

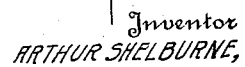
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1,828,751

MATERIAL HANDLING APPARATUS

Original Filed April 15, 1922 2 Sheets-Sheet 1



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Fig. 3.

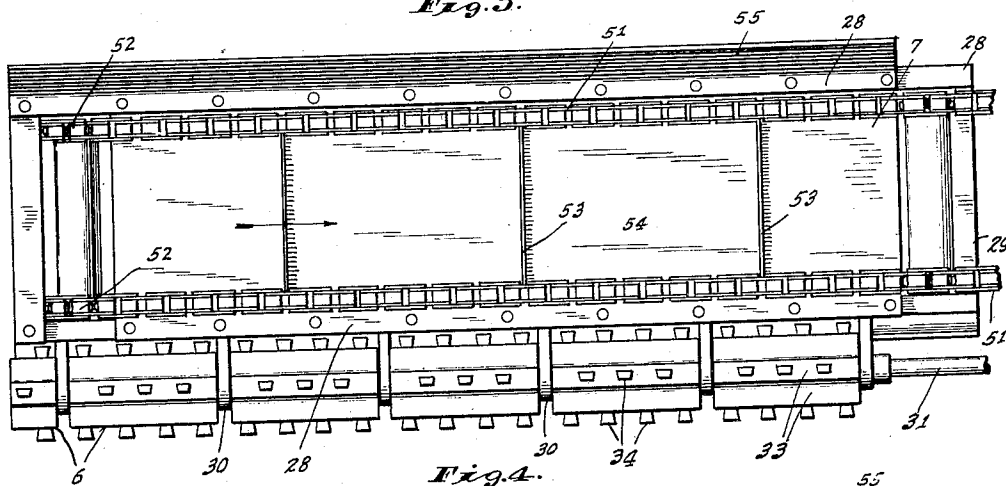


Fig. 4.

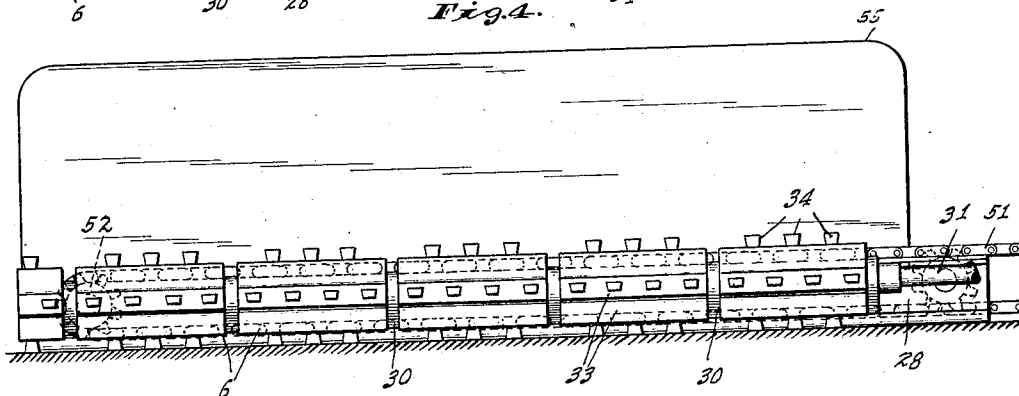
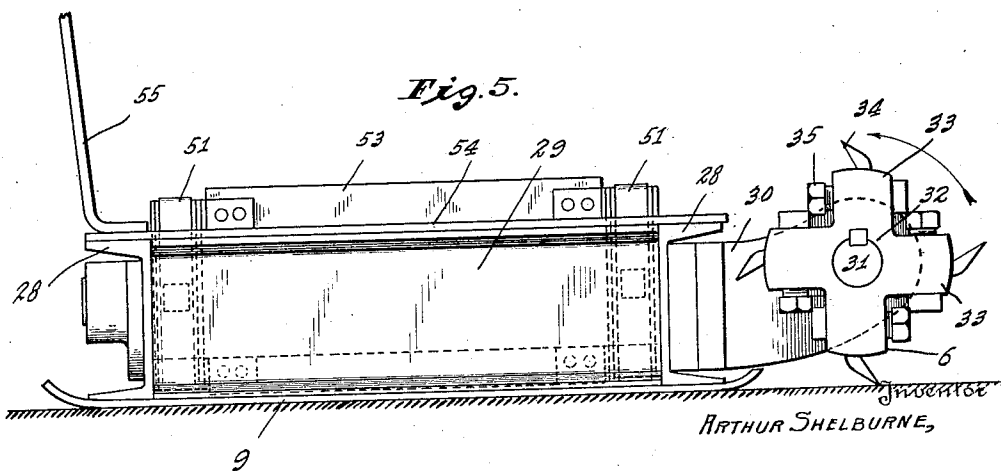


Fig. 5.



