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GATHERING MECHANISM FOR COAL LOADING MACHINES.

APPLICATION FILED AUG. 23, 1917.

1,300,620.

Patented Apr. 15, 1919.

2 SHEETS—SHEET 1.

FIG. 1.

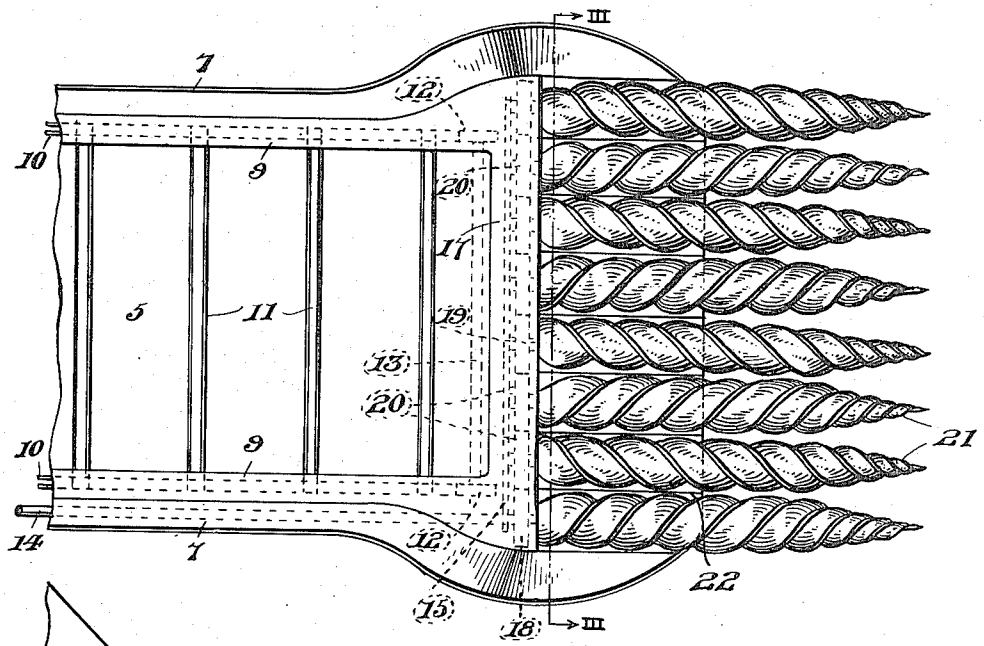


FIG. 2.

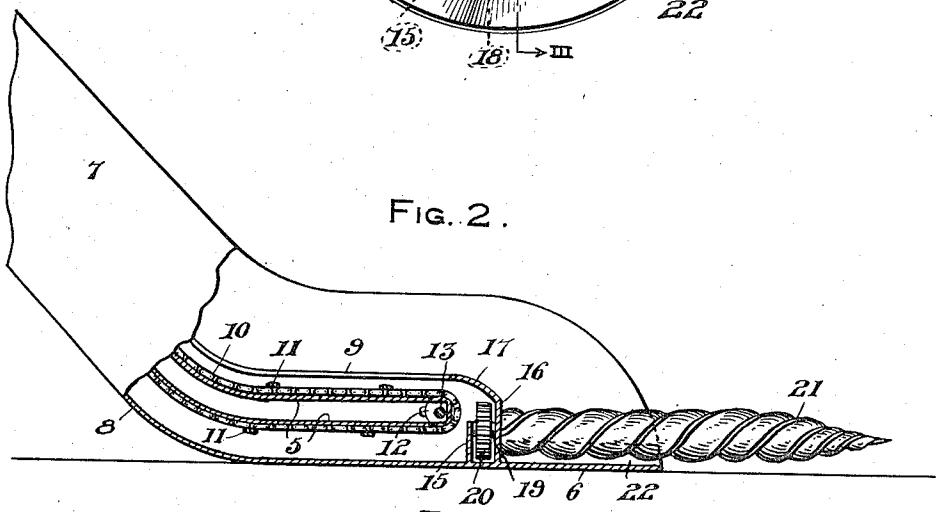
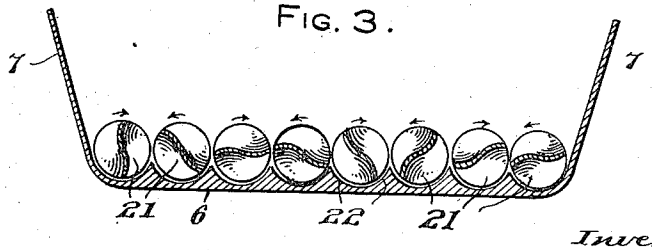


FIG. 3.



