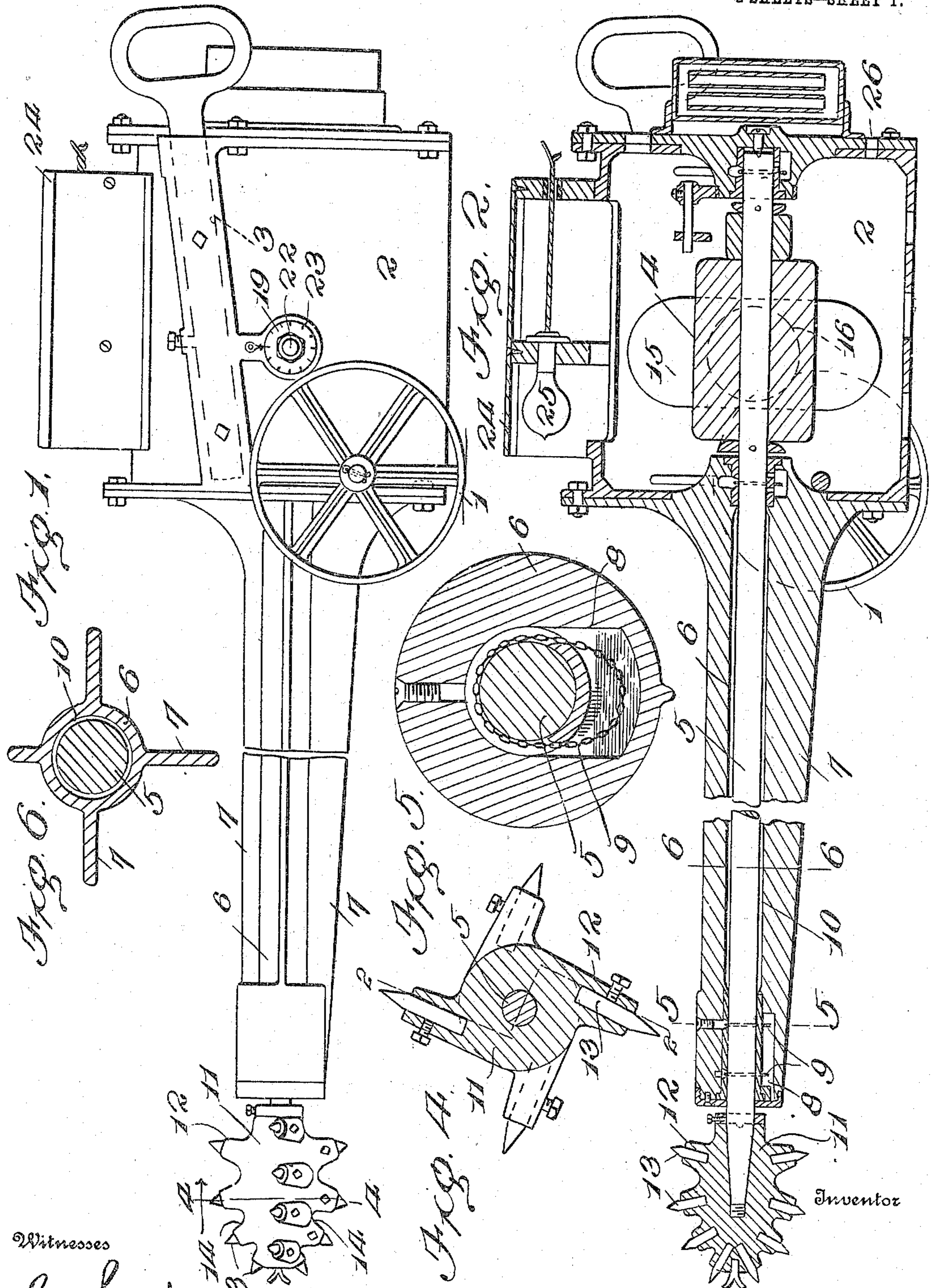


J. C. HIRST.
MINING MACHINE.
APPLICATION FILED AUG. 13, 1908.

957,957.

Patented May 17, 1910.

