

H. A. KUHN & W. W. MACFARREN.

MINING MACHINE.

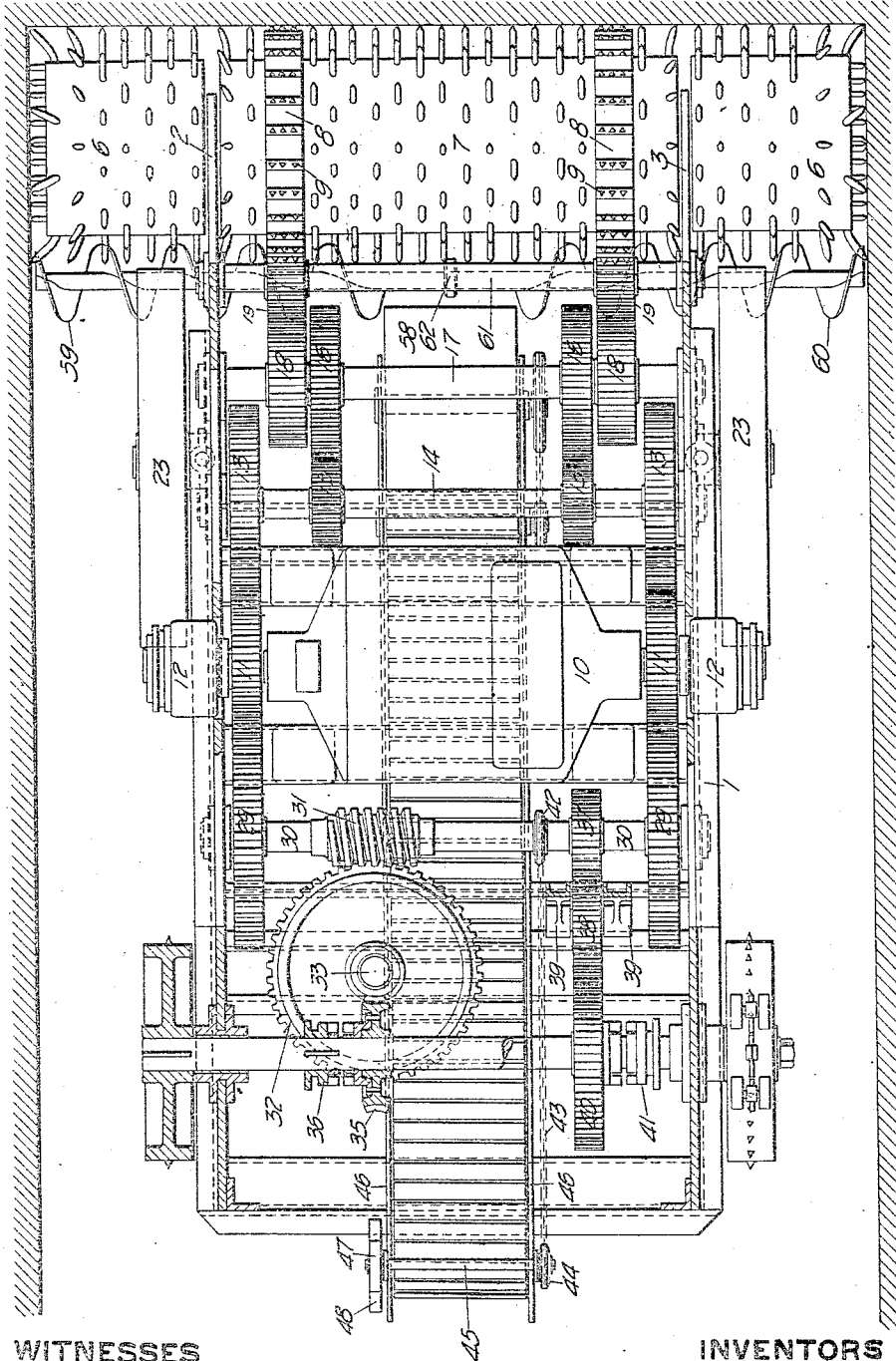
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Patented Aug. 3, 1915.