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MATERIAL HANDLING APPARATUS

Application filed April 15, 1922, Serial No. 553,123. Renewed January 29, 1929.

My invention relates to improvements in material-handling apparatus and is adapted particularly for handling loose material in piles such as coal and the like.

More specifically my invention is adapted for loading coal which has been "shot" down in the mine, it being particularly adaptable for automatically transferring this "shot" coal from the mine bottom to the mine car.

For the purpose of disclosing my invention I have illustrated one embodiment thereof in the accompanying drawings in which:

Fig. 1 is a plan view of the apparatus as a whole;

Fig. 2 is a rear elevation thereof;

Fig. 3 is an enlarged plan view of the pickup mechanism;

Fig. 4 is a front elevation of the same, and Fig. 5 is an end elevation thereof.

In the embodiment of the invention illustrated I provide digging and pickup cylinders 6 which are preferably of small diameter and adapted to dig in under the coal and cause the same to be moved and to drop on a conveyor 7. This conveyor in turn delivers the coal to a second elevating conveyor 8 which is arranged to deliver the coal to the mine car or wherever desired. The apparatus is mounted on a bed frame 9 which forms a skid on which the apparatus is moved and on which the driving mechanism of the apparatus is mounted.

The advancing mechanism of the handling apparatus comprises a pair of power-driven drums 10 and 11 which drums are driven by an electric motor 12 having a worm gear drive connection 13 with the shaft 14, in turn having a worm gear drive connection 15 with the shaft 16. The two drums 10 and 11 are arranged to be connected with the shaft 16 through the medium of operating clutches 17 and 18. These clutches are controlled by operating handles 19 and 20 accessible from the operator's seat 21 mounted on the base 9. The speed of the motor 12 is controlled by a controller 22 operated by a handle 23 likewise accessible from the driver's seat. A cable 24 is wound on the drum 10 and after passing over the idler 25 and the pulley 26 the free end thereof is attached to a dead man well

in advance of the loading apparatus. A similar cable 27 is wound on the drum 11 and is attached to a dead man at the rear of the apparatus. By this arrangement the apparatus may be bodily moved forward. The drums 10 and 11 are arranged to operate in opposite directions so that when the cable 24 is wound up the cable 27 will be unwound to a like extent. By connecting the drums 10 and 11 with the power mechanism and operating them at the same speed through the medium of the clutches the apparatus as a whole may be advanced or retracted in a rightline direction. By operating one drum and releasing the other drum entirely the apparatus may be skewed in either direction.

The bed frame 9 is extended laterally and on this lateral extension is mounted at the front and rear edges thereof channel members 28. Similar members 29 extend between these channels 28 to provide suitable bracing means. This forms a support for the rollers over which the conveyor 7 is adapted to pass and also provides means for supporting the forwardly projecting arms 30 which are arranged at suitable intervals at the front edge of the bed frame and provide bearing supports for the digging and pickup cylinder shaft 31.

The digging and pickup cylinder preferably comprises a plurality of sections, each of which has a hub portion 32 keyed on the shaft 31 and a plurality of radial arms 33, which arms are adapted to receive cutter bits 34 held in position by set screws 35. These bits 34 comprise digging or cutting fingers and are sufficiently sharpened for this purpose. They also have a general inclination in the direction of rotation of the pickup cylinder as indicated in Figure 5, the direction of rotation of the cylinder being indicated by the arrow.

The shaft 31 has a bevel gear connection 36 with a transverse shaft 37 likewise having a bevel gear connection 38 with a longitudinal spud shaft 39. Mounted on the base 9 is a large horizontally disposed bevel wheel 40 having a bevel gear connection 41 with a shaft 42 operated from the shaft 14 through the clutch mechanism 43. This clutch mech-

anism is controlled by an operating lever 44 accessible from the driver's seat. The bevel gear 40 comprises a main driving gear for the conveyors and the pickup cylinders. The shaft 39 has a bevel gear connection 45 with this bevel gear 40 whereby the pickup cylinders are operated therefrom and the chain drives 46 and 47 for the sections of the conveyor 8 are operated from a shaft 48 having a bevel gear connection 49 with this bevel gear 40. The conveyor 7 is operated by a chain drive 50 taking its power from the shaft 37 so that the various conveyor sections as well as the pickup cylinders are driven in unison when the power is applied to the main drive bevel gear 40. Any form of conveyor desirable may be used. I have illustrated typically a conveyor comprising sprocket chains 51 arranged to pass over end sprockets 52 and having arranged between them conveyor cross members or vanes 53 which as they are advanced will engage the material dropped on the platform 54 of the conveyor and move the material along. The upper edges of members 53 are approximately on a level with the upper sides of the pick-up cylinders 6, the shaft 31 of which lies in a horizontal plane between the lower runs of the conveyor 7 as best seen in Fig. 5 and the vanes 53 are equally spaced, thereby providing a series of receiving and conveying compartments for the material delivery by the cylinders. At the edge of the conveyor opposite the digging and pickup cylinders there is provided an inclined back wall 55 extending well above the level of the cylinders which prevents the material from falling off the conveyor 7. Similar side walls 56 and 57 are provided at the side of the conveyor 8 to confine the material in the path of the conveyor.

