Inventor:—
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by his Attorneys.
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My invention relates to certain improvements in loading apparatus, particularly apparatus for loading coal or other mined products.

One object of my invention is to so construct a loading machine that it will remove coal which has been broken down from a vein and carry it by means of an endless conveyor to the rear of the apparatus, where it is discharged into a car or other conveying apparatus.

Another object of the invention is to so design the machine that, when it is moved laterally in either direction, it will break down the coal and feed it to the conveyor, which will carry it to the rear of the apparatus.

And a further object of the invention is to provide means for reciprocating the mechanism carrying the end and side cutters; and also to provide means for turning the reciprocating mechanism on a pivot so that it can be swung to any desired angle while the body portion is stationary.

In the accompanying drawings:

Fig. 1 is a plan view of my improved loading apparatus;
Fig. 2 is a side view of the same;
Fig. 3 is an enlarged sectional view through the forward end of the apparatus;
Fig. 3a is a longitudinal section on the same line as Fig. 3 of the rear of the apparatus;
Fig. 4 is a front view of the apparatus;
Fig. 5 is a transverse sectional view on the line 5-5, Fig. 3;
Fig. 6 is a sectional view on the line 6-6, Fig. 3;
Fig. 7 is a transverse sectional view on the line 7-7, Fig. 3; and
Fig. 8 is a plan view of the boom and its turntable.

This apparatus is particularly adapted for use in cutting and loading bituminous coal.

The apparatus consists of a base 5, and a pivoted section 1, which I term a "boom". The portion 2 of the boom at the rear of the pivot 4 carries the driving mechanism. The forward portion 3 is located close to the floor of the mine and acts as a support and guide for the reciprocating parts of the apparatus.

The boom can be turned on its pivot 4 by means of ropes 7. One end of each rope is attached to a pin 7a on the base and are wrapped around a flanged drum 8 forming part of the base in the present instance and around swivelled sheaves 9* and onto drums 9 mounted on a shaft 44 on the rear portion 2 of the boom. The shaft 44 is driven in any suitable manner from the main shaft 33. In the present instance, each shaft has a sprocket-wheel around which passes a chain 44a, Fig. 1. The ropes 7 may be used to move the apparatus laterally in either direction by extending the ropes to sheaves at either side of the mine gallery, or independent ropes and winches may be used for this purpose if desired.

The boom is made as shown in Fig. 8. A body portion 6 has a forward extension 6a, to which are secured by bolts or other fastenings two longitudinal channel beams 10, which are bent as shown in Figs. 2 and 3a.

Secured to the underside of the beams is a base plate 11 which is bent upwards at the rear as at 11a, a cross-piece 26 extending from one beam to the other beam back of the plate as shown in Fig. 3a.

Secured to the upper edges of the beams 10 is a top plate 12, making a box-like structure at the forward end 3 of the boom.

On the top plate 12 is a wear plate 20, over which the coal is conveyed by a conveyor 13.

The conveyor 13 is made of two short pitch roller chains, which will readily pass around a small roller 14 at the forward end of the boom and around a comparatively small roller at the rear end, so as to keep the depth of the boom as low as possible. The flights 16 of the conveyor are spaced a given distance apart and are preferably angular in cross-section as shown. These flights are of the same depth as the chains, and side guides 17 at each side of the conveyor are of the same height as the chains and are beveled at the outer side as shown in Figs. 6 and 7, so that the coal passing up the side guides will flow onto the conveyor without interference. These side guides extend the full length of the loading section 18, and are raised to form side...
flanges 19 at the inclined portion for the conveyor, and extend rearwardly as shown in Fig. 3. The wear plate 20 also extends to the rear of the boom and supports the coal until it is discharged from the rear of the boom.

When the car "c" is placed in position under the overhanging portion 21 of the apparatus, the coal will be discharged from the conveyor directly into the car. It will be understood that other means may be used to carry the coal away from the apparatus without departing from the essential features of the invention. The return run of the conveyor passes over a guide 22, either in the form of a plate or rail, the guide preferably stopping short at the incline as at 29. While I have shown the flight conveyor traveling over a fixed bottom plate, in some instances a belt conveyor may be used without departing from the essential features of the invention.

At the forward end of the apparatus is a head 23, which is arranged to reciprocate and to cut into the body of broken-down coal. On the end of the head 23 are inclined fingers 24, which are spaced apart as shown in Fig. 1 and project beyond the body portion of the head. As the head is reciprocated, it will break down the coal and will gradually feed it into the conveyor. The head is attached to two longitudinal bars 25, which are located on the outside of the beams 10, the ends of which extend through a guide on the cross-bar 26. On each bar is a bearing 27 for a pivot-pin 28, to which is connected a rod 29. There are one of these rods on each side of the apparatus, and the rods are pivotally mounted on the crank-pins 30 of the shaft 31, which latter is mounted in bearings 32.

The crank-shaft is driven from a shaft 33 by a chain 34, which passes around sprocket-wheels on the two shafts 31 and 33, as clearly shown in Fig. 3. The shaft 33 is mounted in bearings 35 and on this shaft is a bevel wheel 36 which meshes with a bevel pinion 37 on the shaft 38 of the electric motor 39. This motor is preferably flame-proof, and is similar to the motors used in mining machines. On one end of the shaft 33 is a sprocket-wheel 40, around which passes a chain 41 which leads to the rear of the apparatus, the chain passing around a sprocket-wheel 42. The chain 41 is a drive-chain for the endless conveyor and is mounted on the shaft 43, on which is also mounted the sprocket-wheels 15 for the conveyor 13.

