

1,328,487.

F. BILLINGS,  
MINE LOADING MACHINE.  
APPLICATION FILED SEPT. 6, 1912.

Patented Jan. 20, 1920.

3 SHEETS--SHEET 1.

Fig. 1.

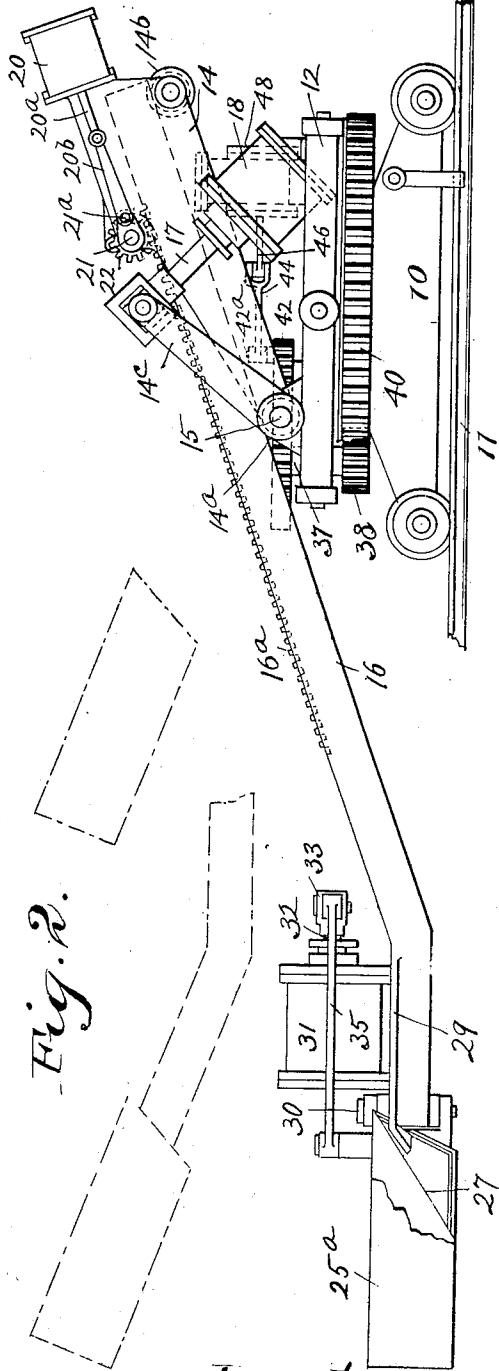
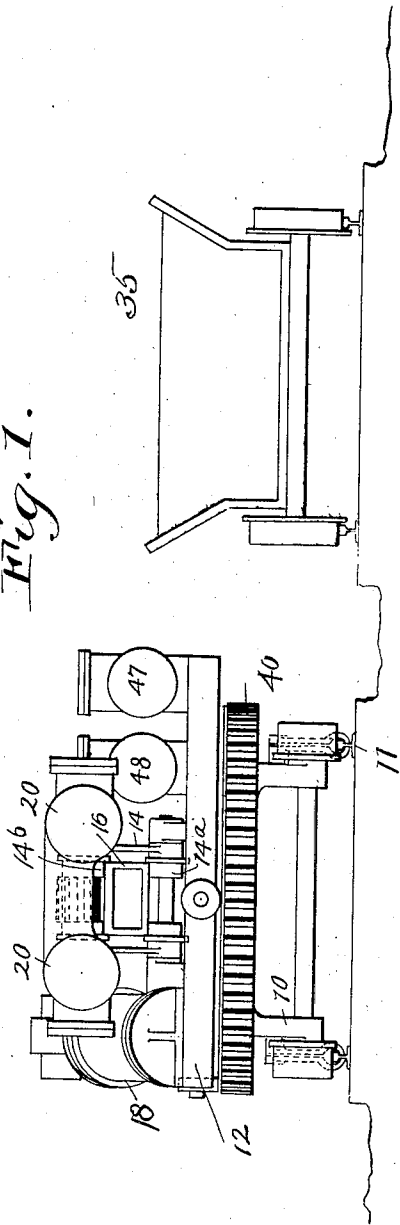


Fig. 2.

Witnesses:  
E. B. Gilchrie,  
E. M. Freeman.

Inventor:  
Frank Billings  
By Thurston & Davis  
Attorneys

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3 SHEETS—SHEET 2.

