May 8, 1956 J. C. SPIGARELLI 2,744,741

ROTARY CUTTER MINING MACHINE WITH BELT DRIVE

Filed Jan. 5, 1954 2 Sheets-Sheet 1

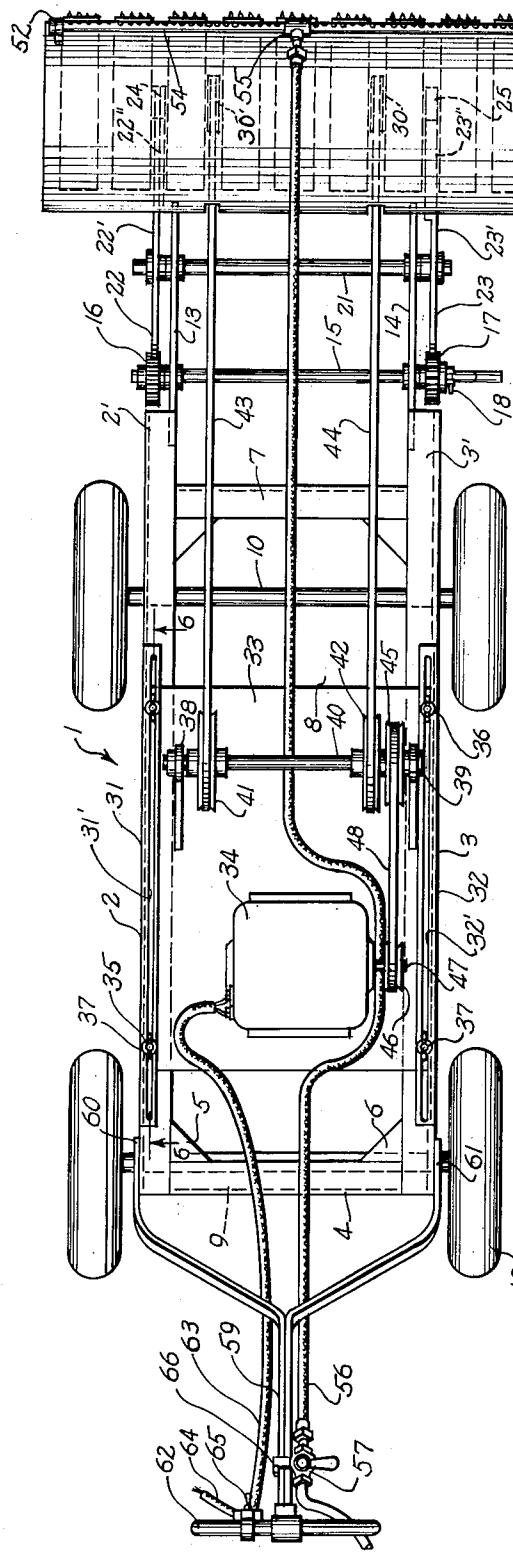


Fig. 1

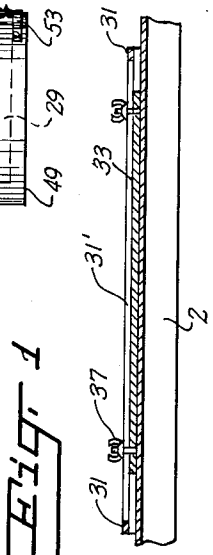


Fig. 3

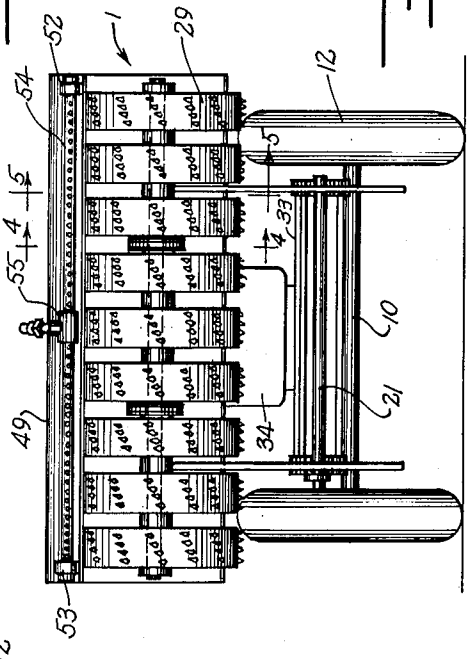


Fig. 2

INVENTOR.
John C. Spigarelli
