

(No Model.)

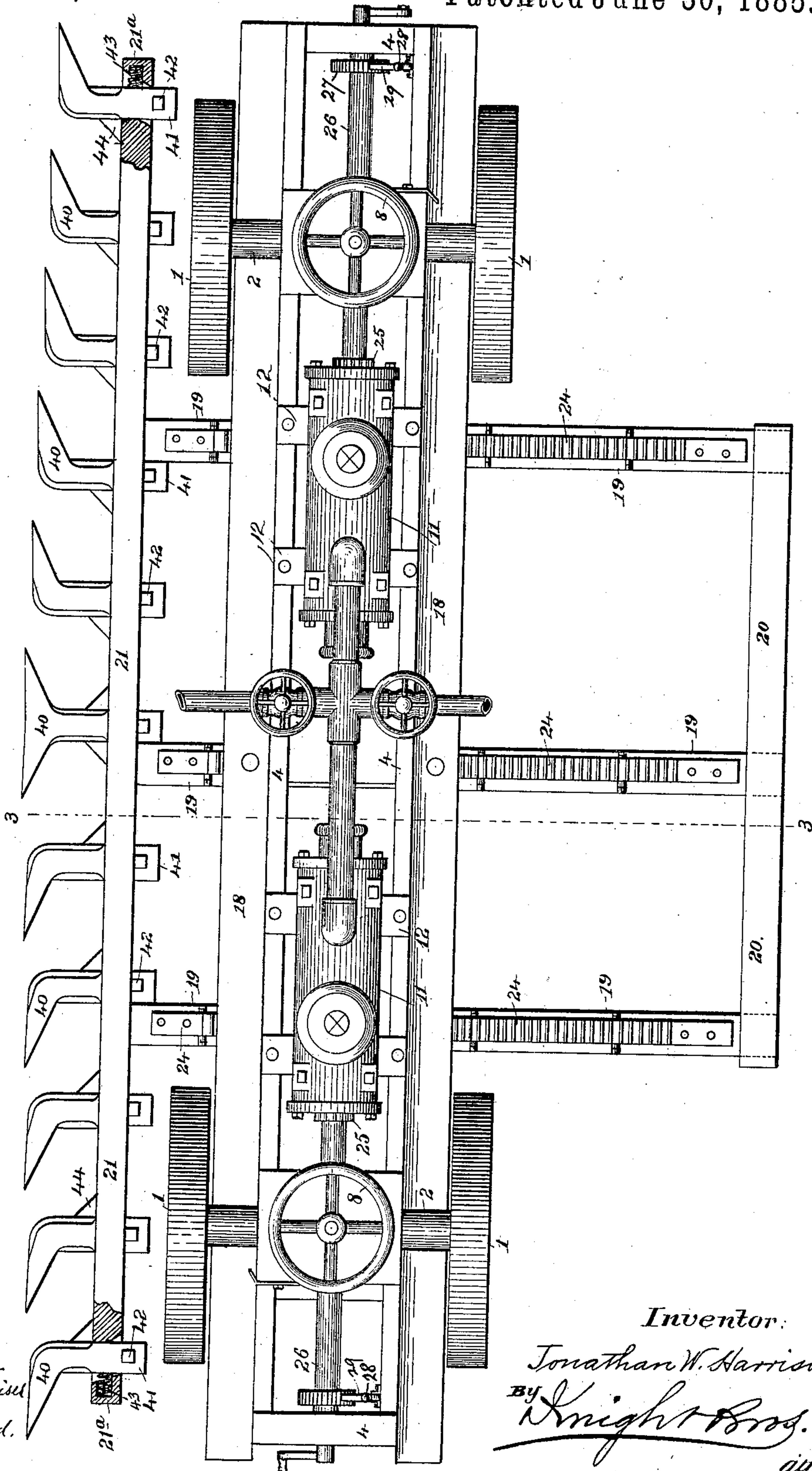
3 Sheets—Sheet 1.

J. W. HARRISON.  
COAL MINING MACHINE.

No. 321,103.

Patented June 30, 1885.

Fig. 1.



Attest:  
J. Henry Kaiser  
Geo. P. Smallwood.

Inventor:  
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attys.

(No Model.)

