

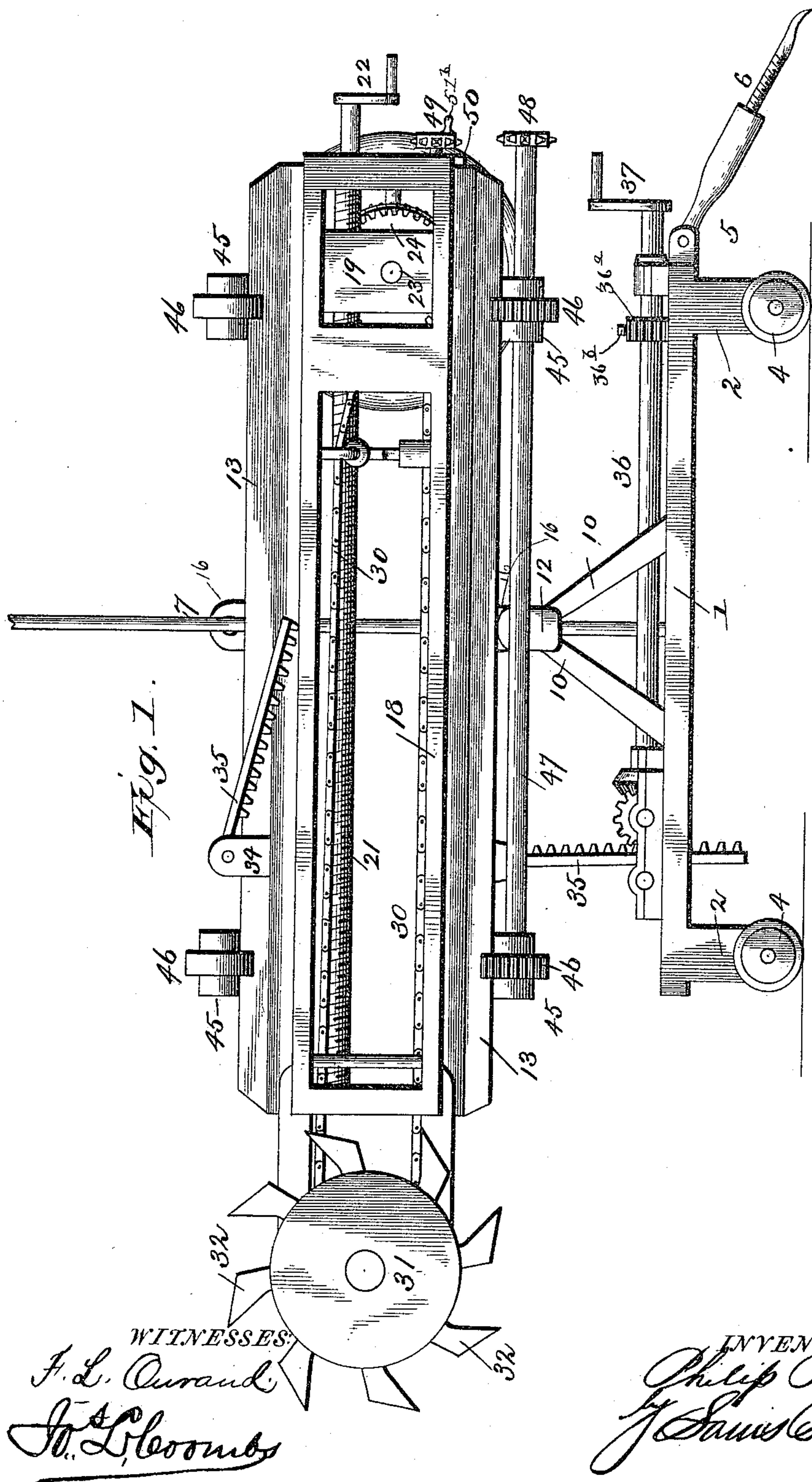
(No Model.)

5 Sheets—Sheet 1

P. RICHARDS.
COAL CUTTING MACHINE.

No. 438,446.

Patented Oct. 14, 1890.