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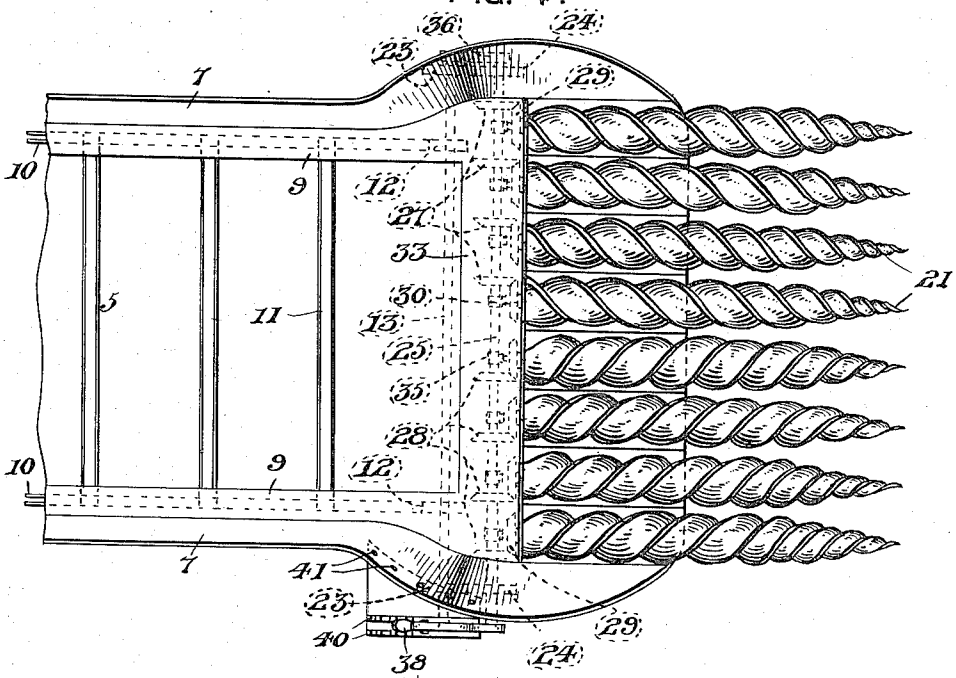
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2 SHEETS—SHEET 2.

FIG. 4.



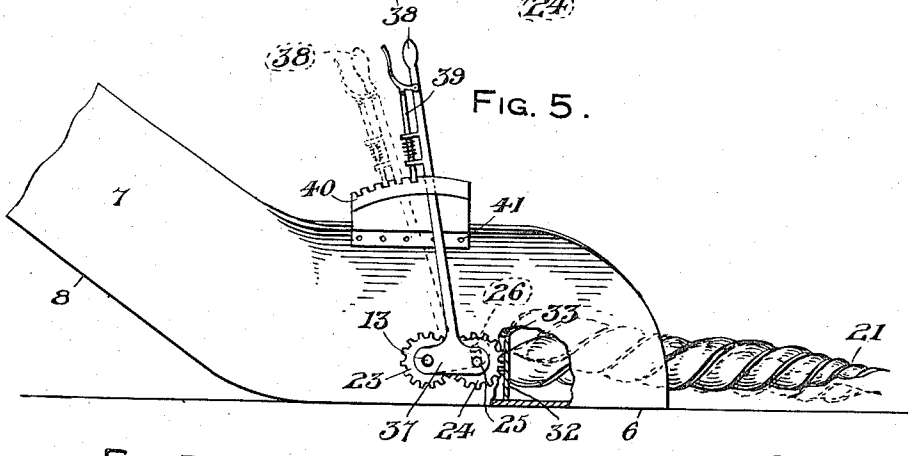


FIG. 5.