BY
McMorrow, Berman & Davidson
ATTORNEYS

May 8, 1956 J. C. SPIGARELLI 2,744,741

ROTARY CUTTER MINING MACHINE WITH BELT DRIVE

Filed Jan. 5, 1954 2 Sheets-Sheet 2

Fig. 3

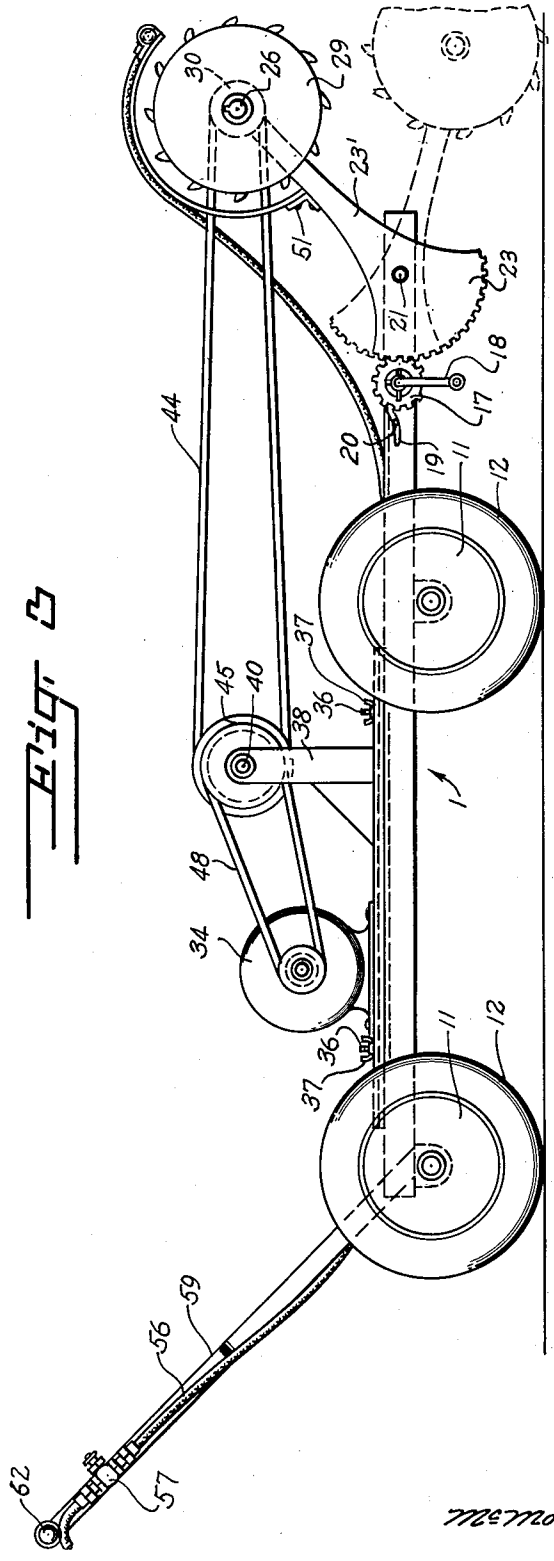


Fig. 5

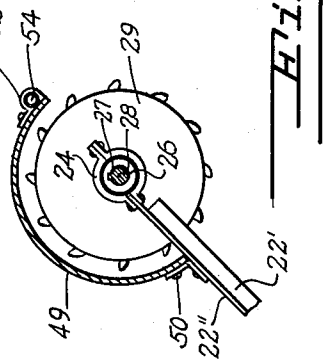
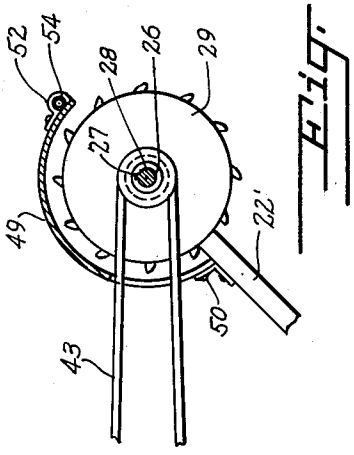