3 SHEETS—SHEET 1.

1,148,975.

FIG. 1.



WITNESSES

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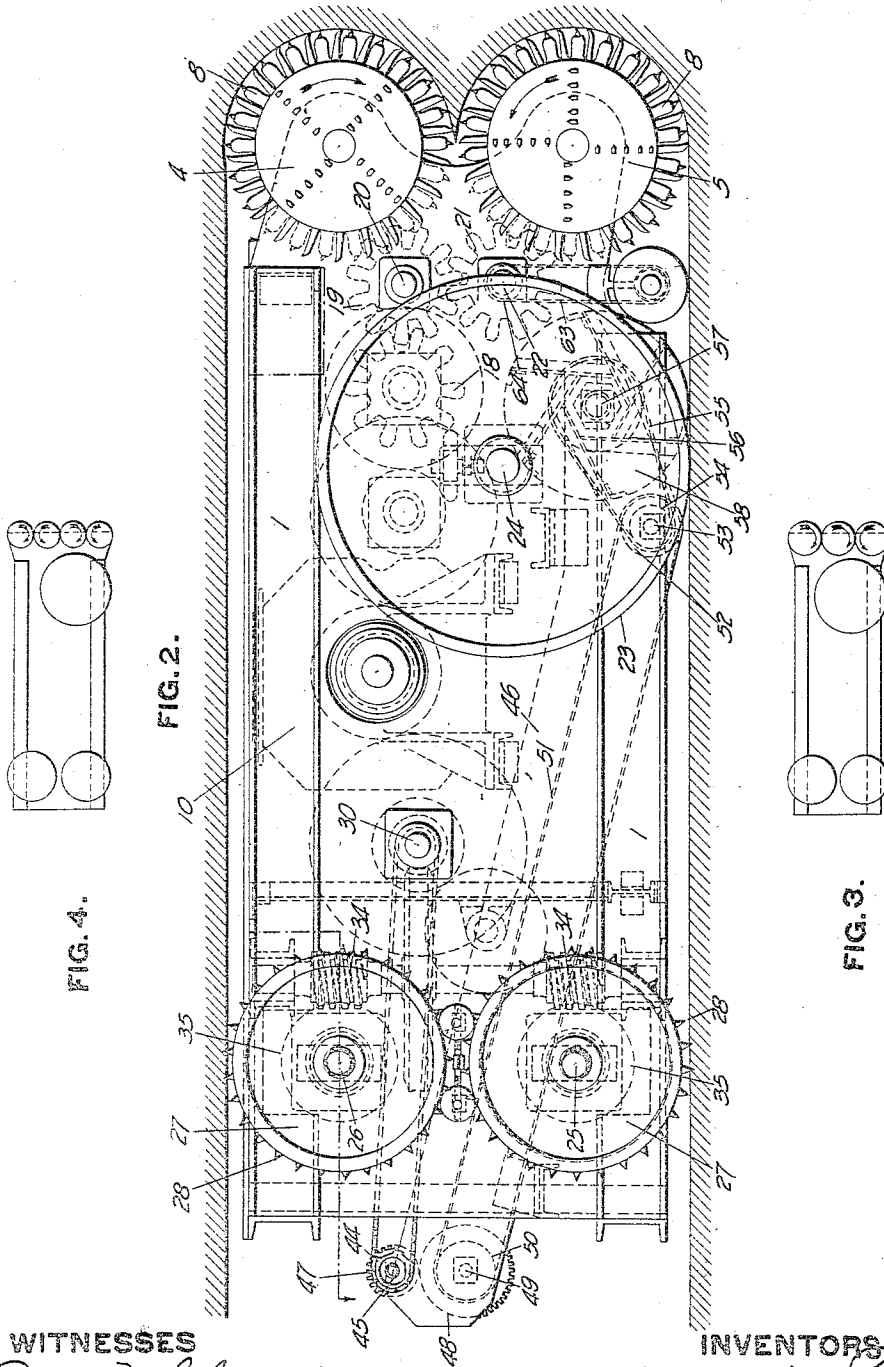
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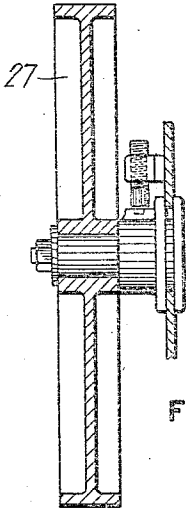