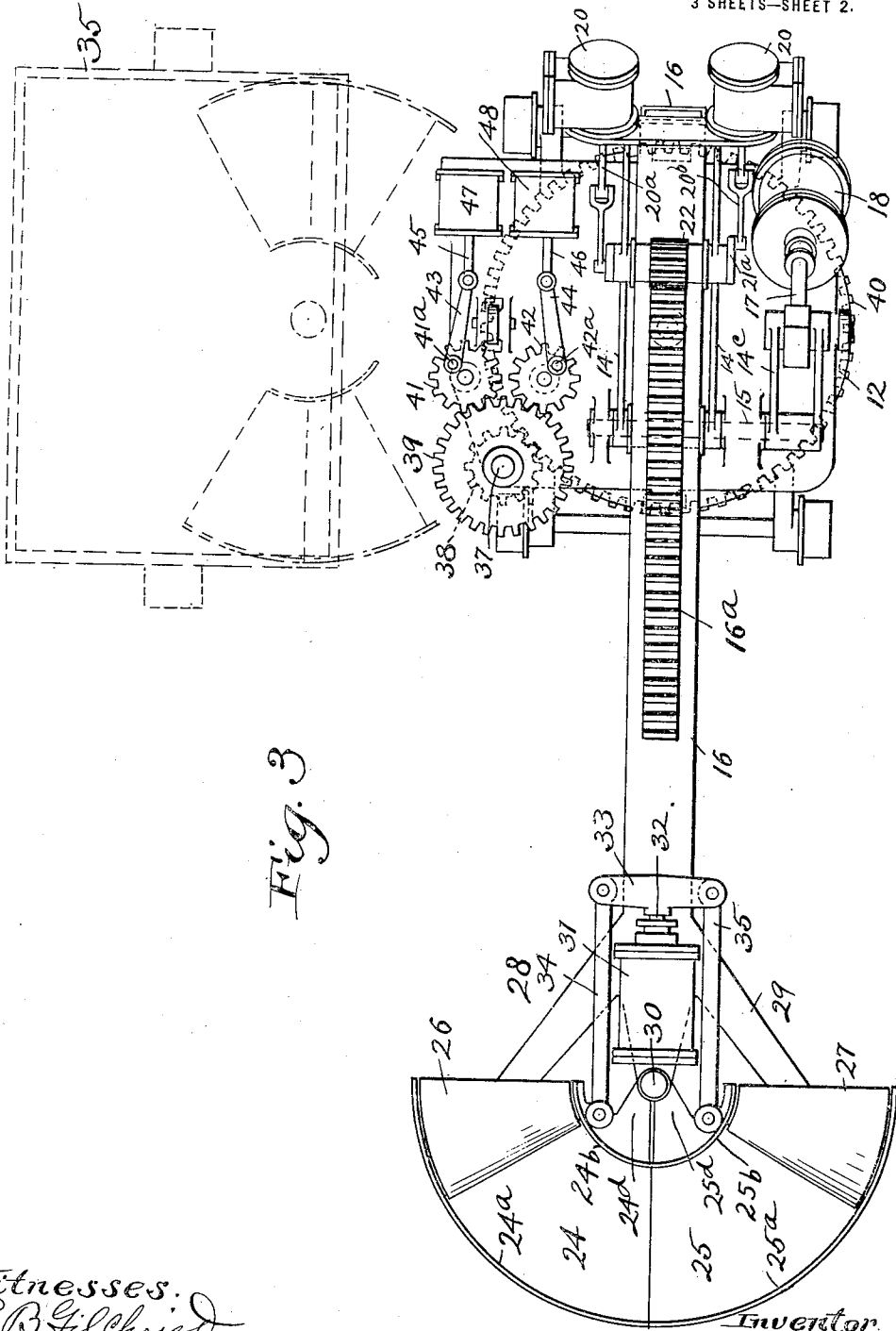


Fig. 3

Witnesses.  
E. B. Gilchrist  
E. M. Freeman

Inventor.  
Frank Billings  
By Shurstone & Thomas  
Attorneys

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3 SHEETS—SHEET 3.