THE MORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

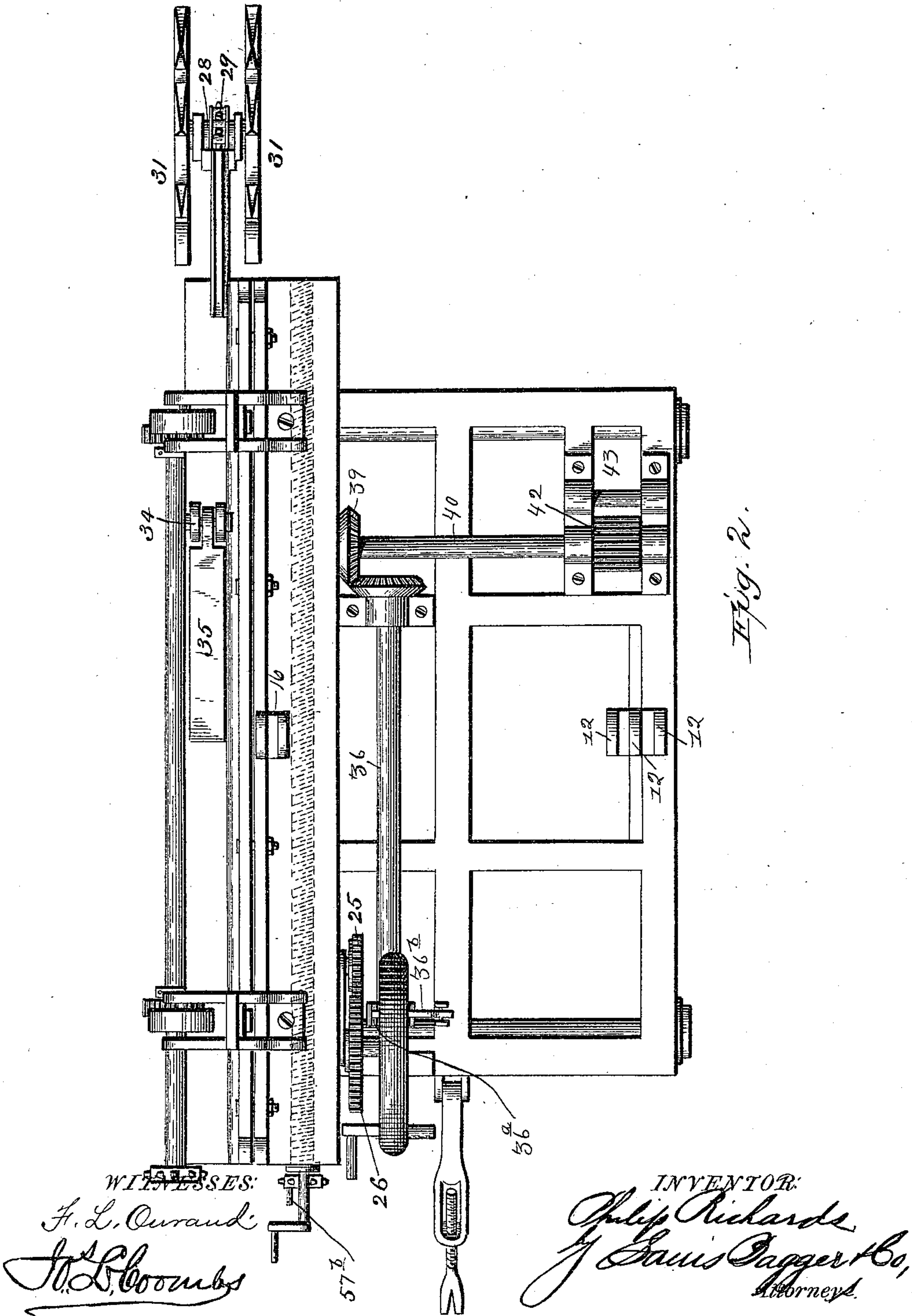