2 SHEETS—SHEET 1.



Witnesses

John C. Hirst
W. D. Woodson

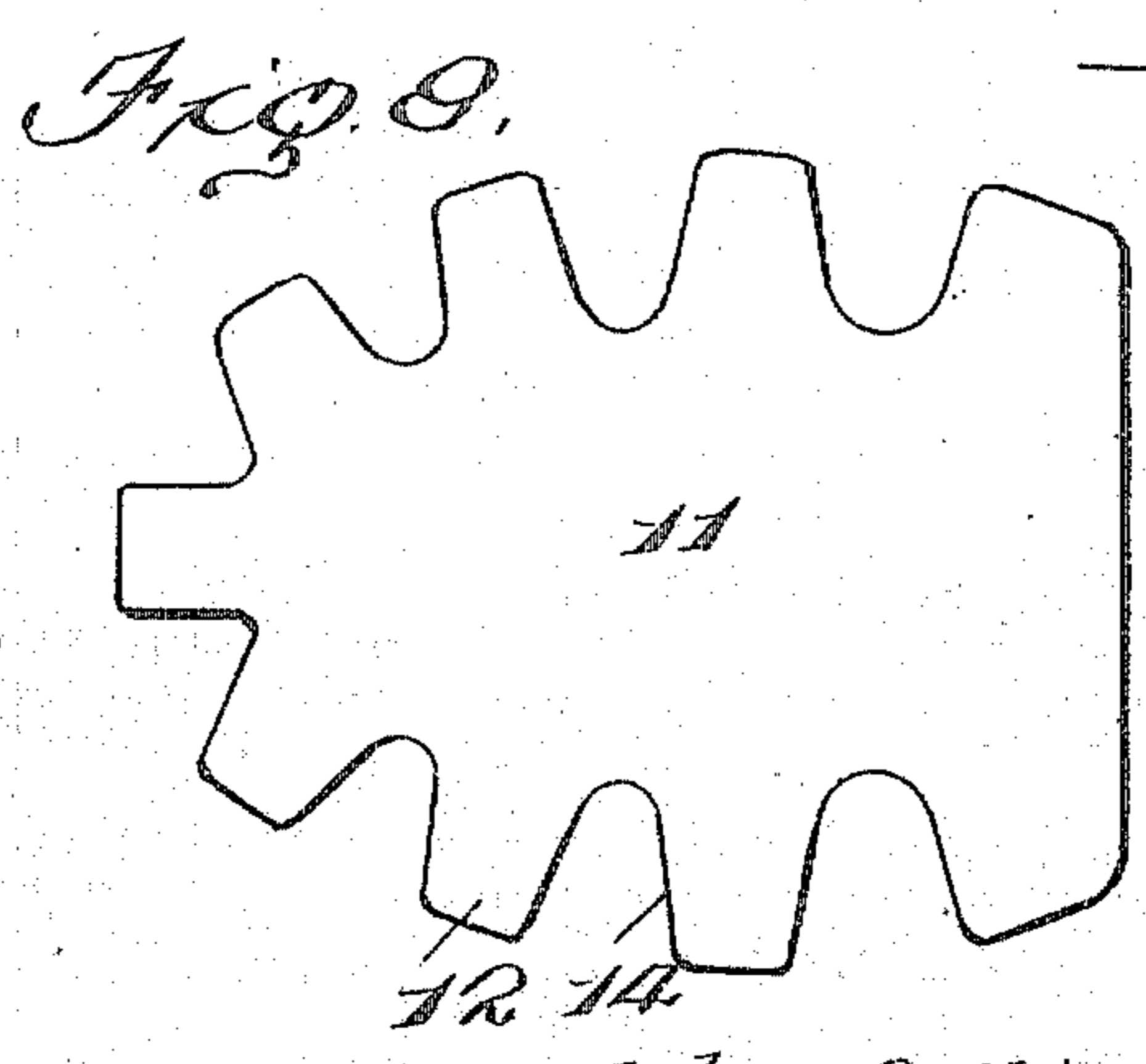
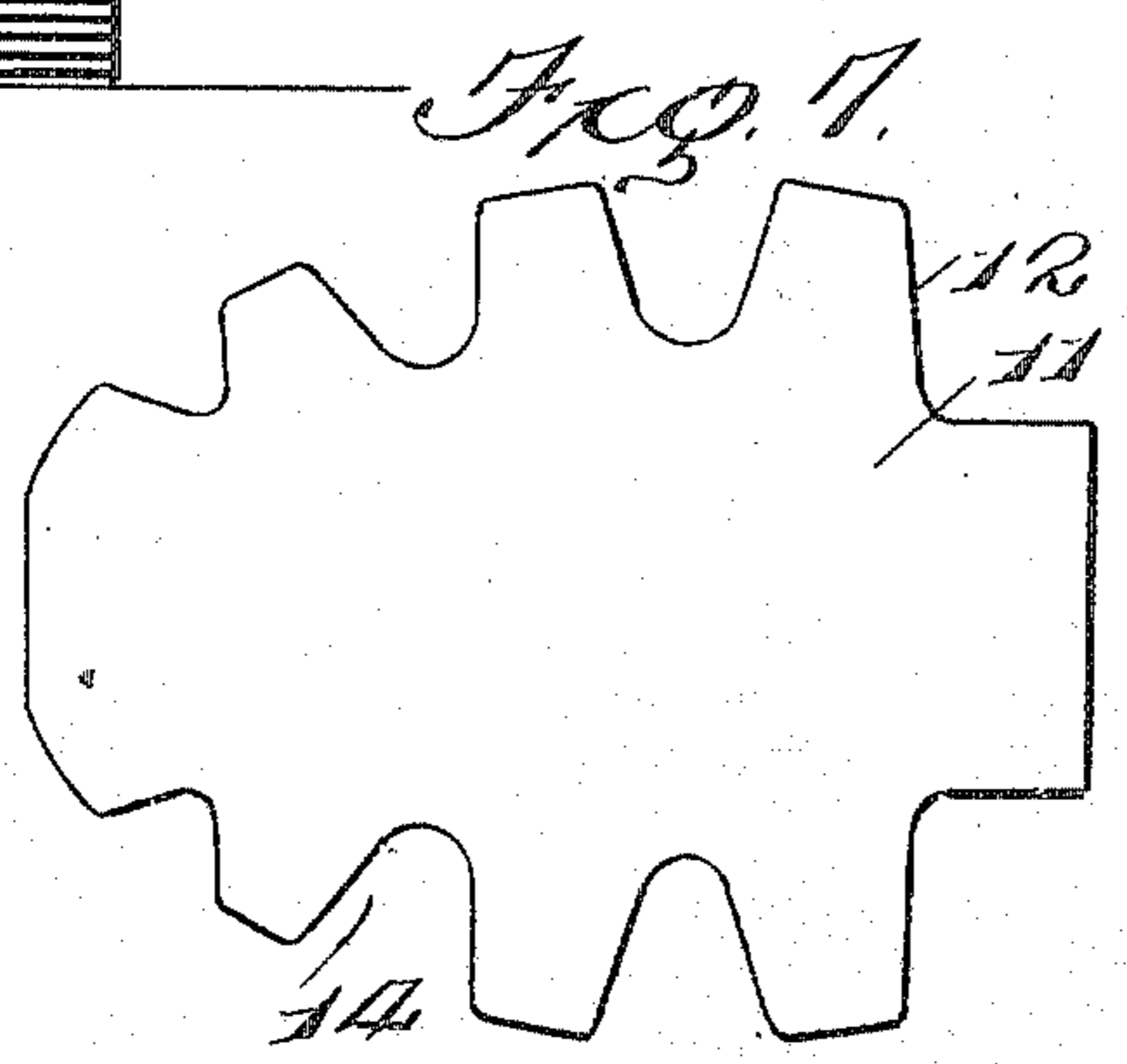