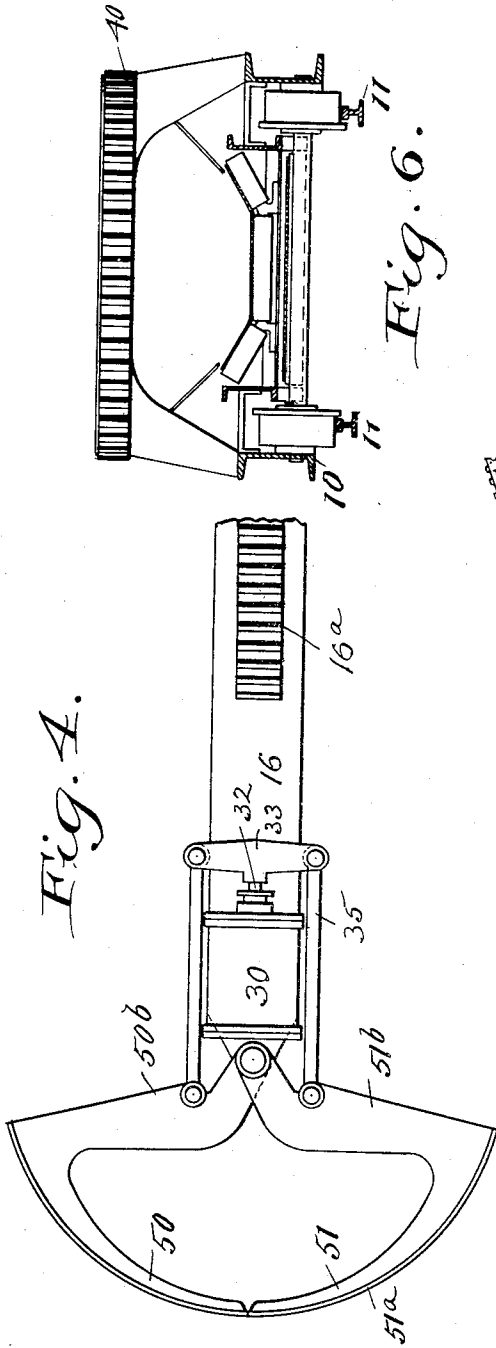


Fig. 4.

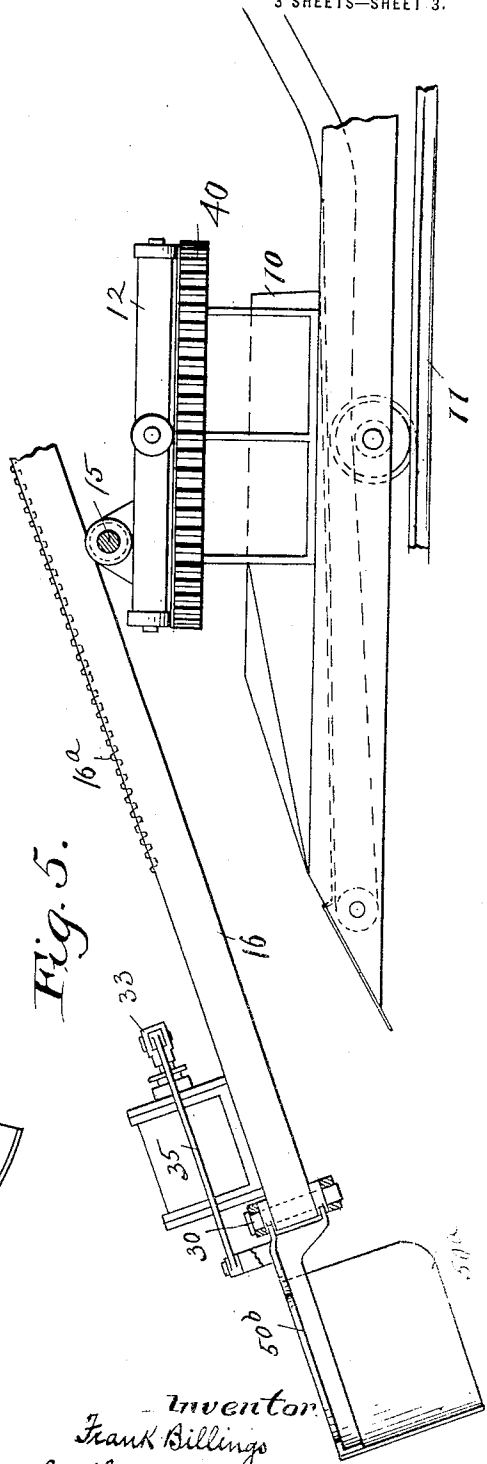


Fig. 5.

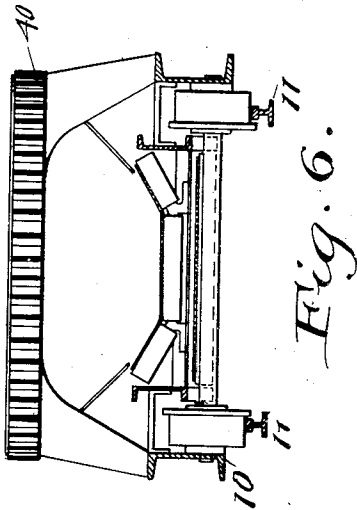


Fig. 6.

Witnesses.  
E. B. Gilchrist.  
E. M. Freeman.