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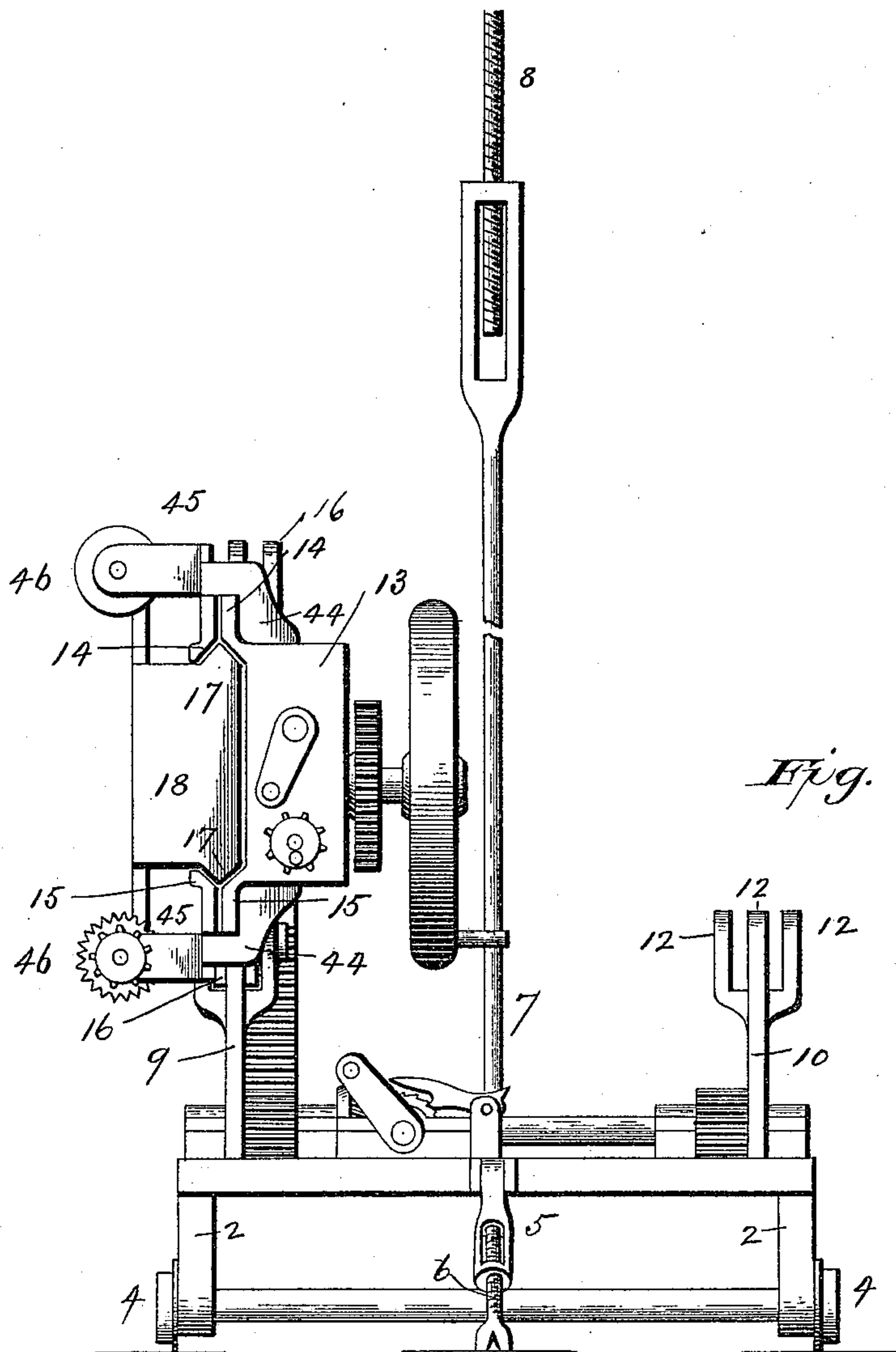