FIG. 7.

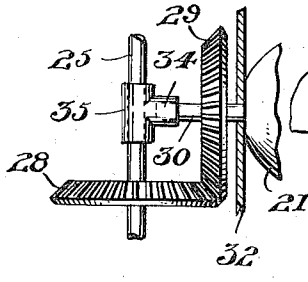


FIG. 6.

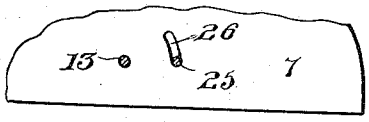
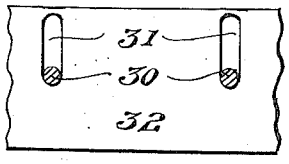


FIG. 8.



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GATHERING MECHANISM FOR COAL-LOADING MACHINES.

1,300,620. Specification of Letters Patent. Patented Apr. 15, 1919.

Application filed August 23, 1917. Serial No. 187,805.

To all whom it may concern:

Be it known that I, JOSEPH F. JOY, a citizen of the United States of America, residing at Belle Vernon, in the county of Fayette and State of Pennsylvania, have invented certain new and useful Improvements in Gathering Mechanisms for Coal-Loading Machines, of which the following is a specification.

This invention relates to certain new and useful improvements in gathering mechanisms for coal loading machines, and more particularly for that class of loading machines adapted to transfer coal from a mine floor to conveniently placed cars for transportation from the mine, an example of which is disclosed in my pending application Serial No. 132,175, filed Nov. 18, 1916.

In the mining of coal it is customary to undermine the face usually to a depth equal to the thickness of the vein, after which it is blasted by a charge of explosive. It is very desirable that the amount of explosive used be the very least necessary to loosen the coal sufficiently to allow its removal. When the work of loading the coal is done by hand, it is merely shattered and the miner resorts to wedges and crow bars to win the coal from the semi-solid state which it is in as the result of a blast rather than resort to heavy blasting which is attendant with great hazards, such as more or less disastrous mine explosions. In the customary method of shooting the coal entirely loose from its natural bed down onto the floor of the mine, in addition to increasing the hazards of mining, the value of the coal is decreased due to the pulverizing effects of the excessive use of explosives. In some cases mechanical picks have been used to break the coal down which also causes an undesirable amount of fine coal and dust.

Heretofore, the gathering mechanisms of these machines have been of such a nature that the coal to be loaded had to be entirely broken down from the face of the mine before they could operate to engage the coal and move it onto the conveyer which transferred it to the cars.

It is the especial object of the present invention to provide a gathering mechanism which will not only move the material from the mine floor onto the conveyer, but also break down in desirable large lumps the coal which has been shattered but left standing after the face of the vein has been "shot," thus materially reducing the quantity of explosive necessarily used and rendering practically unnecessary the use of mechanical picks or the breaking down of the coal by hand.

A further object is to provide a plurality of gathering members consisting in pointed augers so arranged and rotated as to be most effective in and have a wide range for breaking the coal down and then moving it onto the conveyer.

A still further object is to provide a means whereby the gathering members may be tilted or rocked to thereby properly direct the same into crevices or an undercut in the face of the vein.

With these general objects in view and others that will be apparent when the nature of the invention is better understood, the same consists in the novel combination and arrangement of parts hereinafter more fully described, illustrated in the accompanying drawings, and pointed out in the appended claims.

In the drawings forming a part of this application and in which like designating characters refer to corresponding parts throughout the several views:—

Figure 1 is a plan view of a fragment of a conveyer with one embodiment of the invention associated therewith.

Fig. 2 is an elevational view of the device shown in Fig. 1, partly in vertical section and partly broken away.

Fig. 3 is a sectional view taken on line III—III of Fig. 1.

Fig. 4, is a view similar to Fig. 1 of another embodiment of the invention.