FIG. 5

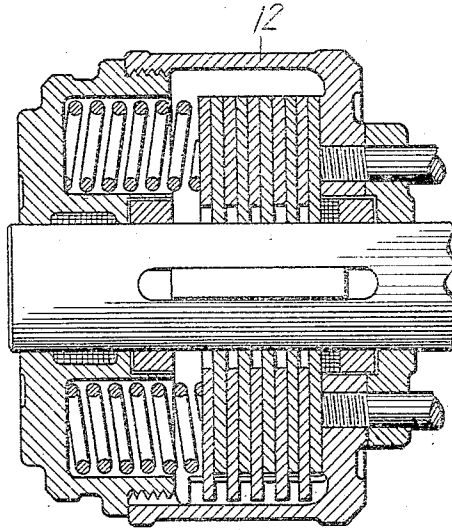


FIG. 6

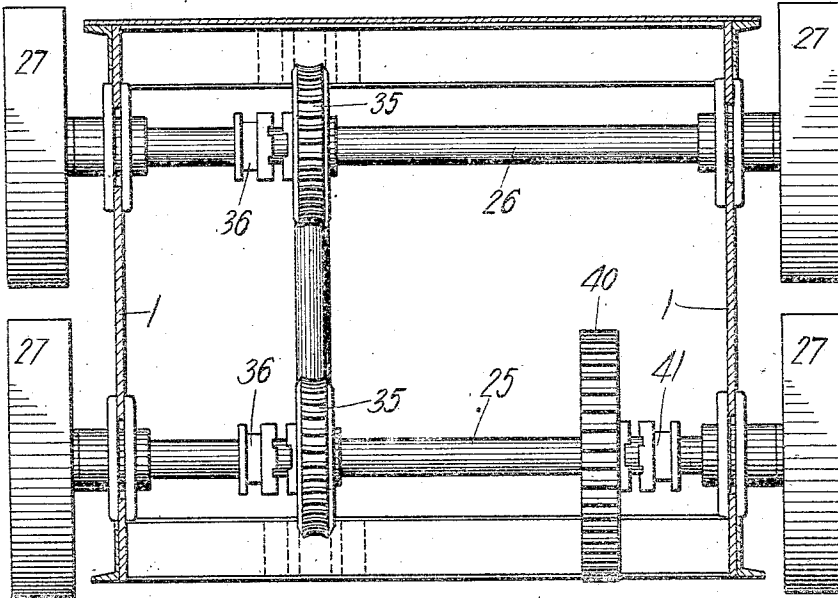


FIG. 7

WITNESSES

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MINING-MACHINE.

1,148,975.

Specification of Letters Patent.

Patented Aug. 3, 1915.

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To all whom it may concern:

Be it known that we, HARRY A. KUHN and WALTER W. MACFARREN, citizens of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Mining-Machines, of which the following is a specification.

The objects of our invention are to provide a machine adapted to mine the full height of the coal seam at one operation; to provide a machine adapted to mine coal without the use of explosives; to provide a machine adapted to mine the coal in comparatively small sizes suitable for coking; to provide a machine which is strong, simple, reliable and fast, and which will mine an immense quantity of soft coal, particularly in entry work, in a given time as compared with the present methods.

To these ends, our invention comprises, generally stated, a substantial frame supported on four wheels, and adapted to run on the floor of the mine. At the front end of this frame, there is provided a pair of horizontal drums, each of these being provided with a large number of inserted cutters. In addition to this, the invention comprises mechanism for rotating the drums and propelling the machine.