Fig. 3.

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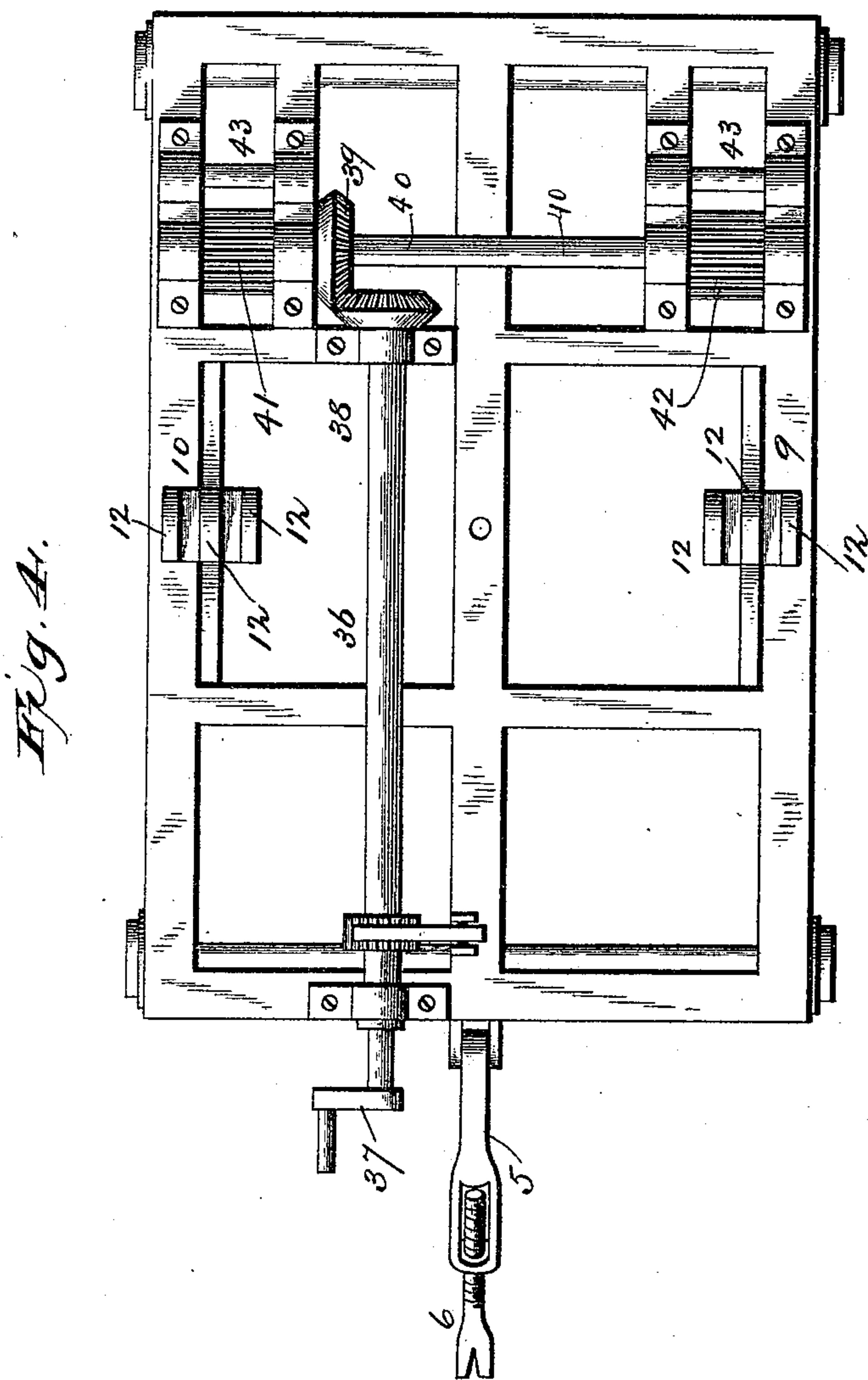