Fig. 5 is an elevational view of the device shown in Fig. 4, partly in section and partly broken away.

Fig. 6 is a fragmentary view showing the slot 26 which allows vertical movement of shaft 25.

Fig. 7 is an enlarged fragmentary detail view showing one of the brackets 35 and associated parts, and

Fig. 8 is an enlarged fragmentary detail view showing the slots 31 in the flange 32 which allow vertical movement of the shafts 30.

In carrying out the embodiments of the invention herein illustrated, the gathering members are associated with the usual conveyer which transfers the coal to conveniently placed cars. The discharge end of

this conveyer is usually suitably supported the required distance above the floor and the same extends downwardly as shown, being provided with a shoe portion 6 adapted to rest upon and slide along the floor. The conveyer herein illustrated is of the well-known chain and scraper type and consists broadly in side plates 7 connected by a floor or bottom 8 and a partition 5 and provided with inwardly projecting ledges or flanges 9, thus forming guide ways in which travel the endless chains 10 which are connected together at intervals by transverse scraper bars 11. The chains 10 go around sprockets secured on the head shaft of the conveyer, not shown, and also around the sprockets 12 secured to the lower conveyer shaft 13, power being applied in any desired manner to the head shaft to operate the conveyer.

Referring to the form of the invention illustrated in Figs. 1, 2, and 3, the numeral 14 designates a shaft which may be rotated by any suitable means, such as by gearing to the head shaft of the conveyer, not shown, and this shaft 14 has a spur gear 18 secured to the end thereof which extends through and is journaled in the flange or partition 15 extending transversely of and upwardly from the shoe 6. Parallel with the flange 15 and spaced therefrom is another flange 16 whose upper portion 17 extends rearwardly as best shown in Fig. 2. Journaled in the partitions 15 and 16 are a plurality of parallel shafts 19 and secured upon these shafts between the partitions 15 and 16 are a plurality of intermeshing spur gears 20, one of which meshes with gear 18 as shown in Fig. 1. It will thus be seen that the gear casing including the rearwardly extending portion 17 of the flange 16 effectually assists in preventing coal from getting to and clogging or otherwise interfering with or damaging the gears 18 and 20.

A plurality of pointed and slightly tapering spiral augers 21 are substantially horizontally arranged in concave portions 22 in the upper face of the forward or apron portion of the shoe 6 and all but one of these augers are carried by the shafts 19, that one being carried by the shaft 14 as shown in Fig. 1. A very important consideration in the arrangement of the augers 21 lies in the fact that a considerable portion of all of them extends a material distance beyond the free end of the shoe 6, thus enabling the same to be easily pushed into the coal or into a crevice or undercut in the face of the vein. In this form of the invention the augers are alternately of right and left hand pitch and one auger of each pair will be rotated in a direction toward the other auger of each pair as indicated by arrows in Fig. 3. This provides an ideal gathering and conveying arrangement whereby the coal will not be thrown off to the sides of the conveyer as the auger at each side of the shoe 6 is rotated in a direction toward the center of the conveyer.

Briefly described, the operation of this form of the invention is as follows:—

The face of the vein having been undercut and blasted with a small quantity of explosive, the machine equipped with this gathering mechanism is moved forward and the augers pushed into the undercut to engage the coal. Rotation is then imparted to shaft 14 and to the augers 21 through the gears 18 and 20 as before described and said augers will bore into and tear away and break down the coal in desirable sizes with a wedge-like action. As the coal is broken down, the augers move it rearwardly onto the conveyer which delivers it into conveniently placed cars as is well-known in the art. This operation is repeated until coal has been broken away and gathered across the entire working face.