Inventor.  
Frank Billings  
By Thurston & Lewis  
Attorneys

# UNITED STATES PATENT OFFICE.

FRANK BILLINGS, OF CLEVELAND, OHIO.

MINE LOADING-MACHINE.

1,328,487.

Specification of Letters Patent.

Patented Jan. 20, 1920.

Application filed September 6, 1912. Serial No. 718,885.

*To all whom it may concern:*

Be it known that I, FRANK BILLINGS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Mine Loading-Machines, of which the following is a full, clear, and exact description.

This invention consists in improvements in the kind of machines especially adapted for use in mines for loading broken off mineral or coal into mine cars, which includes a mechanically operated ram, supported on a wheel truck in such wise that it is capable of moving endwise, of rocking on a horizontal axis, and of swinging about a vertical axis.

The present invention is designed to increase the efficiency, under some conditions, of machines of this character; and the invention consists of the combination with such a ram of two jaws pivoted to the outer end thereof and overhanging the same, a motor also carried by said ram, and mechanism operated by the motor to open and close said jaws. It also includes certain other subordinate combinations,—all of which are shown in the drawings, and will be hereinafter described and definitely pointed out in the claims.

In the drawings, Figure 1 is a rear end view of a machine embodying this invention placed in working relation to a mine car. Fig. 2 is a side elevation of a machine embodying the invention. Fig. 3 is a plan view thereof. Fig. 4 is a plan view of the outer end of such a ram when the jaws are in the form of arc shaped hoe blades. Fig. 5 is a side elevation showing a part of said ram and showing also somewhat diagrammatically the machine by which said hoe blade is supported. Fig. 6 is a vertical sectional end view of the ram supporting machine shown in Fig. 5.

10 represents a wheel truck adapted to run on the mine tracks 11. 12 represents a turn table mounted on this truck and capable of turning about a vertical axis. 14 represents a rocking frame pivoted upon this turn table by means of a horizontal transversely extended shaft or pivot 15. 16 represents a ram or long beam which is supported by and is movable endwise in the rocking frame 14. This beam rests and rides upon two grooved rollers 14<sup>a</sup> and 14<sup>b</sup>, carried by said rocking

frame. An arm 14<sup>c</sup> rigid with frame 14 is connected in a familiar way with the piston rod 17 of a fluid motor 18, which is fixed upon the turn table. This motor may be of any suitable construction. When the piston rod 17 is thrust outward the frame 14 will so rock as to lower the free or overhanging end of the ram 16; and when this piston rod is drawn back the frame will be rocked in the contrary direction.

A pair of fluid motors 20 are fixed to the rear end of the frame 14. The piston rod 20<sup>a</sup> of each is connected through a pitman 20<sup>b</sup> with a crank 21<sup>a</sup>,—the two cranks being fixed to a crank shaft 21 which is mounted in bearings carried by the frame 14. A pinion 22 fixed also to this shaft engages with rack teeth 16<sup>a</sup> on the ram, whereby this ram may be moved forward or backward as required. Pivoted to the front end of the ram are two jaws 24 and 25. In the form of these illustrated in Figs. 1 to 3, inclusive, these jaws are flat segment shaped plates having upturned flanges 24<sup>a</sup> and 25<sup>a</sup> at their outer marginal arc shaped edges and upturned flanges 24<sup>b</sup> and 25<sup>b</sup> at their inner marginal arc-shaped edges. At what may be termed the rear ends of these jaws are the fixed inclined plates 26 and 27, said plates being fixed to the ram through arms 28 and 29. These two jaws have respectively the pivoting ears 24<sup>a</sup> and 25<sup>a</sup> which are pivoted together by means of the pivot pin 30. The fixed end plates 26 and 27 are inclined forward and downward. The result is that their front lower edges lie parallel and close to the top faces of the plates 24 and 25, while the rear edges are at a considerable elevation above the surface of these plates.

31 represents the cylinder of a fluid motor whose piston rod 32 carries a cross arm 33 which is connected by two links 34, 35 with the two jaws 24, 25, respectively. If the piston rod is thrust out of said cylinder, that is to say, rearward, the result will be that these jaws are opened. If, while they are opened, the ram be moved so as to bring these jaws in proper relation to the material to be gathered up, and the piston rod be now drawn forward into the cylinder 31 these jaws will close and pick up a substantially full load of such material. Any excess of that material beyond the capacity of the jaws will ride up the inclined faces of the plates 27 and fall over the top edges thereof.

When the bucket jaws are so loaded, then, by manipulating the ram which carries said jaws, they may be raised; the ram may be moved endwise, and the turn table swung so as to carry said jaws over a mine car 35. When they are in this position the jaws are opened, and, as a result, the material in them will be held against movement by the plates 26, 27, which act substantially like scrapers to push this material off of the jaws and into the mine car.