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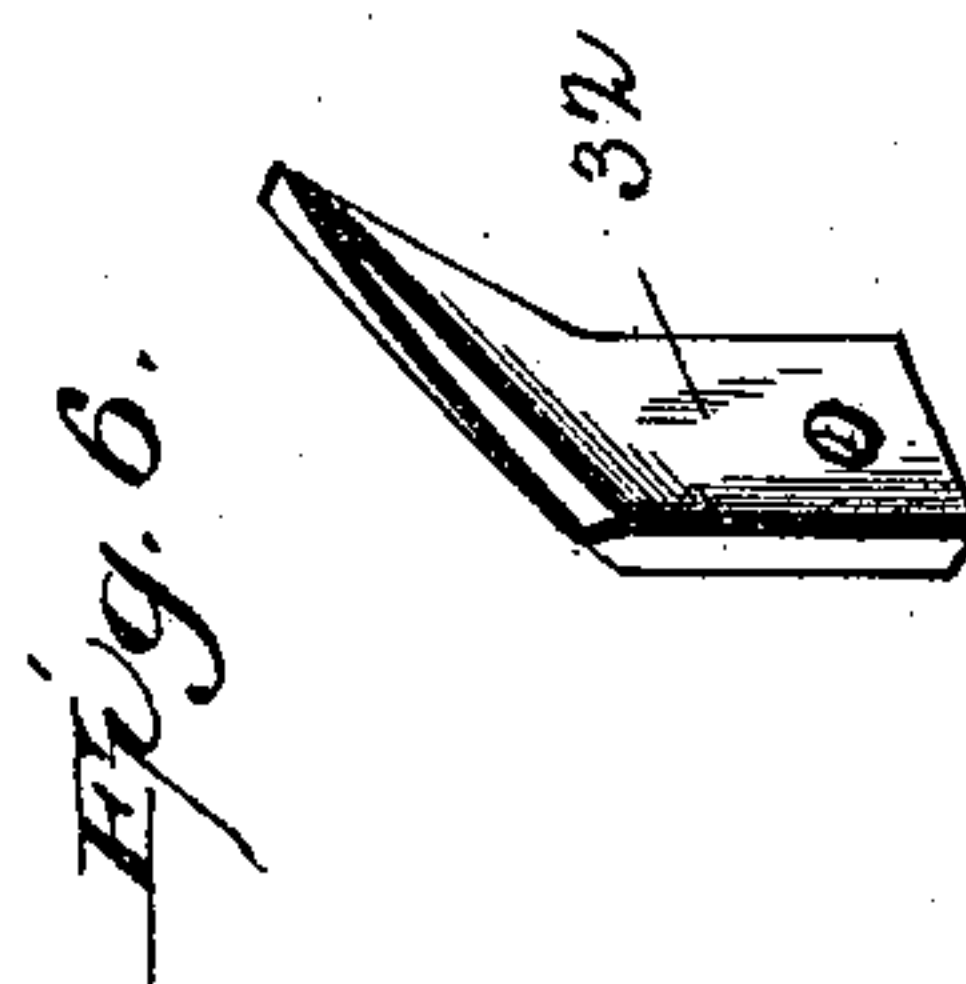
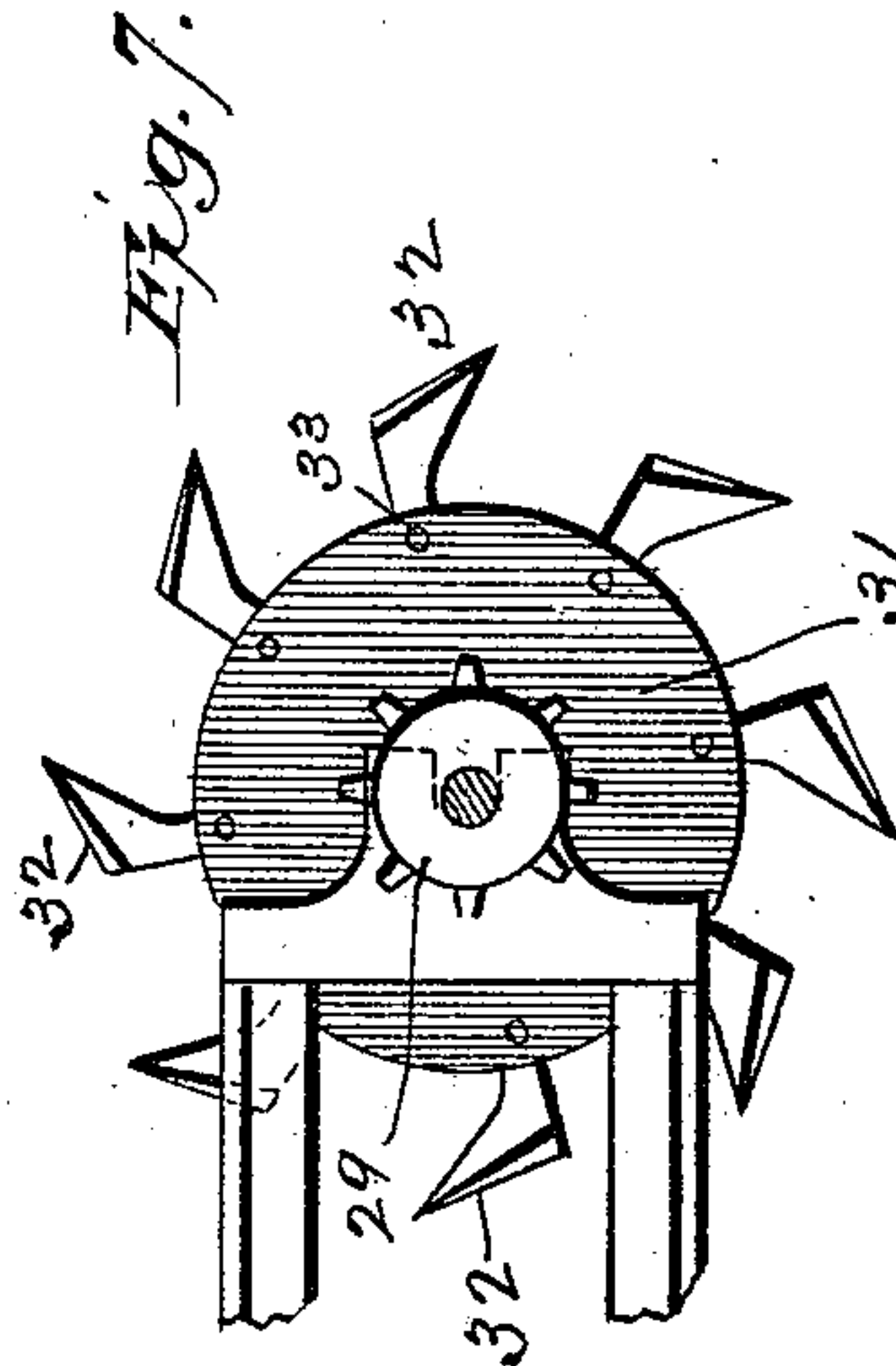