The bars 25 are adapted to be guided by plates 45 attached to the base plate on the rear thereof; and a reciprocating head and cutting side plates located adjacent the floor of the mine, the space between the floor and the cutting head and side plates being substantially unobstructed, in order that the said head and side plates may effectively break down the coal; and means for reciprocating said head and side plates.

2. The combination of a base; a boom mounted thereon; driving mechanism carried by the boom; a shaft having cranks thereon driven from the power mechanism; reciprocating bars connected to the cranks; and inclined side plates secured to the bars having teeth at their edges adjacent the floor of the gallery so that as the boom is moved laterally the teeth will break down the coal and cause it to move up the inclined plates and onto the conveyor, which will carry the coal from the front of the apparatus to the rear thereof.

3. The combination in a loading apparatus for coal and like material, of a base; an endless conveyor arranged close to the ground floor at its forward end and raised at its rear laterally or when the entire apparatus is moved laterally, the loose particles of coal passing up the inclined plates 48 and are discharged over the side guides 17 into the conveyor, the coal being conveyed by the conveyor to the rear of the apparatus.

The operation of the apparatus is as follows:

A drift is cut in the wall of coal by any suitable type of cutting machine, after which the coal is broken down by blasts above the drift. The blasts break down the coal and leave some suspended, while other portions in the form of lumps are on the floor. In hand-mining, a miner uses a pick to loosen this coal and then shovels it into a car. The present apparatus is brought into position in front of the drift, and when motion is imparted to the mechanism, the head and side members at the end of the boom are reciprocated. The sharp fingers cut into the loose coal, causing it to fall into the conveyor, which carries the coal back over the mechanism as shown, and discharges the coal into a mine-car located under the overhanging portion of the apparatus, as clearly shown in Fig. 1. The cutters cut into the coal when the machine is moved laterally across the gallery, and the lumps of loose coal are cut and slide up the incline to the conveyor. The device may be moved into position and the base 5 can be secured by struts so as to firmly hold the turn-table while the machine is in action. By operating the drums, the boom can be moved laterally in either direction.

I claim:

1. The combination in an apparatus for cutting and loading coal and like material, of an endless conveyor for carrying the coal from the forward end of the apparatus to the rear thereof; and a reciprocating head and cutting side plates located adjacent the floor of the mine, the space between the floor and the cutting head and side plates being substantially unobstructed, in order that the said head and side plates may effectively break down the coal; and means for reciprocating said head and side plates.

2. The combination of a base; a boom mounted thereon; driving mechanism carried by the boom; a shaft having cranks thereon driven from the power mechanism; reciprocating bars connected to the cranks; and inclined side plates secured to the bars having teeth at their edges adjacent the floor of the gallery so that as the boom is moved laterally the teeth will break down the coal and cause it to move up the inclined plates and onto the conveyor, which will carry the coal from the front of the apparatus to the rear thereof.

3. The combination in a loading apparatus for coal and like material, of a base; an endless conveyor arranged close to the ground floor at its forward end and raised at its rear laterally or when the entire apparatus is moved laterally, the loose particles of coal passing up the inclined plates and are discharged over the side guides into the conveyor, the coal being conveyed by the conveyor to the rear of the apparatus.
end; driving mechanism located in the rear of the conveyor; side plates located adjacent the floor of the mine and having teeth; the space between the side plates and the floor of the mine being substantially unobstructed in order that the side plates may effectively break down the coal; and means for reciprocating the toothed portions of the plates, said means being driven from the driving mechanism.

4. The combination in an apparatus for loading coal and like material, of a base; a structure mounted thereon, said structure being close to the ground at the forward end and raised at the rear end; power mechanism on the raised portion thereof; an endless conveyor extending the full length of the apparatus and following the contour of the frame; bars at each side of the conveyor; a crank-shaft driven from the power mechanism, cranks on the shaft, said cranks being connected to the bars so as to reciprocate the same; toothed side plates attached to the bars; and a toothed head also attached to the bars, said head extending across the end of the apparatus, and said side plates and said head being located adjacent the floor of the mine; the space between the floor of the mine and the side plates and head being substantially unobstructed in order that the side plates and head may effectively break down the coal.

5. The combination in an apparatus for loading coal and like material, of a base; a boom pivotally mounted thereon, the forward end of the boom being low and consisting of two channel bars spaced apart; a base plate to which the channel bars are secured, said base plate arranged to rest on the floor of the gallery of the mine; guards above the channels; and endless conveyor located between the guards and extending to the rear of the apparatus; two bars arranged outside of the channel bars; inclined plates attached to the bars and having teeth at their lower edges located adjacent the floor; and means for reciprocating the bars so as to cause the bars to loosen the coal and feed it over the guards and into the conveyor.

6. The combination in an apparatus for loading coal and like material, of a base; a boom mounted on said base; power driving mechanism carried by the rear portion of the boom, the forward end of the boom extending close to the floor of the mine; an endless chain conveyor extending from the front of the apparatus to the rear thereof and raised so as to extend over the power mechanism; a bar on each side of the forward end of the apparatus; connecting rods attached to the bars; a crank-shaft having cranks thereon to which the rods are connected; a driven shaft connected to the crank-shaft and also to the power driving mechanism; toothed side plates attached to the bars at each side of the forward end of the apparatus; and a toothed head at the extreme forward end of the apparatus also connected to the bars, so that as power is applied the side plates and head will be given reciprocatory motion, said side plates and said head being located adjacent the floor of the mine, the space between the floor of the mine and the side plates and head being substantially unobstructed in order that the side plates and head may effectively break down the coal.

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