The particular mechanism for operating the turn table which is shown in the drawing consists of a vertical shaft 37 mounted on the turn table platform, a pinion 38 fixed thereto which engages with a fixed gear 40 carried by the truck 10, and a large gear 39 also fixed to the shaft 37. Meshing with this gear 39 are two pinions 41 and 42 which are mounted on vertical axes fixed to the turn table platform. Crank pins 41<sup>a</sup> and 42<sup>a</sup> carried by these pinions are engaged by pitmen 43, 44, which in turn are connected with the piston rods 45, 46 of two of the motors 47, 48, which are supported on the turn table platform.

In the form of the invention which is shown in Figs. 4 and 5 the two jaws are indicated by 50 and 51 and differ somewhat in shape from those shown in Figs. 1 to 3. That is to say, they consist of two arc shaped plates 50<sup>a</sup> and 51<sup>a</sup> which project downward from the top arms 50<sup>b</sup> and 51<sup>b</sup> through which they are pivoted to the ram. These jaws are in the form of arc shaped hoe blades, and are incapable of picking material up, but instead are calculated to drag it along the mine floor and onto a conveyer. The same kind of motor and connecting mechanism as is shown in Figs. 1 to 3, inclusive, are provided for opening and closing these hoe jaws. The particular type of machine with which these hoe jaws are adapted for use is substantially such as forms the subject matter of my prior application Serial No. 538,408, filed Jan. 17th, 1910, and need not therefore be described in detail here.

Although fluid motors of simple form are shown, it will be understood that any form of motors may be employed. Also any suitable form of conveyer mechanism may be employed. Also it will be understood that any suitable mechanism may be employed for supporting the ram, and imparting to it the stated movements.

Having described my invention, I claim:

1. In a loading machine, the combination of a ram, a pair of jaws at the outer end thereof having bottom and side walls and movable in an approximate horizontal plane toward and away from each other, scraper members with respect to which the jaws are movable, the bottom and end edges of the scrapers extending adjacent the said walls

of the jaws and maintaining such relationship during the opening movement of the jaws and means for moving the jaws.

2. In a loading machine, the combination of a ram, a pair of jaws pivotally mounted at the outer end of the ram, said jaws having bottom and side walls and movable in an approximate horizontal plane toward and away from each other, scraper members with respect to which the jaws are movable and bottom and end edges of the scrapers extending adjacent the said walls of the jaws and maintaining such relationship during the opening movement of the jaws and means for moving the jaws.

3. In a loading machine, the combination of a ram, a pair of jaws at the outer end thereof movable in an approximate horizontal plane toward and from each other, scraper members having inner and outer edges with respect to which the jaws are movable, said edges of the scrapers having a radius which is concentric with respect to the radius of the jaws and means for moving the jaws.

4. In a loading machine, the combination of a ram, a pair of jaws pivotally mounted at the outer end thereof and movable in an approximate horizontal plane toward and from each other, scraper members having inner and outer edges with respect to which the jaws are movable, the said edges of the scraper having a radius which is concentric with respect to the radius of the jaws and means for moving the jaws.

5. In a loading machine, in combination, a ram, a pair of jaws at the outer end of the ram, and movable toward and away from each other, said jaws being provided with bottom portions and upstanding edge portions, and fixed scraper members with respect to which the jaws are movable and extending downwardly between the edge portions adjacent to the bottom portions of the jaws, said scraper members serving to scrape the material from the jaws when the latter are opened.

6. In mine loading machine, the combination of a movable ram, and two jaws pivoted to said ram at the outer end thereof, each of said jaws including a segment shaped plate having upturned flanges along the outer and inner arc shaped edges thereof, and two fixed inclined plates which are secured to said ram and lie with their lower edges above and close to said segment shaped plates,—the length of said inclined plates being such as to substantially span the space between the upturned inner and outer flanges of said jaws.

7. In a mine loading machine, the combination of a movable ram and two jaws pivoted to said ram at the outer ends thereof each of said jaws including a segment shaped plate having upturned flanges along

the outer and inner arc-shaped edges thereof  
the curvature of said arc-shaped edges being  
upon a radius passing through the pivotal  
point of the jaws to the ram and two fixed  
5 inclined plates which are secured to said  
ram and lie with their lower edges above  
and close to said segment-shaped plates the  
length of said inclined plates being such as  
to substantially span the space between the

upturned inner and outer flanges of said 10  
jaws.

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

FRANK BILLINGS.

Witnesses:

E. M. FREEMAN,  
A. J. HUDSON.