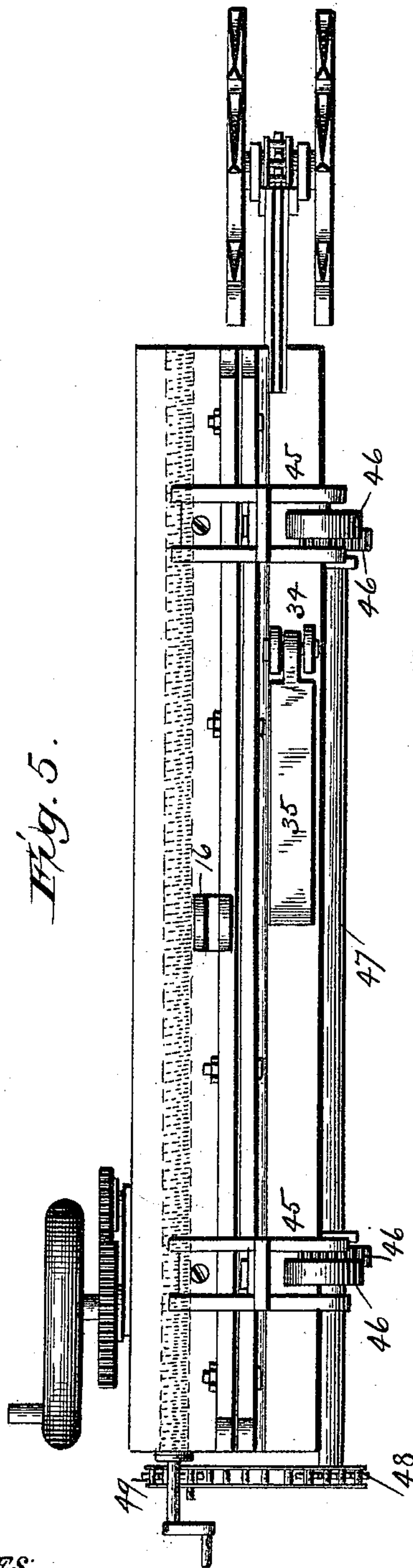
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P. RICHARDS.
COAL CUTTING MACHINE.