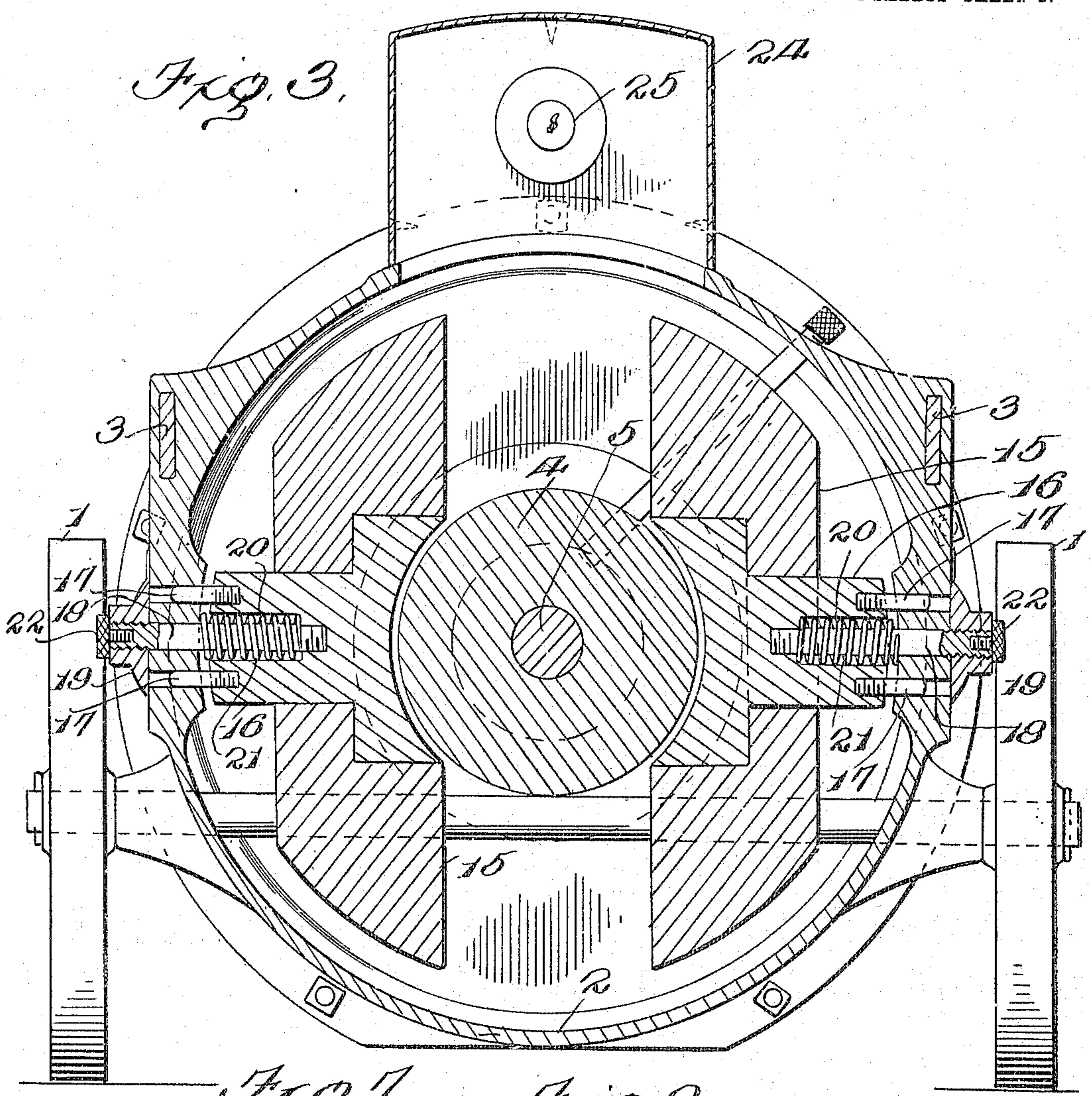
By