Referring to the drawings, Figure 1 is a plan view, partly in section, of our improved machine. Fig. 2 is a side elevation of the same. Figs. 3 and 4 are diagrams of modified forms. Fig. 5 is a sectional elevation through one of the carrying wheels 27, showing its supporting axle. Fig. 6 is a cross section through one of the driving clutches 12. Fig. 7 is a sectional rear elevation of the machine showing the drive to the wheels 27.

The frame 1 is preferably built up of structural steel shapes and plates. From the front end of the frame 1 project a pair of plates 2 and 3. To the plates 2 and 3 there may be secured suitable bearings, in which may be mounted a shaft within the drum.

The upper drum is designated by the numeral 4, and the lower drum by the numeral 5. Each of the drums 4 and 5 consist of two end sections 6, and a middle section 7, these being secured to the above mentioned shaft inside the drum.

Formed upon the outside of the middle drum section 7, there are two series of spur gear teeth 8, forming two spur gears integral with the middle section 7. At the extremities of the gear teeth 8, there are mounted small cutters 9 to cut clearance for the teeth 8.

A motor 10 is mounted at the middle of the machine, and provided with the spur gears 11, one at each end of the armature shaft. These gears 11 are loosely mounted on the motor shaft, and are frictionally connected thereto by the constantly engaged friction clutches 12, which may be adjusted to carry the desired load, and to slip when this load is exceeded.

The gears 11 mesh with and drive the gears 13 upon the shaft 14. Secured to the shaft 14 are the spur pinions 15, which mesh with and drive the spur gear 16 upon the shaft 17. Also secured to the shaft 17 are the spur pinions 18; these latter are the same pitch as the spur gear teeth 8 upon the middle drum section 7.

The spur pinions 18 mesh with and drive the spur pinions 19 upon the shaft 20, the same being mounted in suitable bearings secured to the frame 1. The spur pinions 19 mesh with and drive the spur gear teeth 8 upon the upper drum 4. The spur pinions 19 also mesh with and drive the spur pinions 21 upon the shaft 22, this latter being mounted in suitable bearings upon the frame 1. The spur pinions 21 also mesh with and drive the spur gear teeth 8 upon the lower drum 5. From the above description, it will be seen that both drums 4 and 5 are driven by interlocked gearing from a common motor, and that power is also frictionally transmitted from the motor to the drums.

At the front end of the machine, we provide the large truck wheels 23, which may be conveniently mounted upon the short stub axles 24, these latter being adjustably mounted with respect to the frame 1.

At the rear of the machine, we provide a pair of axles 25 and 26, the latter being vertically mounted above the former. Upon these axles, there are mounted the truck wheels 27, the same being provided with spikes or projections 28 to engage the coal for the purpose of securing the maximum tractive effort to propel the machine.

From the pinions 11 upon the shaft of the

motor 10, power is applied to drive the spur gears 29 upon the shaft 30. The shaft 30 carries a worm 31, meshing with and driving the worm gear 32 upon the vertical shaft 33, this latter being mounted in suitable bearings carried by the frame 1.

The shaft 33 is provided with a pair of worms 34, each of which meshes with and drives a worm gear 35 upon each of the axles 25 and 26. The worm gears 35 are loosely mounted upon the axles 25 and 26, and connected thereto at will by the jaw clutches 36. By these means, a slow forward motion may be given to the machine. For producing a reverse motion at a faster speed than the above, we take power from the shaft 30 to the rear axle 25 as follows:

Shaft 30 carries the spur gear 37 meshing with and driving the idler gear 38 upon a short shaft supported in the bearings 30. The idler gear 38 meshes with and drives the spur gear 40, the same being loosely mounted on the axle 25 and connected at will thereto by jaw clutch 41.

By throwing out of engagement the jaw clutches 36 and throwing into engagement the jaw clutch 41, the machine may be traversed by power from the motor 10 at a speed controlled by means of the electric controller for the motor 10, and in either direction, according as the motor is run.

