

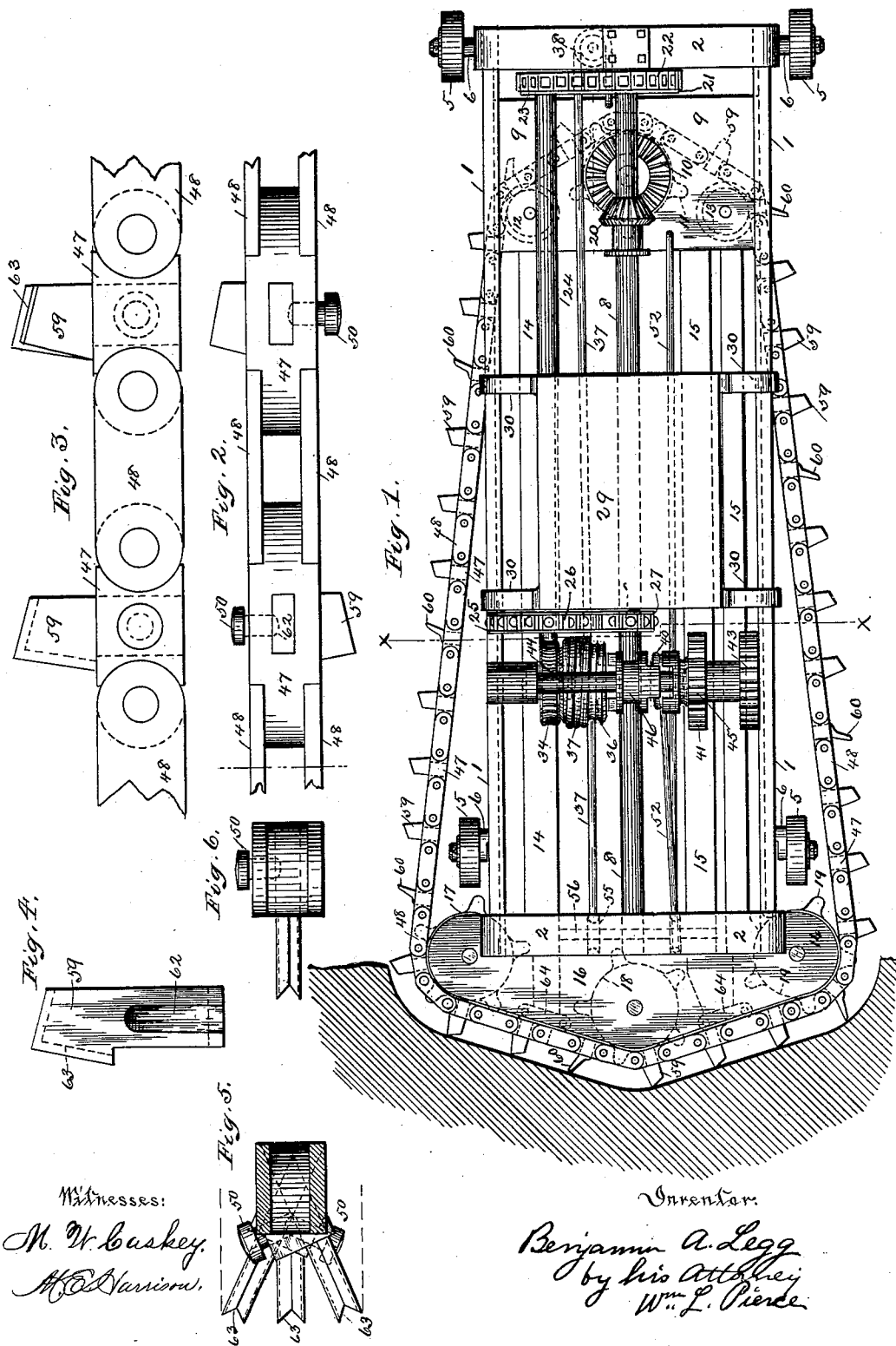
(No Model.)

3 Sheets—Sheet 1.

B. A. LEGG.
MINING MACHINE.

No. 482,046.

Patented Sept. 6, 1892.



(No Model.)

3 Sheets—Sheet 2.

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Fig. 7.

