gathering arm away from said conveyor comprising a crank, a connecting rod driven thereby, a lever supported above said finger for movement about a pivotal axis, means for operatively connecting said connecting rod with said lever and means for operatively connecting said lever with said finger.

29. In an apparatus of the class described, an inclined conveyor, gathering mechanism for gathering and depositing material on said conveyor comprising a gathering arm movable about an axis inclined with respect to a horizontal plane across the forward end of said conveyor towards and away from said conveyor including a finger movable in a plane disposed at a right angle with respect to said conveyor upon movement of said gathering arm away from said conveyor, and means for moving said gathering arm towards and away from said conveyor and simultaneously moving said finger in a plane disposed at a right angle with respect to said conveyor upon movement of said gathering arm away from said conveyor comprising a crank, a connecting rod driven thereby, a lever supported above said finger for movement about a pivotal axis, a link having connection with said lever at one of its ends and said connecting rod intermediate its ends and means for operatively connecting said lever with said finger.

30. In an apparatus of the class described, an inclined conveyor, gathering mechanism for gathering and depositing material on said conveyor comprising a gathering arm movable about an axis inclined with respect to a horizontal plane across the forward end of said conveyor towards and away from said conveyor including a finger movable in a plane disposed at a right angle with respect to said conveyor upon movement of said gathering arm away from said conveyor, and means for moving said gathering arm towards and away from said conveyor and simultaneously moving said finger in a plane disposed at a right angle with respect to said conveyor upon movement of said gathering arm away from said conveyor comprising a crank, a connecting rod driven thereby, a lever supported above said finger for movement about a pivotal axis, a link having connection with said lever at one of its ends and said connecting rod intermediate its ends, means for operatively connecting said lever with said finger and means for operatively connecting the opposite end of said link with said gathering arm.

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