No. 438,446.

Patented Oct. 14, 1890.



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UNITED STATES PATENT OFFICE.

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COAL-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 438,446, dated October 14, 1890.

Application filed July 25, 1890. Serial No. 359,858. (No model.)

To all whom it may concern:

Be it known that I, PHILIP RICHARDS, a citizen of the United States, and a resident of Plymouth, in the county of Luzerne and State of Pennsylvania, have invented certain new and useful Improvements in Coal-Cutting Machines; and I do hereby declare that the following is a full, clear, and exact description of the invention, which will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My invention relates to machines for mining coal of that type which operate by cutting or channeling the coal seams within the drifts or galleries of the mine, and are adapted to be operated by electricity, compressed air, or any other suitable prime motor.

The object of the invention is to provide a machine of the above character, the carriage of which carrying the cutters is detachable and reversible, so as to enable the machine to cut vertically close up to either of the side walls of the drift or horizontally close to the bottom thereof.

The invention also contemplates improvements in the construction of the machine, whereby superior advantages are attained with regard to efficiency of operation and work performed.

The invention consists in the novel construction and combination of parts herein-after described and definitely pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation of a machine constructed in accordance with my invention. Fig. 2 is a plan view. Fig. 3 is an end view. Fig. 4 is a plan view with the carriage removed. Fig. 5 is a side elevation of the carriage detached from the bed and adapted to work horizontally. Fig. 6 is a detail view of one of the cutters. Fig. 7 is a detail view of the cutters and their operating sprocket-wheel.

In the said drawings, the reference-numeral

1 designates the supporting-bed, consisting of a rectangular frame having downwardly-depending arms 2, in which are journaled the axles 3, carrying the supporting-wheels 4. At its rear end this frame is provided with a hinged or pivoted arm 5, having an adjustable screw-threaded arm 6, provided with a bifurcated point. The object of this arm is to steady and hold the frame by engaging with the floor of the mine.

The numeral 7 designates an upright, having a screw-threaded opening or slot at one end to receive a correspondingly-threaded arm 8. The lower end of upright 7 rests in a recess in the frame 1, while the arm 8 abuts against the top of the mine and in connection with the pivoted arm 5 securely holds the frame in place. Upwardly extending from each side of the frame 1, at or near the center thereof, are two uprights 9 10, each of which is provided with three lugs 12, which form the pivotal bearings for the carriage carrying the cutters.

The numeral 13 designates a rectangular frame for supporting the carriage, having horizontal flanges 14 and 15 on its top and bottom sides. The flanges are each provided with two lugs 16, which engage with and are pivoted to the lugs 12 on the uprights 9 10. The flanges are beveled at their inner edges, forming V-shaped ways, within which work the similarly-shaped ways 17 of the carriage 18. This carriage consists of an open rectangular frame, and is provided near its rear end with a cross-head 19, having a screw-threaded lug 20, through which passes the rotatable screw-rod 21, which has its bearings in the ends of the supporting-frame 13, and is provided at its rear end with an operating-crank 22, by which it can be operated to advance or withdraw the carriage and cutters to and from the work. This cross-head also forms the bearings for the shaft 23, carrying sprocket-wheel 24 at its inner end and pinion 25 at its outer end. This pinion 25 meshes with a cog-wheel 26, mounted on the axle 27, and is

driven by any suitable motor. At the front end of the carriage are two outwardly-projecting arms carrying at their ends a rotating shaft 28, to which is secured a sprocket-wheel 29, connected with sprocket 24 by means of sprocket-chains 30. The teeth of sprocket 29 extend beyond the sprocket-chain, so as to form cutters which will cut away coal that may be in their path. On each end of the shaft 28 are secured the cutter-disks 31, having the cutters 32. These cutters rest in slots in said disks and are secured therein by set-screws 33, so as to be removable and replaceable by others when dull or damaged. The flanges 14 and 15 are each provided also with a lug or stud 34, in which is pivoted a rack-bar 35, by which the ends of the carriage are elevated and depressed during the progress of the cutting by the following means: Journaled in lugs on the bed 1 is a shaft 36, provided at its rear end with an operating-crank 37. At its forward end this shaft is provided with a bevel-gear 38, which meshes with a similar gear 39, mounted upon the transverse shaft 40, which carries two gears 41 42, which engage with the rack-bars 35. In front of these gears 41 42 are rollers 43, which serve to keep the rack-bars in contact with the gears. The shaft 36 is provided with a ratchet-wheel 36^a, which engages with a pawl 36^b, pivoted to bed 1 to prevent backward movement of said shaft.