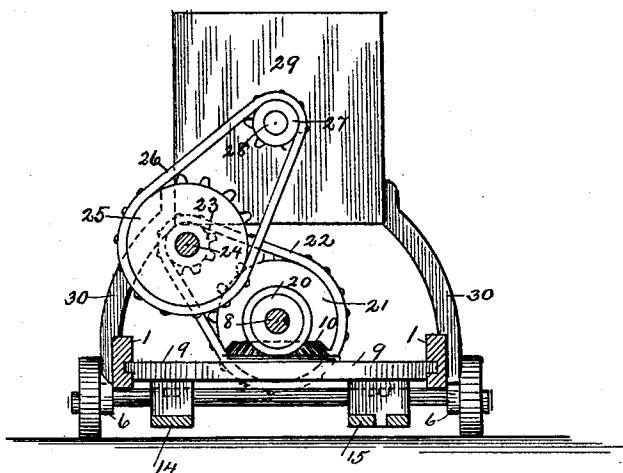
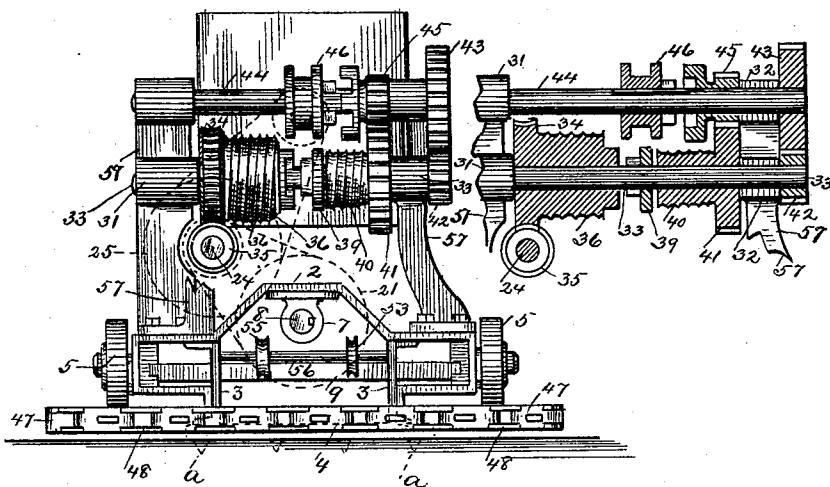


Fig. 8.

Fig. 10.



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(No Model.)

3 Sheets—Sheet 3.

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Fig. 1A.

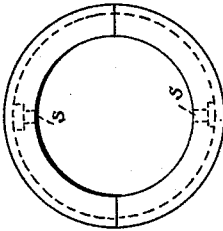


Fig. 13.

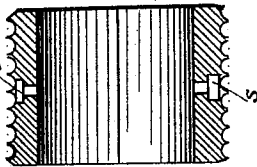


Fig. 12.

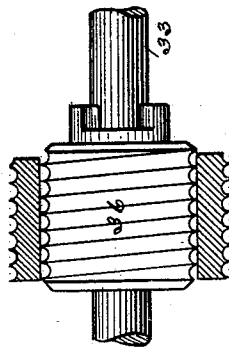


Fig. 11.

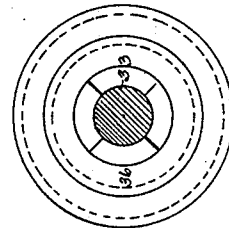
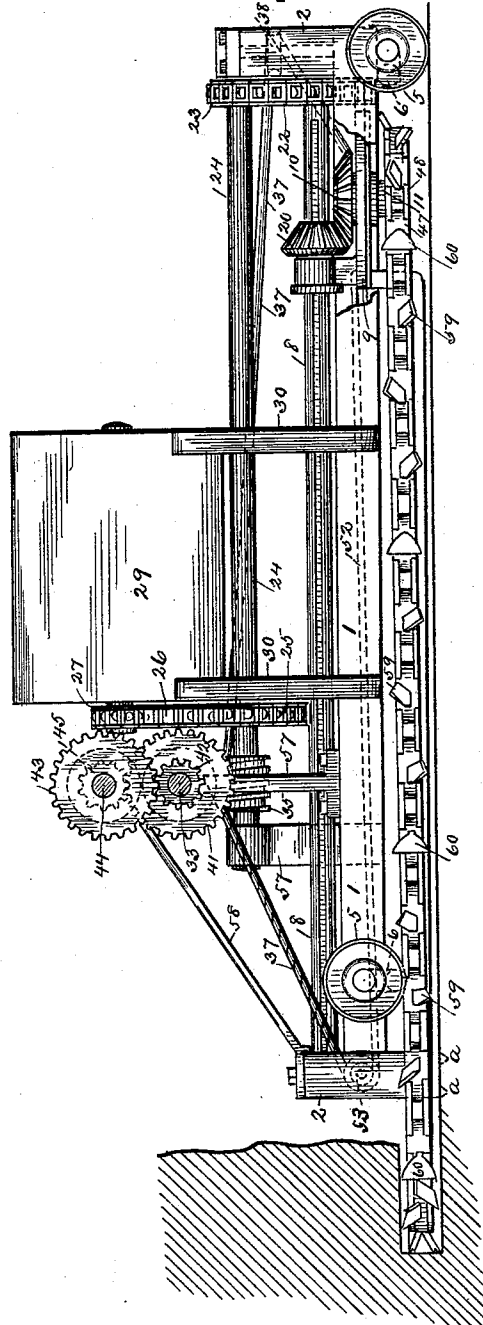


Fig. 9.