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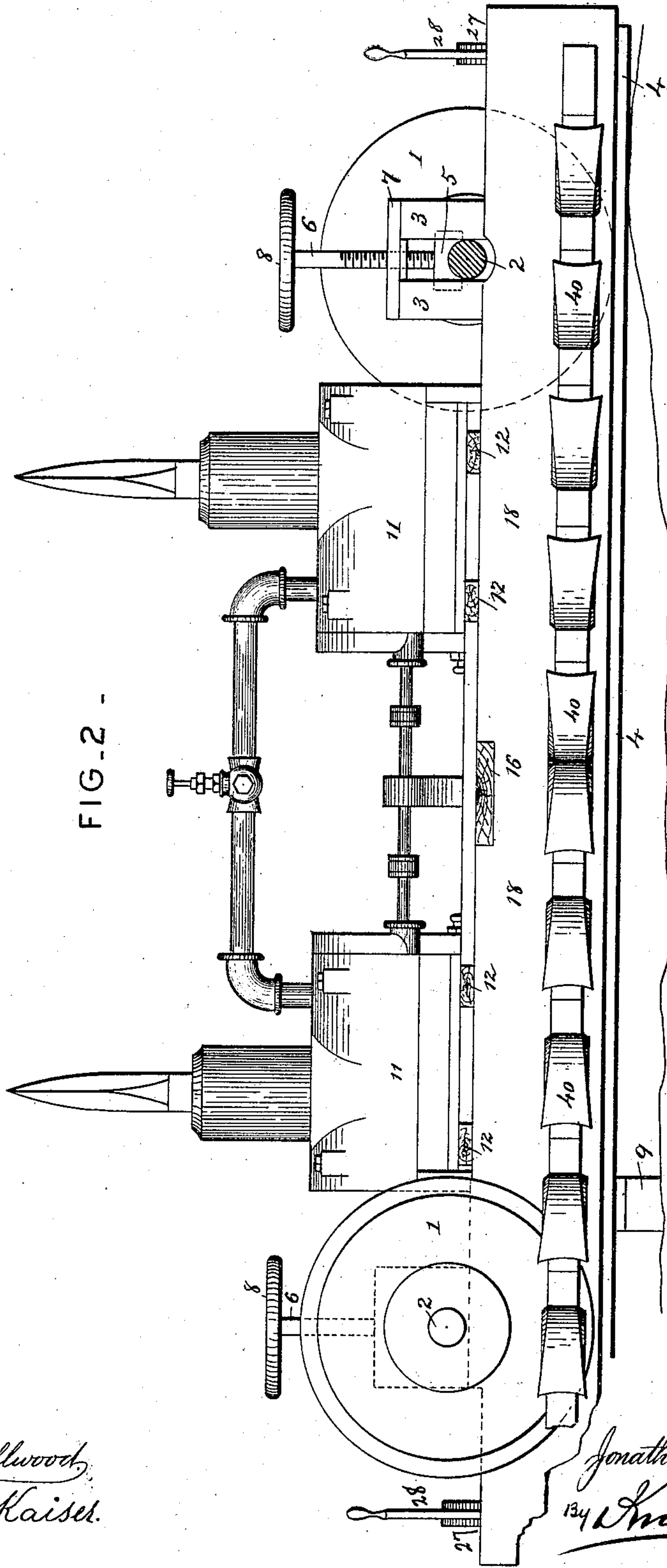


FIG. 2 -

ATTEST-  
*Geo. T. Smallwood,*  
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(No Model.)