In operation the digging pickup cylinders 6 are advanced toward the pile of loose coal, the cylinders being arranged close to the ground and as the cylinders rotate the bits 34 cut into the mass of the coal, causing the pickup cylinders to dig in under the coal whereby the coal will be caused to fall on the conveyor 7 both by this digging in of the cylinder and also the tendency of the bits to throw the coal rearwardly and on the conveyor as they are advanced. The coal is transferred by the conveyors 7 and 8 to the mine car or to any place desired.

I have described the apparatus as being particularly applicable for the handling of coal and in the claims have described it as a coal handling apparatus. It will be understood however that this is typical of the material to be handled and that the apparatus is equally applicable to handling other loose material having the same characteristics of coal, such for instance as gravel, dirt and the like.

While I have in this application specifically described one embodiment which the invention may assume in practice, it will be understood that this embodiment of the same is shown for purposes of illustration and that the invention may be modified and embodied in various other forms without departing from its spirit or the scope of the appended claims.

I claim as my invention:

1. In coal handling apparatus, the combination of a horizontally positioned oblong support, means on said support for advancing it in the direction of its breadth, and coal loading mechanism carried by said support comprising a conveyor travelling in the direction of the length of the support, a pick-up cylinder adjacent one edge of said conveyor and mounted on an axis below its receiving surface, and means adjacent the opposite edge of said conveyor for retaining material thereon.

2. In coal handling apparatus, the combination of a horizontally positioned oblong support, means on said support for advancing it in the direction of its breadth, and coal loading mechanism carried by said support comprising a conveyor travelling in the direction of the length of the support, a pick-up cylinder adjacent one edge of said conveyor and mounted on an axis below its receiving surface, said conveyor having spaced vanes the upper edges of which lie in a horizontal plane which intersects the upper radius of said cylinder, and means adjacent the opposite edge of said conveyor for retaining material thereon.

3. Loading mechanism comprising a skid, conveyor mechanism having its receiving end disposed thereover, loading means disposed at one side of the receiving end of said conveyor mechanism adapted to deliver material on to the latter, a motor on said skid beneath a portion of said conveyor mechanism, a main gear journaled on a vertical axis on said skid beneath said conveyor mechanism, operative connections between said main gear and said conveyor mechanism, operative connections between said main gear and said motor, and flexible lateral feeding mechanism operatively connected to said last mentioned operative connections.

4. Loading mechanism comprising a skid, a conveyor mechanism having its receiving end disposed thereover, loading means disposed at one side of the receiving end of said conveyor mechanism adapted to deliver material on to the latter, a motor on said skid, a supplemental conveyor on said skid having its receiving end beneath the delivery end of said first mentioned conveyor and its delivery end extending over said motor, a main gear journaled on a vertical axis on said skid beneath the receiving end of said last mentioned conveyor, operative connections be-

tween said main gear and said conveyor mechanism, operative connections between said main gear and said motor, and flexible lateral feeding mechanism likewise operatively connected to said motor.

5. In a coal handling apparatus, the combination of a horizontally positioned oblong support, means on said support for advancing it in the direction of its breadth, and coal loading mechanism carried by said support comprising a conveyor travelling in the direction of the length of said support, and a pick-up cylinder adjacent one edge of said conveyor and mounted on an axis below its receiving surface.

6. In a coal handling apparatus, the combination of a horizontally positioned oblong support, means on said support for advancing it in the direction of its breadth, and coal loading mechanism carried by said support comprising a conveyor travelling in the direction of the length of the support, and a pick-up cylinder adjacent one edge of said conveyor and mounted on an axis below its receiving surface, said conveyor having spaced vanes the upper edges of which lie in a horizontal plane which intersects the upper radius of said cylinder.

7. In a coal handling apparatus, the combination of a portable base, means on said base for effecting feed thereof, and coal loading mechanism carried by said base comprising a conveyor travelling in the direction of the length of said base and a pick-up cylinder adjacent one edge of said conveyor and mounted on an axis below its receiving surface.