John C. Hirst
W. D. Woodson Attorneys

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Witnesses
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UNITED STATES PATENT OFFICE.

JOHN C. HIRST, OF REYNOLDSVILLE, PENNSYLVANIA.

MINING-MACHINE.

957,957.

Specification of Letters Patent.

Patented May 17, 1910.

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To all whom it may concern:

Be it known that I, JOHN C. HIRST, a citizen of the United States, residing at Reynoldsville, in the county of Jefferson and State of Pennsylvania, have invented certain new and useful Improvements in Mining-Machines, of which the following is a specification.

This invention comprehends certain new and useful improvements in machines for mining coal, and the invention has for its primary object an improved construction of electrically actuated rotary mining machine which will be effective in operation to cut into the coal with a minimum of dust or slack, the invention embodying for this purpose, an improved construction and arrangement of cutter head and pick points carried thereby. And a further object of the invention, is a coal mining machine embodying comparatively few and simple parts that may be easily manufactured and readily assembled, and which will be durable as well as efficient in operation.

With these and other objects in view as will more fully appear as the description proceeds, the invention consists in certain constructions, arrangements and combinations of the parts that I shall hereinafter fully describe and claim.

For a full understanding of the invention, reference is to be had to the following description and accompanying drawings in which:

Figure 1 is a side elevation of a coal mining machine embodying the improvements of my invention; Fig. 2 is a longitudinal sectional view thereof, the section through the cutter head being taken on the line 2—2 of Fig. 4; Fig. 3 (Sheet 2) is an enlarged transverse sectional view, the section being taken through the motor casing and the pole pieces of the motor. Fig. 4 is a transverse sectional view on an enlarged scale, of the cutter head, the section being taken on the line 4—4 of Fig. 1. Fig. 5 is a similar view on the line 5—5 of Fig. 2; Fig. 6 is a transverse sectional view on the line 6—6 of Fig. 2; and, Figs. 7 and 8 are diagrammatic views of the cutter head.

My improved coal mining machine is arranged to be moved from place to place on ground or traveling wheels 1 that are journaled in any desired way on opposite sides of a motor casing 2, said wheels being pref-

erably so positioned as to properly balance the machine.

3 designates handle shanks that are mounted for adjustment in the opposite side walls of the casing 2, set screws, as best illustrated in Fig. 1, being employed to hold these extensible handles in different extended positions, according to the leverage which it is desired that these handles shall possess.

The casing 2 contains a motor of which 4 designates the armature mounted upon the longitudinally extending shaft 5. This shaft 5 projects forwardly from the motor casing 2 and is journaled in suitable bearings mounted in the front and rear ends of a bearing sleeve 6 bolted or otherwise secured to the front end of the casing as shown, and preferably embodying a series of longitudinally extending radially projecting ribs or webs 7 serving to strengthen said bearing sleeve. The bearings for the ends of the shaft 5 at the front and rear ends of the sleeve 6 and at the rear end of the motor casing are all constructed substantially as illustrated in detail in Fig. 5. That is to say, they each contain an oil chamber 8 and one or more feed chains 9 encircling the shaft as illustrated in said view; filling plugs and drain plugs of any desired character may be used, but as my invention is not limited to any exact construction of these parts, I need not further refer to them. The interior of the sleeve 6 is of larger diameter than the shaft 5 from the bearing at the inner end of the sleeve to the bearing at the outer end of the sleeve, whereby to form an elongated oil chamber 10 for lubricating the shaft throughout the major portion of its length.

The outer end of the shaft 5 carries a bulbous cutter head 11 which is secured thereto in any desired way, and which is, taken as a whole, in the shape of an ovate spheroid with a plurality of peripheral protuberant sockets 12 in which pick points 13 are held by set screws or similar fastening devices, so that any of the cutters may be removed if broken and others substituted therefor.

It is to be particularly noted as best illustrated in Figs. 1, 4, that the sockets 12 and pick points 13 are tangentially disposed with respect to the cutter head and arranged on straight lines facing in the direction in

which the shaft is intended to turn; and that the cutters are arranged in staggered relation to each other, the cutters of one longitudinally extending set being located in transverse alinement with the recesses 14 formed between the cutters of the two adjacent sets, this arrangement being clearly indicated in Figs. 1, 7, and 8. By this arrangement, it will be seen that my improved cutter head and pick points possess distinct advantages in that the pick points 13 will effectually dig into the coal by a direct thrust coincident with their length, in the rotary movement of the shaft 5 whereby a much more effective cut is assured; and it will also be manifest that less dust and slack will be formed by this arrangement than would be formed were the cutters to be formed with chisel points and radially disposed with relation to the cutter head, in which event a grinding action on the coal would be effected.

Attention is here called to the fact that by providing the machine with a bulbous cutter head of substantially ovate spheroidal shape with the cutters or pick points thereof tangentially disposed on straight lines, when the machine is swung laterally in the arc of a circle with the ground wheels as the pivotal axis, the active ends of the pick points will successively engage the work and cut a kerf or channel in the bed of coal, the rotary movement of the head at the same time causing the pick points or cutters to dig into the coal by a direct thrust, as before stated.

To those versed in the art to which this invention appertains, it is well known that some grades of coal should be worked at a much lower speed than others.

