

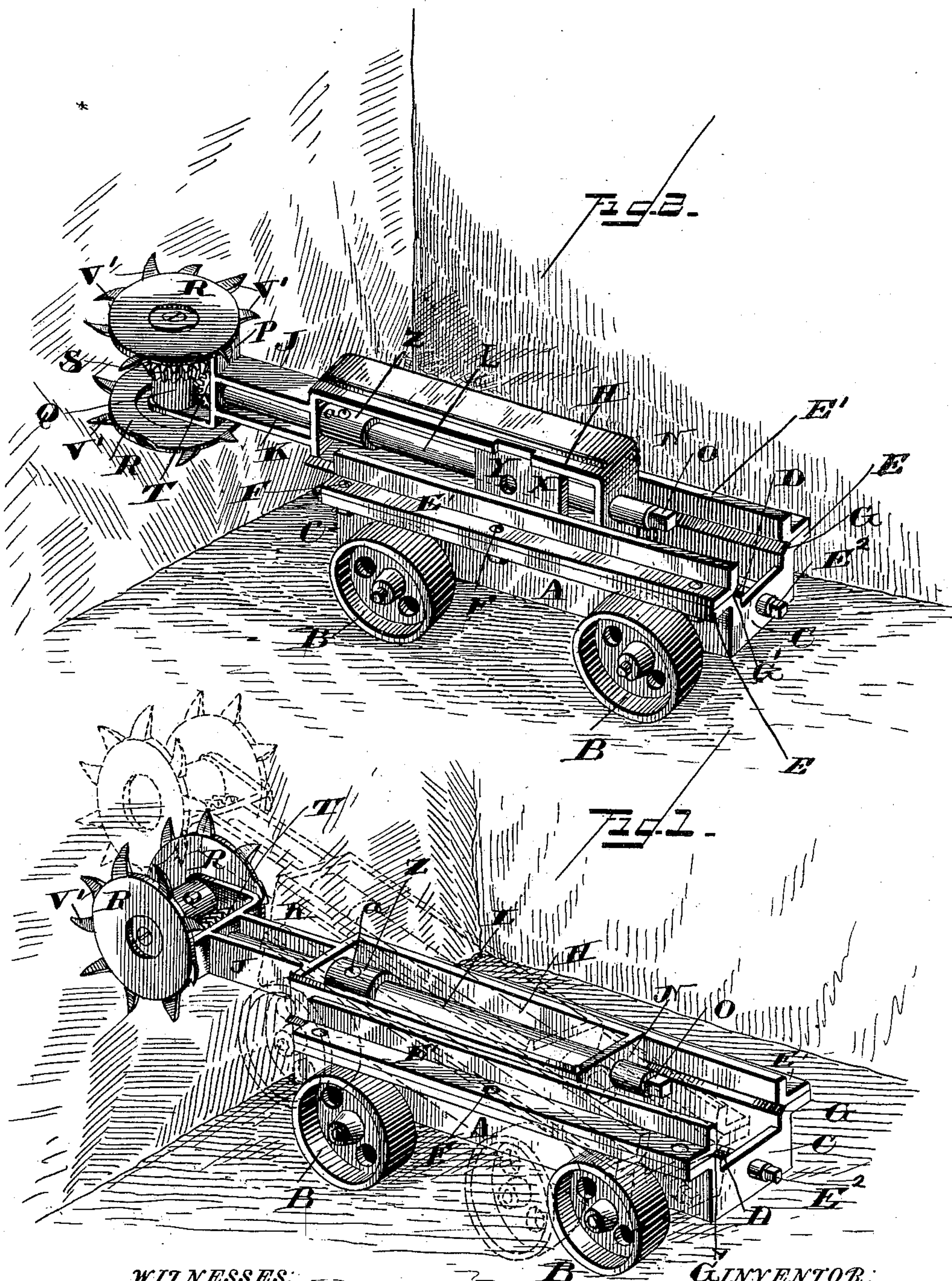
(No Model.)

2 Sheets—Sheet 1.

P. RICHARDS.
COAL CUTTING MACHINE.

No. 428,951.

Patented May 27, 1890.