Fig. 4



INVENTOR.
John C. Spigarelli
BY

McMorrow, Berman & Davidson
ATTORNEYS

United States Patent Office 2,744,741 Patented May 8, 1956

2,744,741

ROTARY CUTTER MINING MACHINE WITH BELT DRIVE

John C. Spigarelli, Price, Utah

Application January 5, 1954, Serial No. 402,236
3 Claims. (Cl. 262—26)

This invention relates to mining machines, and more especially, to machines utilized in the mining of coal slack, though it will be obvious to those skilled in this art that the apparatus is readily adaptable for utilization in connection with other mining operations and any other class of mineral matter.

One of the primary objects of this invention is to provide portable coal mining apparatus equipped with rotary cutters for engagement with a coal seam, the arrangement and disposition of the component elements of the apparatus being such as to facilitate and expedite the carrying out of the mining operations.

Another object of this invention is to provide a wheeled chassis or carriage having rotary motor driven cutters mounted for adjustment thereon, and means associated therewith for wetting the mined mineral.

A further object of this invention is to provide a machine of the type described with gearless driving means for rotating the cutters, and with manually manipulated means for swinging the above-mentioned rotary cutters through an arc which passes above and below the longitudinal medial axis of the chassis.

A still further object of this invention is to provide mining equipment of the class to which reference has been made which is non-complex in construction and assembly, and which is inexpensive to manufacture and maintain.

Other and further objects and advantages of this invention will become more apparent from a consideration of the following specification when read in the light of the accompanying drawings, wherein:

Figure 1 is a top plan view of a coal mining machine constructed in accordance with the teachings of this invention;

Figure 2 is a front end elevation of the machine shown in Figure 1;

Figure 3 is a side elevation of the machine shown in Figure 1;

Figure 4 is a detail side elevation of the rotary cutter and driven pulley assembly taken on the vertical plane of line 4—4 of Figure 2, and looking in the direction of the arrows;

Figure 5 is a detail view of the rotary cutters and the bearing structure therefor taken on the vertical plane of line 5—5 of Figure 2, and looking in the direction of the arrows; and

Figure 6 is a partial detail cross sectional view taken on the vertical plane of line 6—6 of Figure 1, and looking in the direction of the arrows.

Referring now and more specifically to the drawings, reference numeral 1 designates, in general, a coal mining machine constructed in accordance with this invention. The machine 1 comprises any suitable carriage or chassis which in this instance consists of a pair of elongated, spaced and parallel inverted and opposed L-shaped side members 2 and 3, respectively, each of which are rigidly connected together at one of their respective adjacent ends by a cross-member 4 which extends perpendicularly therebetween. The rigidity of the relationship between the members 2, 3 and 4 is further insured by the insertion of the right angle triangular inserts 5 and 6 within the corners at the intersections of the side members 2 and 3 with the cross-member 4.

Spaced inwardly from the other ends of the side members 2 and 3, the same are connected by the second

cross member 7 which extends transversely thereof and at right angles thereto to preserve the parallel relationship between the side members 2 and 3. A substantially polygonal flat plate 8 is fixedly secured between the side members 2, 3 and the last mentioned cross member 7 to reinforce the right angle relationship between these several members. As seen in Figure 1 of the drawings, the cross member 7 is spaced inwardly of the aforementioned other ends of the longitudinally extending side members 2, 3 in order to provide end extensions thereof designated by the reference numerals 2' and 3' (see Figure 1).

The opposed depending and parallel sides of the members 2 and 3 are traversed at their one and other ends thereof by the shafts 9 and 10 on the outer ends of which are secured rotatable wheels 11 on which are mounted detachable tires 12.

The above mentioned wheeled chassis may be referred to as the "box type" though other constructions of the chassis may be employed if desired.

An elongated substantially rectangular support bar 13 has one of its ends secured to the outer end of the extension 2' and extends longitudinally thereof. A similar support bar 14 is connected with the extension 3'. A cross shaft 15 extends transversely through the support bars 13 and 14 and is rotatably supported therein. As is seen in Figure 1, the cross shaft 15 has end portions which project beyond the remote sides of the support bars 13, 14, whereby a pair of gears 16 and 17 may be keyed or otherwise mounted thereon for rotation therewith. A crank 18 is affixed to the cross shaft 15 adjacent the gear 17 to provide manually operated means for rotating the cross shaft and the gears mounted thereon. A ratchet pin 19 is pivotally mounted at 20 to the extension 3' and has an end thereof adapted to releasably engage the teeth of the gear 17 to prevent rotation of the latter in a counter-clockwise direction.