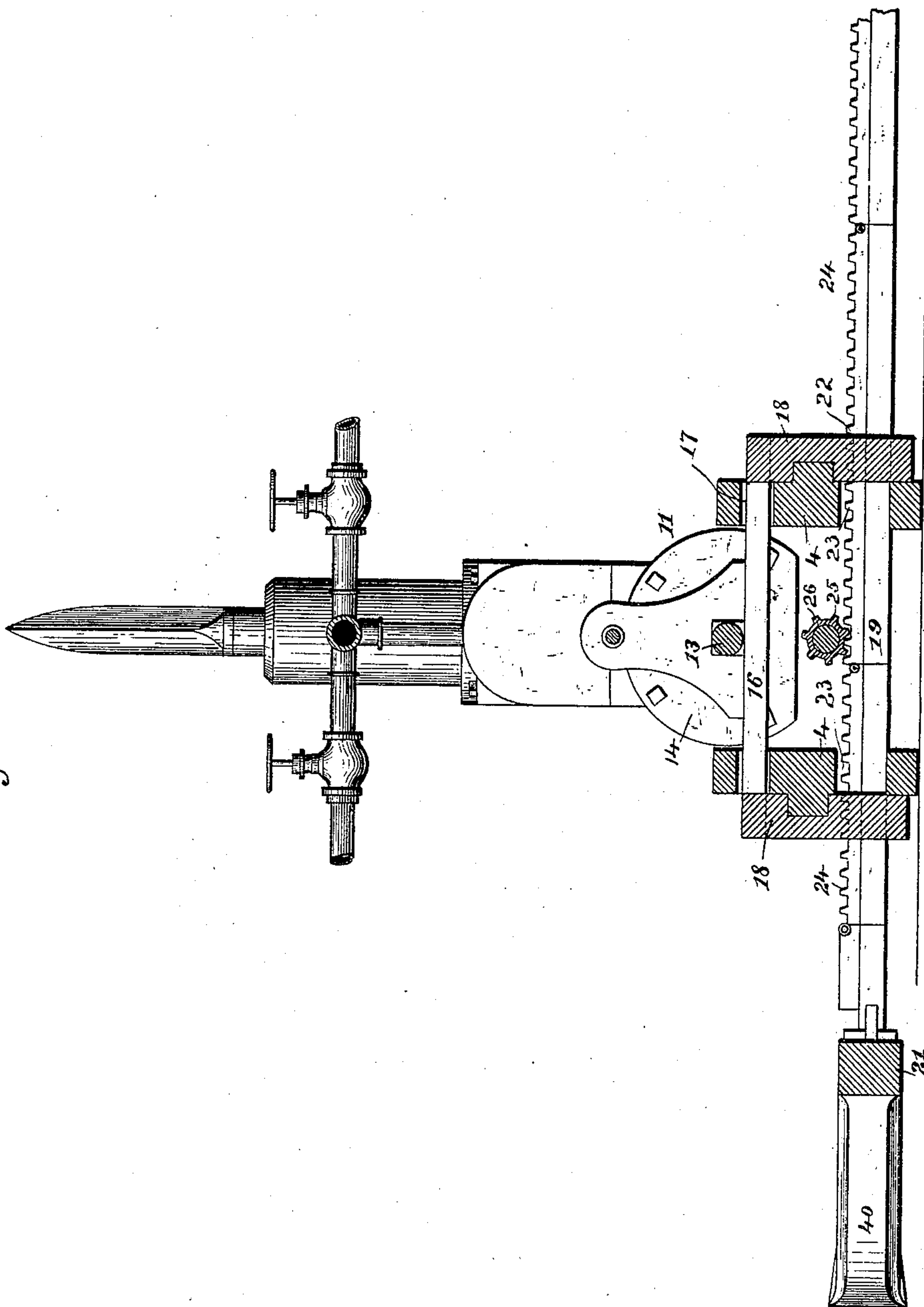
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Fig. 3.



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J. Henry Kaiser.  
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# UNITED STATES PATENT OFFICE.

JONATHAN W. HARRISON, OF YPSILANTI, ASSIGNOR OF ONE-HALF TO  
CHARLES R. MILLER, OF ADRIAN, MICHIGAN.

## COAL-MINING MACHINE.

SPECIFICATION forming part of Letters Patent No. 321,103, dated June 30, 1885.

Application filed August 31, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, JONATHAN W. HARRISON, a citizen of the United States, residing at Ypsilanti, in the county of Washtenaw and State of Michigan, have invented certain new and useful Improvements in Coal-Mining Machines, of which the following is a specification.

My invention relates particularly to mining-machines especially adapted for undercutting, but is in part applicable to different classes of such machines.

My invention consists, first, in articulating the cutter-frame, so as to adapt it to be folded up in a vertical plane, for convenience in passing posts and other obstructions, and, secondly, in the manner (which will be hereinafter fully described, and particularly pointed out in the claims) of securing the teeth to the cutter-bar, whereby they are allowed a limited movement independently thereof.

In order that my invention may be more fully understood, I will proceed to describe it with reference to the accompanying drawings, in which—

Figure 1 is a plan view of my improved mining-machine. Fig. 2 is a side elevation thereof. Fig. 3 is a vertical sectional view on the line 3 3, Fig. 1.

1 are the supporting-wheels of the machine, which are journaled on or keyed to axles 2. Said axles have bearing between guides 3, in such manner as to allow vertical adjustment of said guides, and, consequently, of the main frame 4 of the machine, to which frame the said guides are rigidly fixed. Such vertical adjustment is effected by means of hand-wheels 8 on the ends of screws 6, which pass through the cross-heads 7, and bear in suitable sockets on the pillow-blocks 5, resting on the axles 2. The cross-heads 7 are firmly bolted to the tops of guides 3. By the turning of the hand-wheels 8 at both ends of the machine the frame may be lowered onto the ground when the machine is to be operated, or it may be hung on the axles 2 when it is to be moved from place to place. Unevenness of ground of the roadway is compensated for by using a movable track made of detachable sections hinged together, and when at work the steadiness of the

machine is increased by placing an iron bolster under its lower end. Such a bolster is shown at 9 in Fig. 2.