WITNESSES:
J. L. Osgood.
Amos Jones

INVENTOR:
Philip Richards
By Sam Rogers
Attorneys

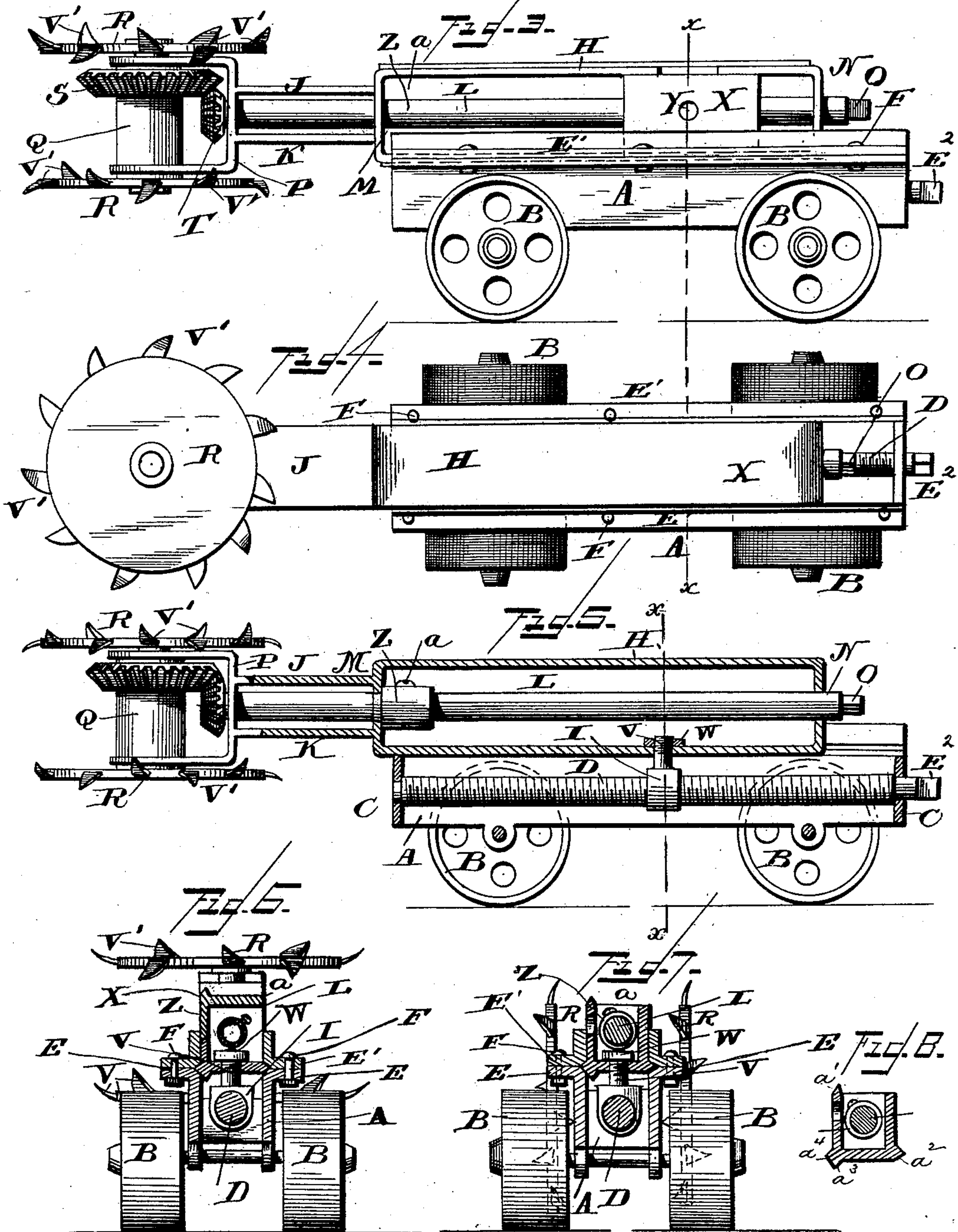
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James H. Jones

INVENTOR:

Philip Richards
J. Sam. Cagger & Co.
Attorneys

UNITED STATES PATENT OFFICE.

PHILIP RICHARDS, OF PLYMOUTH, PENNSYLVANIA, ASSIGNOR OF ONE-HALF
TO GEORGE W. SHONK, OF SAME PLACE.

COAL-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 428,951, dated May 27, 1890.

Application filed January 4, 1890. Serial No. 335,925. (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, and in which—

Figure 1 is a perspective view illustrating my machine as applied to the cutting on one of the sides of the breast of coal within the mine. Fig. 2 is a similar view showing my machine as applied to undercutting the breast of coal. Fig. 3 is a side elevation of the machine. Fig. 4 is a plan or top view of the same. Fig. 5 is a longitudinal sectional view on a vertical plane parallel to the axis of the machine. Fig. 6 is a transverse sectional view on line xx ; and Fig. 7 is a similar view, but showing the sliding carriage at right angles to the position shown in Fig. 6. Fig. 8 is a sectional view of the carriage detached.

Like letters of reference denote corresponding parts in all the figures.