8. In a loading machine, a support slidable on its bottom directly on the mine bottom, a motor on said support and having a power shaft, conveying means on said support including a front elevating conveyor and a rear discharge conveyor, said rear discharge conveyor being mounted for horizontal swinging movement relative to said support about a vertical axis, material gathering means on said support including a gathering member for moving the material to be loaded directly onto said elevating conveyor, driving connections between said motor and said material gathering means including a horizontal main driving shaft extending longitudinally of the machine, a transmission element journaled on said support for rotation about a vertical axis and driven by said shaft and driving connections between said transmission element and said gathering member, the axis of said transmission element being arranged coincident with the rear conveyor axis, feeding means for the machine for feeding the same bodily laterally over the mine bottom to effect lateral engagement of said material gathering member with the material to be loaded and to control the angular position of said gathering member relative to the material, and includ-

ing relatively rotatable feeding and controlling drums and cables cooperating respectively therewith, driving connections between said main driving shaft and said drums, and driving connections between said transmission element and said conveying means.

9. In a loading machine, a support slidable on its bottom directly on the mine bottom, a motor on said support and having a power shaft, conveying means on said support including a front elevating conveyor and a rear discharge conveyor, said rear discharge conveyor being mounted for horizontal swinging movement relative to said support about a vertical axis, material gathering means on said support including a gathering member for moving the material to be loaded directly onto said elevating conveyor, driving connections between said motor and said material gathering means including a horizontal main driving shaft extending longitudinally of the machine with its axis lying in the central longitudinal vertical plane of the machine, a transmission element journaled on said support for rotation about a vertical axis lying in the same vertical plane as said main driving shaft axis and driven by said shaft and driving connections between said transmission element and said gathering member, the axis of said transmission element being arranged coincident with the rear conveyor axis, feeding means for the machine for feeding the same bodily laterally over the mine bottom to effect lateral engagement of said material gathering member with the material to be loaded and to control the angular position of said gathering member relative to the material, and including relatively rotatable feeding and controlling drums and cables cooperating respectively therewith, driving connections between said main driving shaft and said drums, and driving connections between said transmission element and said conveying means.

10. In a loading machine, a support slidable on its bottom directly on the mine bottom, a motor on said support and having a power shaft, conveying means on said support including a front elevating conveyor and a rear discharge conveyor, said rear discharge conveyor being mounted for horizontal swinging movement relative to said support about a vertical axis, material gathering means on said support including a gathering member for moving the material to be loaded directly onto said elevating conveyor, driving connections between said motor and said material gathering means including a horizontal main driving shaft extending longitudinally of the machine with its axis lying in the central longitudinal vertical plane of the machine, a transmission element journaled on said support for rotation about a vertical axis lying in the same vertical plane

as said main driving shaft axis and driven by said shaft and driving connections between said transmission element and said gathering member, the axis of said transmission element being arranged coincident with the rear conveyor axis, feeding means for the machine for feeding the same bodily laterally over the mine bottom to effect lateral engagement of said material gathering member with the material to be loaded and to control the angular position of said gathering member relative to the material, and including relatively rotatable feeding and controlling drums and cables cooperating respectively therewith, driving connections between said main driving shaft and said drums including cooperating worm gearing including a worm wheel, a transverse shaft driven thereby, and driving connections between said shaft and each drum, and driving connections between said transmission element and said conveying means.

11. In a loading machine, a support slidable on its bottom directly on the mine bottom, a motor on said support and having a power shaft, conveying means on said support including a front elevating conveyor and a rear discharge conveyor, said rear discharge conveyor being mounted for horizontal swinging movement relative to said support about a vertical axis, material gathering means on said support including a gathering member for moving the material to be loaded directly onto said elevating conveyor, driving connections between said motor and said material gathering means including a horizontal main driving shaft extending longitudinally of the machine with its axis lying in the central longitudinal vertical plane of the machine, a transmission element journaled on said support for rotation about a vertical axis lying in the same vertical plane as said main driving shaft axis and driven by said shaft, and driving connections between said transmission element and said gathering member, the axis of said transmission element being arranged coincident with the rear conveyor axis, feeding means for the machine for feeding the same bodily laterally over the mine bottom to effect lateral engagement of said material gathering member with the material to be loaded and to control the angular position of said gathering member relative to the material, and including relatively rotatable feeding and controlling drums and cables cooperating respectively therewith, driving connections between said main driving shaft and said drums including cooperating worm gearing including a worm wheel, a transverse shaft driven thereby, and driving connections between said shaft and each drum including a controlling clutch individual to each drum whereby the drums may be driven separately or simultaneously,

and driving connections between said transmission element and said conveying means.

In witness whereof, I, ARTHUR SHELBURNE, have hereunto set my hand at Terre Haute, Indiana, this 12th day of April, A. D. one thousand nine hundred and twenty-two.

ARTHUR SHELBURNE.

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