A second cross shaft 21 is mounted between the support bars 13, 14 adjacent the free ends thereof, the shaft 21 having opposed ends which project beyond the remote sides of the support bars. A pair of segmental racks 22 and 23 are pivotally mounted on the cross shaft 21, one adjacent each end thereof, with the teeth of the racks meshing with their respective adjacent gears 16 and 17. Each of the racks 22, 23 are formed with a radial extension 22', 23' which has an inverted L-shaped transverse cross section to form opposed lateral arms 22'' and 23'' (see Figures 1 and 5), to the free ends of which are riveted or otherwise rigidly secured a pair of split bearings 24 and 25, respectively. A hollow tubular cross shaft 26 is mounted for rotation in the bearings 24, 25 and is provided with a longitudinally extending keyway for locking engagement with a longitudinally extending key 27 integrally formed with a driven shaft 28.

A plurality of rotary cutters 29 are affixed in spaced relation to the tubular shaft 26 for rotation therewith. As is seen in Figure 1 a pulley 30 is secured for rotation with the tubular shaft 26 between a pair of adjacent rotary cutters 29 adjacent one side of the machine 1 and a smilar pulley 30' is also affixed for rotation with the shaft 26 adjacent the other side thereof.

From the foregoing structure, it will be apparent that the radial extensions 22', 23' define cutter support arms pivotally carried by the chassis adjacent one end thereof for movement in parallel arcuate paths about a common horizontal axis, with the cutters 29 being carried by the arms on one end thereof for movement therewith. The means whereby the support arms 22', 23' are moved simultaneously in their parallel arcuate paths will comprise the segmental racks or gears 22 and 23 which are adapted to mesh with the transversely spaced gears 16

and 17 which are mounted for rotation about a common horizontal axis lying in the same plane and longitudinally spaced from the common axis about which the support arms move. Thus, upon rotation of the transversely spaced gears 16 and 17, by means of the crank 18, the support arms and the cutters carried thereon will be moved in the arcuate path about the common horizontal axis defined by the center line of the cross shaft 21, to a selected position in the path of movement.

At each side and adjacent the back end of the machine 1 (Figures 1 and 6) a bracket 31, 32 is rigidly secured to the side members 2, 3 to slidably receive a substantially rectangular bed plate 33 on which is mounted an electric motor 34. The brackets 31, 32 are each longitudinally slotted at 31', 32' to receive the bolts 35, 36 which project upwardly from the bed plate 33, the slots and bolts constituting means for adjusting the position of the motor 34 relative to the opposite ends of the machine 1. Wing nuts 37 serve to maintain the adjusted position.

A pair of laterally spaced standards 38 and 39 project upwardly from the bed plate 33 and support a cross shaft 40 for rotation therein. A pair of pulleys 41 and 42 are affixed to the cross shaft 40 in alignment with the pulleys 30' and 30, respectively, and are connected in driving relation by means of the endless V-belts 43 and 44. A third pulley 45 is affixed to the cross shaft 40 adjacent the pulley 42. The last named pulley is aligned with a pulley 46 mounted on the drive shaft 47 of the motor 34, the pulleys 45 and 46 being connected in driving relation by the endless V-belt 48.

Referring to Figures 1, 2 and 3, it is seen that an arcuately shaped guard 49 has one of its ends rigidly secured to the spaced arms 22", 23" by angle members 50, 51 and arches over the rotary cutters 29 in spaced relation relative thereto. At opposite sides of the free end of the guard 49 a pair of lugs 52, 53 secured a transversely extending pipe 54 thereto, the pipe 54 being provided with a T-connector 55 intermediate its ends for connection of one end of a flexible hose 56 the other end of which is connected to a source of water under pressure through a manually operated valve 57. Water is discharged through the longitudinally spaced and aligned ports 58 formed in the pipe 54.

A yoke 59 has its arms connected with the side members 2, 3 at 60 and 61, respectively, and a handle bar 62 connected to the outer end of its leg.