It is desired to deliver the coal at a central point at the rear of the machine, and to accomplish this, the following mechanism is provided: The shaft 30 carries a sprocket 42, which drives a chain 43 engaging a sprocket 44 upon a shaft 45. The shaft 45 is supported in bearings secured to a pair of plates 46, which extend from the rear of the machine to a point near the front end thereof. The shaft 44 carries a gear 47 which meshes with and drives a gear 48 upon the shaft 49, the same being supported in suitable bearings secured to the plates 46. The shaft 49 may be supplied with a pulley or a pair of sprockets 50 engaging the conveyer 51, and driving the same. At its lower end, the conveyer 51 passes around a suitable pulley or sprockets 52 on shaft 53, also supported by plates 46. Shaft 53 also carries sprockets 54 driving the chain 55, which in turn drives a sprocket 56 mounted upon a shaft 57, which is also secured to the plates 46. The shaft 57 carries a rotating loading device 58 for picking up the coal and depositing it on the conveyer 51, from whence it is carried to the desired point of discharge.

By referring to Fig. 1, it will be seen that the loading device 58 is comparatively narrow, and that it is required to pick up the coal coming from the full width of the drums 7. It is therefore necessary to provide a supplementary device to bring the coal in from the ends of the drums toward the center, where it may be picked up by

the loading device. To these ends, we provide a pair of oppositely pitched screw conveyers 59 and 60 mounted upon a common shaft 61, which may be supported in suitable bearings secured to the frame 1. The shaft 61 carries the sprocket 62, which may be conveniently driven by a chain 63 engaging a sprocket 64 upon the shaft 22.

The above described conveying mechanism is adapted to convey mixed lumps of moderate size and fine coal from any position where it may be discharged by the drums, to a suitable point at the rear of the machine, where the coal may be discharged onto a supplementary conveyer, or directly into mine cars.

A suitable guard plate may be extended across the end of the machine in the rear of screw conveyers 59 and 60 to prevent any coal being spilled rearwardly from the screw. This guard plate may be provided with a suitable opening through which the coal may pass to the loader 58.

In the operation of our improved machine, it is necessary only to throw into engagement the clutches 36, and start the motor 10, after which the machine automatically advances into the coal, tearing off and breaking up the same in large quantities, which are automatically delivered to the rear of the machine.

It will be seen that we have provided a strong, simple, and fast machine for this purpose (the speed of action being only limited by the amount of power available and the durability of the cutting points).

It will also be seen that the machine is easily controlled, inexpensive to construct, and that it may be designed to cut an entry or tunnel of almost any desired height and width, within reasonable limits.

The word drums, as used herein, means a substantially cylindrical body of a considerable length, as distinguished from a flat circular body or saw. It is our intention to make these drums of a diameter so that the sum of their diameters (over the cutters) shall be equal to the thickness of the coal to be mined, but as conditions may arise which would render a less height desirable, we do not wish to be limited to this precise construction. The drums used on our improved machine may be made in one piece, or they may be built up to any desired manner to give facility in handling or economy in manufacture.

It is evident that the drums 4 and 5 may be arranged to rotate in the same instead of opposite directions, as shown in Fig. 2, if desired, or in opposite directions to those shown by the arrows, and also opposite to each other.

In Fig. 3 we have shown a diagram of a machine similar in all respects to that shown in Figs. 1 and 2, but having three horizontal

drums; and in Fig. 4 we have shown a further modification having four horizontal drums.

From the above, it will be evident that the precise construction and arrangement of parts may be widely varied, without departing from the spirit of our invention, and we therefore desire to claim and hold as ours all the patentable subject matter covered by the following claims.

We claim—

1. In a mining machine, a frame, a pair of drums mounted at the front end thereof, one above the other and having transverse horizontal axes, said drums extending across the front of the machine and being wider than any following part, cutters on the drums, and means for driving the drums in a direction to produce a downward reaction

on the lower drum, and upward reaction on the upper drum.

2. In a mining machine, a frame, a pair of drums mounted at the front end thereof, one above the other, said drums having horizontal axes extending across the machine and of a length greater than any following part of the machine, cutters on the drums, the cutters on adjacent drums being spaced apart just sufficiently to clear each other, and means for driving said drums so that the coal cut thereby will be delivered in a thin stream between the drums.

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