In the embodiment of the invention illustrated in Figs. 4 to 8 the lower conveyer shaft 13 has its ends extended through the side plates 7 and secured thereto are spur gears 23 which mesh with spur gears 24 secured upon and near the ends of the transverse shaft 25 which extend through arcuate slots 26 in the side plates 7. Secured upon the shaft 25 are a pair of oppositely disposed sets of bevel gears 27 and 28 which mesh with bevel gears 29 secured upon shafts 30 which carry the augers 21. The shafts 30 rest in slots 31, (see Fig. 8) of the flange 32 which extends upwardly from the shoe 6 (see Fig. 5) and then rearwardly as at 33 to house the gears 27, 28, and 29. The shafts 30 also extend rearwardly where they are journaled in socket portions 34 of bearing brackets 35, (see Fig. 7) which loosely surround the shaft 25. At one side of the conveyer, the adjacent ends of shafts 13 and 25 are loosely journaled in and connected together by a link 36, (see Fig. 4) while at the other side they are similarly connected by the link portion 37 of a hand lever 38 which is provided with a suitable latch 39 adapted to engage in notches in the quadrant 40 which is secured to one of the side plates 7 as at 41.

In the operation of this embodiment of the invention, the conveyer is driven in any suitable manner thus causing rotation from shaft 13 to be inparted to the augers 21 through the gears 23, 24, 27, 28, and 29. The augers geared to gears 27 are of a left-hand pitch while those geared to gears 28 are of a right-hand pitch and through the gearing described the augers of each set are rotated in a direction toward those of the other set and toward the center of the conveyer. By manipulation of the hand lever 38 the rear end portions of the augers 21 may be raised as shown by dotted lines in

Fig. 5 by lifting shaft 25 to thereby bring the rear portion of the augers up into contact with overhanging material and break down and carry it away. Otherwise the operation of this form is substantially the same as the form shown in Figs. 1, 2, and 3.

While the forms of the invention herein shown and described are those which are believed to be the preferred embodiments thereof, it is nevertheless to be understood that minor changes may be made therein without departing from the spirit and scope of the invention as claimed.

What I claim is:—

1. In a coal loading machine, the combination with a conveyer shoe portion, of a plurality of sets of substantially horizontal pointed tapering spiral augers arranged longitudinally of and projecting beyond the free end of said shoe portion, the augers of one set being of a pitch opposite to the pitch of another set, means to communicate rotation to said augers whereby the augers of one set are rotated in a direction opposite to the direction of rotation of those of another set, and means to raise the rear end portions of the augers to simultaneously lower the forward end portions of the same.

2. In a loading machine of the class described, the combination with a conveyer having a shoe at the lower end thereof, of a plurality of substantially horizontal pointed tapering spiral augers arranged longitudinally of and projecting beyond the free end of said shoe, means to communicate rotation to said augers, and means to raise the rear end portions of the augers to simultaneously lower the forward end portions of the same.

3. In combination, a conveyer shoe portion having a transverse gear casing and an apron extending forwardly from said gear casing, said gear casing having a vertical front wall provided with vertically elongated slots, a plurality of substantially horizontal augers arranged longitudinally of said apron and having shafts extended rearwardly through said vertically elongated slots into said gear casing, an upwardly movable transverse driven shaft in said gear casing connected and geared to said auger shafts, and manually operable means to move said driven shaft upwardly whereby the rear end portions of said augers are raised and the forward end portions thereof are simultaneously lowered.

4. In combination, a horizontal conveyer shoe portion having a transverse gear casing, a plurality of parallel substantially horizontal pointed tapering spiral augers arranged longitudinally of said shoe portion and having shafts extended rearwardly into said gear casing, and gearing in said gear casing to communicate rotation to said shafts.

5. In combination, a conveyer shoe portion having a transverse gear casing, a plurality of substantially horizontal augers arranged longitudinally of said shoe portion and having upwardly movable shafts extended rearwardly into said gear casing, gears on said shafts within said casing, an upwardly movable transverse driven shaft within said casing connected with the auger shafts, gears on said driven shaft meshing with said gears on the auger shafts, and means to move said driven shaft upwardly.

6. In combination, a conveyer shoe portion having a transverse gear casing, a plurality of substantially horizontal augers arranged longitudinally of said shoe portion and having upwardly movable shafts extended rearwardly into said gear casing, gears on said shafts within said casing, an upwardly movable transverse driven shaft within said casing connected with the auger shafts, gears on said driven shaft meshing with said gears on the auger shafts, and means to move said driven shaft upwardly whereby the rear end portions of said augers are raised and the forward end portions of the same are simultaneously lowered.