Upon the frame 4 are hung the engine or engines for actuating the cutting or channeling tools, the said tools themselves, and the mechanism for transmitting motion from the engine to the cutters.

I have shown in the drawings a pair of engines, 11 11, arranged in line, and supported by bolsters 12 from the frame 4. The piston-rod 13 is common to both cylinders 11, within the heads 14 of which it is packed in suitable manner. The preferred form of engines employed for this purpose is that shown in my contemporaneous application for Letters Patent No. 76,747, filed November 14, 1882, to which reference may be had for more particular description of and claims to this portion of my invention.

To the middle of piston-rod 13 is immovably attached a cross-head, 16, the ends of which extend through slots 17 in the sides of the frame 4, and are there bolted to the slides 18, which, with the cross-head 16, form the reciprocating frame of the machine. Longitudinal grooves on the slides 18 receive corresponding longitudinal tongues on the frame 4, the reciprocating frame being thus adapted to be thrown with the piston from end to end of the machine, carrying with it the cutting mechanism, which is hung thereon in the manner now to be described. Transverse bars 19, forming, with the longitudinal bars 20 21, a frame, pass loosely through holes 22 in the slides 18. In the sides of the frame 4 are formed slots 23 to allow free motion to the bars 19 as they are moved longitudinally of the machine with the slides 18. Each bar 19 is formed in three pieces, hinged together as shown, to allow of the cutter-frame being raised at either side of the machine when it is desired to pass a post or other obstruction. Upon the upper side of the bars 19 are cog-racks 24, by means of which the frame 19 20 21 is fed forward to its work. An elongated cylinder, 25, carried by shaft 26, which runs longitudinally of the machine, and has bearings in the ends of frame 4, has corrugations or teeth of a pitch equal to those on racks 24. A ratchet-wheel, 27, keyed on the



shaft 26, is actuated to revolve the cylinder 25, and through it feed forward the frame 19 20 21. The hand-lever 28, bearing spring-pawl 29, may be used to effect this feeding motion, 5 or it may be effected automatically by the reciprocating action of the engine, in the manner described in my contemporaneous application for Letters Patent before referred to. The cutter-bar 21 is carried, as before stated, 10 by the feed-frame 19 20, and may be placed on either end of said frame, according to the desired direction of cut—that is to say, the frame 19 20 21 may be so turned that the positions of the bars 20 and 21, as here shown, 15 may be reversed; or the direction of cut may be reversed by simply changing the cutter-bar 21 end for end. In practice a number of cutter-bars will be furnished bearing teeth of different grades for different kinds of cutting. 20 The cutter-bar is composed of a series of teeth, 40, inserted removably within the bar 21 by means of tongue and key 41. Abutments 44 on the rear sides of the shank of each tooth brace the said teeth and serve as stops to prevent them from being forced through the cutter-bar. The cutter-bar is recessed at 21<sup>a</sup> to 25 receive the teeth 40, and springs 43 are placed within said recesses adapted to bear on the shanks of the teeth, so as to permit a slight movement to said teeth on the return-stroke 30 of the cutter-bar, and throw them out in position for cutting on the forward stroke of the bar. The teeth of the cutter-bar are arranged

as shown—the longest at the center, and decreasing regularly in size thence toward each end. 35 The teeth on different ends of the bar are turned in opposite directions, so as to permit them to cut in both directions of stroke. On a large machine, with a cutter-bar having twelve teeth, they will be set eight inches apart, 40 and with a stroke of twelve inches the cutter-bar will have four inches to “set over” in when making its backward stroke, each succeeding tooth following in the wake of and removing the shoulder left by the one before it. 45

Having thus described my invention, the following is what I claim as new therein and desire to secure by Letters Patent:

1. In a coal-mining machine, the combination, with a stationary frame and a reciprocating frame supported and guided thereon, of a cutter-frame supported by said reciprocating frame and sliding transversely thereof, said cutter-frame being articulated so as to fold up in a vertical plane, in the manner and for the 55 purpose set forth.

2. In a mining-machine, the combination of cutter-bar 21, having a series of recesses, 23<sup>a</sup>, a series of teeth, 40, supported in the bar 21, and springs 43, for maintaining said teeth in 60 upright position.

JONATHAN W. HARRISON.

Witnesses:

THOMAS NINDE,  
CHARLES R. PATTISON.