The operation of the machine thus far described is as follows: The frame 13 is attached upon one of the uprights 9 or 10 by means of the lugs 12 and 16, through which passes a pivot pin or bar. In the present instance the frame is shown as secured to the upright 9 and the machine cutting close to the left-hand wall of the mine. One of the rack-bars 35 is then engaged with the gear 41 by passing it between said gear and one of the rollers 43. Motion being now imparted to the cog 26 and pinion 25, the cutters will be revolved by sprockets 24 and 29 and chain 30, with which said cog and pinion are connected. By rotating the shaft 36 the front of the carriage is elevated or depressed by means of gears 38 39, and gear 41, engaging with rack-bar 35. It will be seen that the parts are so constructed relatively to each other that the outer sides of the cutting-disks and cutters will be flush with the outer side of the carriage, thereby enabling the cutters to operate close up to the side wall of the mine.

For the purpose of enabling the cutters to cut close up to the opposite wall of the mine, the carriage and its supporting-frame can be reversed, as follows: The lugs 16 are released from engagement with lugs 12 on upright 9 by withdrawing the pivot-pin, and the supporting-frame and carriage are detached from said upright and are reversed, and the lugs 12 on the opposite side of the frame are engaged with the upright 10 and the rack-bar 35 with the gear 42. This operation will

bring the outer cutting-disk and cutters flush with the outer side of the carriage on the right side of the mine and allow the cutters to act close up to that side.

For the purpose of allowing the machine to be used as a horizontal cutter close to the ground or floor, I provide the flanges 14 15 at each end with lugs 44, which carry bearings 45, in which are journaled wheels or rollers 46. The frame 13 and the carriage can be removed from the bed 1 and be supported by these wheels and rollers, and then be made to act as a horizontal cutter close to the ground. For the purpose of laterally moving the frame and carriage during the progress of the work, the wheels or rollers on one side are formed with teeth or serrations, and are mounted upon a rotatable shaft 47, journaled in the bearings 45. The rear end of this shaft is provided with a sprocket-pinion 48, connected with a similar pinion 49, mounted on a stud 50, secured to frame 13. The pinion 49 is provided with an operating crank or handle 51^b.

From the above description it will be seen that the machine can cut close up to the right or left wall of the mine by simply reversing the carriage and its supporting-frame. The said supporting-frame and carriage can also be removed from the bed and used close to the ground as a horizontal cutter.

Having thus described my invention, what I claim is—

1. In a coal-mining machine, the combination, with a bed having an upright on each side at or near the center thereof, of a reversible supporting-frame and carriage provided with lugs upon opposite sides by which they may be pivoted to either upright, substantially as described.

2. In a coal-mining machine, the combination, with a bed having an upright on each side at or near the center, of a supporting-frame and sliding carriage, said frame provided with lugs upon its top and bottom adapted to be pivoted to one of said uprights, a pivoted rack-bar attached to said frame, a gear journaled in the bed engaging with said rack-bar, and a shaft and pinions for actuating said gears, substantially as described.

3. In a coal-mining machine, the combination, with a bed having an upright on each side at or near the center, of a supporting-frame and sliding carriage, said frame provided with lugs upon its top and bottom adapted to be pivoted to one of said uprights, a pivoted rack-bar attached to said frame, and gears journaled in said frame adapted to engage with said bar and rollers for keeping the gear and rack-bar in contact, substantially as described.

4. In a coal-mining machine, the combination, with a supporting-frame and a sliding carriage, of supporting rollers or wheels journaled on one side of said frame, toothed or serrated rollers or wheels mounted upon a

shaft journaled in the opposite side of the frame, a sprocket-wheel on the end of said shaft, a corresponding sprocket-wheel having a crank or handle journaled to the support-
5 ing-frame, and a sprocket-chain connecting said sprockets, substantially as described.

In testimony that I claim the foregoing as

my own I have hereunto affixed my signature in presence of two witnesses.

PHILIP RICHARDS.

Witnesses:

BENNETT S. JONES,
AUGUST PETERSON.