In order to accomplish the regulation of the speed of the shaft 5, I have provided, as best illustrated in Fig. 3, adjusting means for the pole pieces 15 of the motor. Each of these pole pieces is formed with a boss 16 carrying guiding pins 17 which work in openings in the side walls of the casing 2, and spindles 18 are secured to the respective pole pieces and extend outwardly through the side walls of the casing, the outwardly projecting ends of said spindles being threaded to receive adjusting nuts 19 which work thereon. Springs 20 are coiled around the respective spindles and are located within chambers 21 in the respective bosses 16 of the pole pieces 15, the springs exerting an expanding force so as to press the pole pieces inwardly as clearly illustrated in the drawings. The adjusting nuts 19 are intended to act to draw the pole pieces away from the armature 4, it being evident that by thus carrying the pole pieces away from the armature, the electro-motive force of the motor is reduced. The inward movement of the pole pieces which is accomplished by loosening up the adjusting nuts 19 is limited by

means of nuts 22 screwed on the outer ends of the respective spindles 18 and against these nuts, the adjusting nuts 19 are adapted to abut, when this inward limit of the movement of the pole pieces has been reached. It will thus be seen that my adjustment provides effective means whereby the speed of the shaft 5 may be varied and controlled, the number of revolutions of the shaft per minute according to the adjustment effected by the adjusting nuts 19 being determined on said nuts by graduations as indicated at 23 in Fig. 1.

24 designates a lamp casing which extends forwardly as shown and which surmounts the motor casing 2, said lamp casing 24 containing an incandescent lamp bulb 25 which may receive its current from any suitable source of supply; so that the operator may have the rays of the lamp directly upon his work. Preferably the lamp receives its current directly from the leads or supply wires of the rheostat or starting resistance device so that the lamp circuit will not be broken or open when the motor is stopped, the light burning continuously and being, at all times available for the operator, not only in the actual work of mining, but when he is oiling or adjusting any parts of the machine, or moving it from place to place.

Having thus described the invention, what is claimed as new is:

1. A mining machine including a wheeled truck, an operating shaft mounted for rotation on the truck and a bulbous cutter head secured to the operating shaft and provided with a circumferential series of tangentially disposed cutters adapted to successively engage the work as the shaft is swung laterally in the arc of a circle with the truck wheels as a pivot.

2. A mining machine including a wheeled truck, an operating shaft mounted for rotation on the truck and a bulbous cutter head secured to the operating shaft and provided with a series of peripheral tangentially disposed cutters arranged in staggered relation, the active ends of the cutters being adapted to successively engage the work as the shaft is swung laterally in the arc of a circle with the truck wheels as a pivot.

3. A mining machine including a wheeled truck, an operating shaft mounted for rotation on the truck and a cutter head mounted for rotation with the shaft and provided with a circumferential series of tangentially disposed cutters arranged on straight lines and adapted to successively engage the work as the shaft is swung laterally in the arc of a circle with the truck wheels as a pivot.

4. A mining machine including a wheeled truck, an operating shaft mounted for rotation on the truck and a cutter head of substantially ovate spheroidal shape mounted for rotation with the operating shaft and

provided with a peripheral series of tangentially disposed cutters arranged in staggered relation, the active ends of the cutters being adapted to successively engage the work as the shaft is swung laterally in the arc of a circle with the truck wheels as a pivot.

5 5. A mining machine including a wheeled truck, an operating shaft mounted for rotation on the truck and a bulbous cutter head
10 mounted for rotation with the shaft and provided with a series of peripheral tangentially disposed pick points arranged on straight lines and adapted to successively engage the work as the shaft is swung laterally in the arc of a circle with the truck
15 wheels as a pivot, the active ends of the pick points being disposed on lines conforming to the shape of the head.

20 6. A mining machine including a wheeled truck, an operating shaft mounted for rotation on the truck, a bulbous cutter head secured to the operating shaft and provided with a series of peripheral protuberant sockets and cutters detachably mounted in
25 said sockets, said cutters being tangentially disposed on straight lines and adapted to

successively engage the work as the shaft is swung laterally in the arc of a circle with the truck wheels as a pivot.

7. A mining machine including a wheeled 30 truck, an operating shaft mounted for rotation on the truck, a substantially ovate spheroidal shaped cutter head mounted for rotation with the shaft and provided with a series of circumferential tangentially dis- 35 posed protuberant sockets arranged on straight lines, cutters adjustably mounted in the sockets and having their active ends disposed on lines conforming to the shape of the head and clamping devices piercing 40 the walls of the sockets and engaging the cutters for retaining the latter within said sockets, the active ends of the cutters being adapted to successively engage the work as the shaft is swung laterally in the arc of a 45 circle with the truck wheels as a pivot.

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

JOHN C. HIRST. [L. s.]

Witnesses:

W. N. WOODSON,
FREDERICK S. STITT.