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UNITED STATES PATENT OFFICE.

BENJAMIN A. LEGG, OF ALLEGHENY, PENNSYLVANIA.

MINING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 482,046, dated September 6, 1892.

Application filed September 29, 1891. Serial No. 407,110. (No model.)

To all whom it may concern:

Be it known that I, BENJAMIN A. LEGG, a citizen of the United States, residing at Allegheny, in the county of Allegheny and State of Pennsylvania, have invented or discovered a new and useful Improvement in Mining-Machines, of which the following is a specification.

In the accompanying drawings, which make part of this specification, Figure 1 is a plan view of my machine. Fig. 2 is an edge view of a portion of the chain and cutters. Fig. 3 is a plan view of the same; Fig. 4, a detail plan view of one cutter; Fig. 5, a vertical cross-section through the casting of the chain, showing three cutters. Fig. 6 is a side view of casting and center cutter. Fig. 7 is a vertical section on line *xx* of Fig. 1. Fig. 8 is a front elevation of the machine. Fig. 9 is a side elevation of the machine. Fig. 10 is a vertical section through the shaft of the winding-drums. Fig. 11 is a section through the sleeve, drum for retracting, and shaft on which it is mounted. Fig. 12 is an elevation of the same with the sleeve in section. Fig. 13 is a section through the sleeve, and Fig. 14 is a plan of the sleeve.

My invention relates to the cutters and variable feed for reversing the carriage in chain mining-machines.

The frame of my machine consists of the two longitudinal beams 1 1, which are grooved on their inner edges lengthwise as guides for the sliding table hereinafter described.

2 is a strap at the forward end of the machine, which connects the two longitudinal beams 1 1. 3 3 are short sections of channel-bars, secured to the strap 2 and supporting the cross-plate 4, upon the underside of which are the spurs *a a* to set the machine firmly in the floor.

The four wheels 5 5 of the machine are journaled in the beams 1 1 by the crank-axes 6 6.

In the hanger 7, on the under side of the strap 2, is journaled the shaft 8, which extends longitudinally through the middle of the machine to the rear thereof.

The rear truck-frame is substantially the same as the front already described.

The sliding cutter-frame is made up of the following parts: 9 is a transverse plate hav-

ing ribs to fit in the grooves of the beams 1 1. 10 is a bevel gear-wheel secured upon a shaft extending up from said plate 9. Under said bevel-wheel 10 is a sprocket-wheel 11, fast upon the same shaft therewith. Underneath said plate are also two guide sprocket-wheels 12 and 13. Dropping downward and extending forward from said plate are the two arms 14 and 15, to the forward ends of which is secured the cross-plate 16, having journaled on its under side the three sprocket-wheels 17, 18, and 19. The shaft 8 is grooved lengthwise to permit of the longitudinal travel thereon of the bevel-wheel 20. The shaft 8 is driven by the sprocket-wheel 21, chain 22, sprocket-wheel 23 on the counter-shaft 24, sprocket-wheel 25 on the forward end of said shaft 24, chain 26, and sprocket-wheel 27 on shaft of motor 29, secured by straps 30 30 to the beams 1 1 and at the middle point of the length of said beams.

The winding-drums and their connections will now be described. 31 32 are the bearings for the shaft 33. (Best seen in Figs. 7 and 8.) Looking in at the front of the machine on the left-hand end of said shaft is a worm-wheel 34, engaging the worm 35 on shaft 24. 57 57 are stands for the journals of said shafts 24 and 33, and 58 58 braces for said stands. Attached to said worm-wheel is the retracting-drum 36, both wheel and drum being loose on the shaft. The rope 37, as seen in Fig. 1, after being wrapped around the drum 36, passes around the sheave 55 on the shaft 56, and after being wrapped to the rear of the machine around the horizontal sheave 38, journaled on a vertical shaft secured to rear strap 2, and thence passes down and forward, when it is attached to the rear of the plate 9. Returning now to the shaft 33, 39 is a clutch thereon; 40, a loose advancing drum thereon, secured to which is the gear-wheel 41, also loose on the shaft. At the right-hand end of said shaft is the gear-wheel 42, fast on the shaft, meshing into the gear-wheel 43, fastened on a counter-shaft 44. 45 is a loose gear-wheel on the shaft 44, meshing into the gear-wheel 41, and 46 a clutch. It is apparent that by shifting the two clutches either drum may be made to revolve, and the direction of their pull is rendered opposite by the two gears 42 and 43. On the drum 40 is wound the rope