7. In combination, a conveyer shoe portion having a transverse gear casing and an apron extending forwardly from said gear casing, a plurality of substantially horizontal augers arranged longitudinally of and projecting beyond the free end of said apron and having upwardly movable shafts extended rearwardly into said gear casing, gears on said shafts within said casing, an upwardly movable transverse driven shaft within said casing connected with the auger shafts, gears on said driven shaft meshing with said gears on the auger shafts, and means to move said driven shaft upwardly.

8. In combination, a conveyer shoe portion having a transverse gear casing and an apron extending forwardly from said gear casing, a plurality of substantially horizontal augers arranged longitudinally of and projecting beyond the free end of said apron and having upwardly movable shafts extended rearwardly into said gear casing, gears on said shafts within said casing, an upwardly movable transverse driven shaft within said casing connected with the auger shafts, gears on said driven shaft meshing with said gears on the auger shafts, and means to move said driven shaft upwardly whereby the rear end portions of said augers are raised and the forward end portions of the same are simultaneously lowered.

9. In combination, a conveyer shoe portion having a transverse gear casing, a plurality of substantially horizontal augers arranged longitudinally of said shoe portion and having shafts extended rearwardly into said gear casing, gearing in said gear casing to communicate rotation to said shafts, and

means to raise the rear end portions of said augers to simultaneously lower the forward end portions thereof.

10. In combination, a conveyer shoe portion having a gear casing, a substantially horizontal auger arranged longitudinally of said shoe portion and having a shaft extended into said gear casing, a gearing in said gear casing to communicate rotation to said shaft, and means to raise the rear end portion of said auger to simultaneously lower the forward end portion thereof.

11. In combination, a conveyer shoe portion having a gear casing, a substantially horizontal auger arranged longitudinally of said shoe portion and having an upwardly movable shaft extended into said gear casing, a gear on said shaft within said casing, an upwardly movable driven shaft within said casing connected to said auger shaft, a gear on said driven shaft meshing with said gear on the auger shaft, and means to move said driven shaft upwardly whereby the rear end portion of said auger is raised and the forward end portion of the same is simultaneously lowered.

12. In combination, a conveyer shoe portion having a gear casing and an apron extending forwardly from said gear casing, a substantially horizontal auger arranged longitudinally of and projecting beyond the free end of said apron and having an upwardly movable shaft extended into said gear casing, a gear on said shaft within said casing, an upwardly movable driven shaft within said casing connected with the auger shaft, a gear on said driven shaft meshing with said gear on the auger shaft, and means to move said driven shaft upwardly whereby the rear end portion of said auger is raised and the forward end portion of the same is simultaneously lowered.

13. In combination, a conveyer shoe portion, a plurality of substantially horizontal augers arranged longitudinally of and projecting beyond the free end of said shoe portion and having upwardly movable shafts, gears on said shafts, an upwardly movable transverse driven shaft connected with the auger shafts, gears on said driven shaft meshing with said gears on the auger shafts, and means to move said driven shaft upwardly whereby the rear end portions of said augers are raised and the forward end portions of the same are simultaneously lowered.

14. In combination, a conveyer shoe portion, a plurality of substantially horizontal augers arranged longitudinally of said shoe portion, and means to raise the rear end portions of said augers to simultaneously lower the forward end portions thereof.

15. In combination, a conveyer shoe portion, a substantially horizontal auger arranged longitudinally of and projecting beyond the free end of said shoe portion, and means to raise the rear end portion of said auger to simultaneously lower the forward end portion thereof.

16. In combination, a conveyer shoe portion, a substantially horizontal auger arranged longitudinally of said shoe portion and having an upwardly movable shaft, a gear on said shaft, an upwardly movable driven shaft connected to said auger shaft, a gear on said driven shaft meshing with said gear on the auger shaft, and means to move said driven shaft upwardly whereby the rear end portion of said auger is raised and the forward end portion of the same is simultaneously lowered.

In testimony whereof I affix my signature.

JOSEPH F. JOY.