As seen in Figure 1, the motor 34 is connected by the cable 63 to an electrical line 64 through the switch 65 mounted on the handle bar 62, and that clamping means 66 rigidly secure the valve 57 to the leg of the yoke 59 adjacent the handle bar.

To operate the machine 1 the operator actuates the switch 65 to energize the motor 34. The afore-described pulley system is thus actuated to effect the rotation of the tubular shaft 26 and the rotary cutters secured thereon. The machine 1 is then moved forwardly to cause the cutters 29 to engage and break up the coal seam, the guard 49 preventing coal lodging in the teeth thereof from being hurled therefrom under centrifugal force to the ultimate harm of the user or of persons proximate to the machine.

At desired intervals the valve 57 may be operated to spray water from the pipe 54 over the mined coal to reduce the dust content in the mine.

The gear 17 and rack 23 provide means for vertically adjusting the position of the rotary cutters 29 relative to the vein being operated upon. In swinging the rotary cutters 29 from the full line position toward the dotted line position shown in Figure 3, the wing nuts 37 are loosened to permit the bed plate 33 to be shifted forwardly to maintain the proper center line distance between the pulleys 41, 42 and 29, 30, respectively.

Having described and illustrated one embodiment of this invention in detail, it will be understood that the same is offered by way of example, and that the invention is only to be limited by the scope of the following claims.

What is claimed is:

1. A mining machine comprising a wheeled chassis, cutter support arms pivotally carried by said chassis adjacent one end thereof for movement in parallel arcuate paths about a common horizontal axis, a cutter carried by said arms on one end thereof for movement therewith, gear means carried by said chassis for rotation about a common horizontal axis lying in the same plane and spaced from said first common axis and operatively connected to the other end of said support arms to move the support arms to a selected position in its arcuate path, a motor mounted on said chassis for movement logitudinally of the chassis, driving means operatively connected between said motor and said cutter to impart rotation to said cutter, and means for securing said motor in its longitudinal path of movement at a position wherein the driving means is adjusted with respect to the spacing between the motor and the cutter when the support arms and cutter are moved to the selected position.

2. A mining machine comprising a wheeled chassis, cutter support arms pivotally carried by said chassis adjacent one end thereof for movement in parallel arcuate paths about a common horizontal axis, a cutter carried by said arms on one end thereof for movement therewith, gear means carried by said chassis for rotation about a common horizontal axis lying in the same plane and spaced from said first common axis and operatively connected to the other end of said support arms to move the support arms to a selected position in its arcuate path, a bed plate mounted on said chassis for movement longitudinally thereof, a motor carried by said bed plate for movement therewith, a driving means operatively connected between said motor and said cutter to impart rotation to said cutter, and means for securing said bed plate in its longitudinal path of movement at the position wherein the driving means is adjusted with respect to the spacing between the motor and the cutter when the support arms and cutter are moved to the selected position.

3. A mining machine comprising a wheel chassis, a pair of cutter support arms pivotally carried by said chassis on opposite sides and adjacent one end thereof for movement in parallel arcuate paths about a common horizontal axis, a cutter carried by said arms on one end thereof and extending therebetween for movement therewith, a gear segment formed on the other end of each of said arms, transversely spaced gears rotatably mounted on said chassis for rotation about a common axis longitudinally spaced from said first common axis, one of said gears being enmeshed with one of said segment gears so that upon rotation of said gears, said arms and said cutter will be moved in the arcuate path to a selected position, a bed plate mounted on said chassis for movement longitudinally thereof, a motor carried by said bed plate for movement therewith, a driving means operatively connected between said motor and said cutter to impart rotation to said cutter, and means for securing said bed plate in its longitudinal path of movement at the position wherein the driving means is adjusted with respect to the spacing between the motor and the cutter when the support arms and cutter are moved to the selected position.

References Cited in the file of this patent

UNITED STATES PATENTS

Re. 7,135	Sheldon	May 23, 1876
779,442	Richmond et al.	Jan. 10, 1905
908,928	Wood	Jan. 5, 1909
1,143,897	Flexner et al.	June 22, 1915
1,278,846	Budd	Sept. 17, 1918
1,336,440	O'Toole	Apr. 13, 1920
2,269,781	Osgood	Jan. 13, 1942