52, one end being secured to said drum. The other end passes forward around the sheave 53 and back to the forward end of the plate 9. It is apparent, therefore, that as the two drums 36 and 40 normally revolve in opposite directions by reason of the interposition of the gears 42 43 the carriage can be advanced and retracted without reversing the motor—viz., by simply shifting the friction-clutches so as to bring into action either drum, as desired. A slow speed is thus obtained for moving the carriage, which is shifted back and forward with much less friction than by the use of a rack and pinion. If it is desired to increase the diameter of the drum 36 to get an increased speed, an extra sleeve made in two parts, as seen in Figs. 11 to 13, is slipped around said drum and secured thereto by set-screws S S.

My chain and cutters are best seen in Figs. 2 to 6. The chain consists of alternate block-links 47 47 and open links 48 48. On the block-links are set the cutters 59 59 and scrapers 60 60.

In Fig. 1 I have shown only top and bottom cutters with the scrapers; but I propose to also use a center cutter, as seen in Figs. 5 and 6. The top and bottom cutters are set in the blocks at an angle so as to throw their cutting-faces apart and make a wide kerf. The center cutters are set in straight and are designed to break down the rib of coal left between the top and bottom cutters. The cutters are secured to the blocks by set-screws 50 50, which clamp the body of the cutter in the groove 62. When the cutter becomes worn, it can be protruded and the set-screw still fall in the groove 62. The cutting-faces of all the cutters are made with a V-shaped groove 63 and are also beveled along their edges from their face to the heel to make a cutting-edge. The V-shaped groove facilitates dressing the cutters. The most important feature in the cutters, however, is that the cutting-edge 63 is sloped back in a direction opposite to that of the movement of the chain. The effect of this shape is that if there is any slack in the chain at the rear of the cutter said slack is rather held back than drawn forward into the kerf in the coal. This effectually prevents the chain being dragged into and locked in the kerf of the coal, a consideration which will be duly appreciated by those familiar with coal-mining.

Prior machines, as far as I am aware, have required guides for the chain along the whole front of the machine to prevent the locking of the chain. This greatly increased the amount of friction in driving the machine, which I almost entirely obviate. Besides the sprocket-wheels there is no guide for the chain

at the front of the machine except the two feet 64 64. The scrapers 60 60 usually alternate with the sets of the cutters.

The operation of the machine is as follows: After being rolled into a room on its wheels, as can be readily done, as its weight is centered at the middle, the eccentrically-mounted wheels are turned so as to drop the entire machine and the machine is firmly set by the spurs in the floor. The motor, which is preferably an electric one, being started, the carriage is fed forward by the action of the drum 40 until the cutters touch the surface of the coal. The cutter-chain is then set in motion, as described above. Since the motor is on the stationary frame of the machine, an under cut of five or six feet can be obtained with a machine only seven and one-half feet long, while if the motor were on the traveling frame the machine to secure the above results would be eight and one-half to nine feet long. After the cut is finished the spurs can be lifted from the floor by inserting a pinch-bar under the frame and shaking it. The same result can also be accomplished by turning the crank-axles on which the wheels are mounted; but this consumes unnecessary time. The machine, after the spurs are loosened, is levered along laterally by a bar. As in most coal-mines, props must be set near the breast to support the roof. The importance of having a short machine is obvious.

Having described my invention, I claim—

1. In a mining-machine, the combination of a winding-drum, a removable sleeve adapted to be secured to said drum for the purpose of varying the feed, devices for driving said drum, a rope wound on said drum and connected with a movable carriage, and said carriage movable on a stationary frame, substantially as set forth.

2. In a mining-machine, a cutter having a V-shaped groove on its cutting-edge, said edge being sloped back from the shank to the end of said cutter in a direction reversely inclined to the movement of the chain, substantially as set forth.

3. In a mining-machine, a cutter having a V-shaped groove on its end and its cutting-edge sloped back from the shank to the end of said cutter in a direction reversely inclined to the movement of the chain, substantially as set forth.

In testimony whereof I have hereunto set my hand this 23d day of September, A. D. 1891.

BENJAMIN A. LEGG.

Witnesses:

WILLIAM BEAL,
WM. L. PIERCE.