This invention has relation to machines for mining coal, of that type which operate by undercutting 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; and it consists in the detailed construction and combination of parts of the coal-cutting machine, which will be hereinafter more fully described and claimed, whereby the machine may be adjusted so as to either undercut the breast of coal or cut it away at the sides, or both, as may be found to be expedient in any given case.

Reference being had to the accompanying two sheets of drawings, the letter A designates the movable frame or bed of the machine, which is supported upon two or more wheels B, four wheels being shown on that form of my machine illustrated on the drawings. Journaled in boxes C C in opposite ends of this frame A is the automatic feed-screw D, the rear end of which terminates in a squared

tenon E², whereby the screw may be coupled to a piece of flexible shafting (not shown on the drawings) for imparting a rotary motion to it. The upper side of the frame or bed A flares outwardly, as shown at E E, and has bolted to it removably by the nutted bolts F parallel beveled guides E' E'—one on each side—forming the V-shaped guideways G G. Between these ways slides the movable carriage H, which is provided with a depending screw-threaded boss I, working upon the feed-screw D, so that as this screw revolves the carriage H will slide forward or back upon its bed or frame in the guideways G G, according to the direction in which the feed-screw revolves.

The carriage H consists simply of a rectangular frame, having at its forward end an upper and a lower projecting arm J and K, between which the forward end of the shaft L is inserted, said shaft being journaled in the boxes or bearings M and N. This shaft, like the feed-screw D, terminates at its rear end in a squared tenon O, whereby it may be coupled to the shaft from which it is to receive its rotary motion. The sides of the carriage H, at opposite diagonal edges, are formed with beveled horizontal flanges a' a^2 , while one or both of the other edges of the said sides are formed with similar flanges a^3 a^4 at right angles to each other, as seen more clearly in Fig. 8. These flanges fit and work in the guideways G G of the frame A. When the machine is arranged to cut horizontally, as seen in Fig. 6, flanges a^2 and a^4 will engage, respectively, with guideways G and G', and when turned, as hereinafter described, to cut vertically flange a^3 will engage with guideway G and flange a' with guideway G', as seen in Fig. 7. The forward ends of the parallel projecting arms J and K support a D-shaped bearing P for a short vertical shaft Q, which has at one end within said bearing a bevel-pinion S, meshing with the bevel-pinion T at the outer end of the drive-shaft L. The upper and lower projecting ends of the short shaft Q have keyed or otherwise firmly fastened to them the circular parallel cutting-disks R R, the peripheries of which are armed with teeth of cutters V', either solid with the disks or removable, and of such size and

shape as may be found most useful, according to whether the machine is to be used for mining hard or soft coal or for cutting into the slate lining the seams of coal to be mined. I desire it to be understood, therefore, that I do not limit myself to any particular shape or style of teeth on the revolving cutting-disks R R.

The depending screw-threaded boss I, by which the sliding carriage is fed forward or moved back upon its bed, is fastened removably to the under side of the carriage-frame by means of a screw-threaded extension V and nut W; but in order to make it possible to shift the position of the carriage upon its bed to a position at right angles (thereby changing the position of the parallel cutting-disks to a position at right angles to their normal or horizontal position for undercutting,) I provide the carriage-frame H on one side with a plate or bearing X, having a central aperture Y, through which the threaded projection V of the threaded boss I may be inserted and fastened in place by means of the nut W.

To change the position of the carriage and its appurtenances upon the bed, all that is necessary is to remove the parallel guides E' and nut W, when the carriage may be lifted off its bed, turned at right angles or from the position illustrated in Figs. 2 and 6 to that shown in Figs. 1 and 7, after which the guides and nut are replaced, and the parts are in position for cutting into the breast at the sides of the drift instead of undercutting the breast, as in Fig. 2.

As a matter of convenience, I prefer to construct the drive-shaft L in two parts or sections, which are connected so as to form practically a single shaft by means of the collar or socket Z and binding-screw *a*. (See Fig. 5.) If desired, however, the shaft may be constructed in a single piece.

From the foregoing description, taken in connection with the drawings, the manner of operating this machine will be readily understood. By placing the sliding carriage in its horizontal position upon the bed or frame—that is, in the position illustrated in Figs. 2 and 6—the revolving cutters will cut into the breast of coal in a horizontal plane, thereby undercutting the breast; but by placing the sliding carriage at right angles to this position, thereby bringing the revolving cutters in a vertical position, the breast may be cut sidewise, as illustrated in Fig. 1. The cutters are fed forward gradually by means of the revolving feed-screw, to which motion is imparted by the same mechanism which revolves the cutting-shaft, and after the carriage with the cutters has reached the end of its forward stroke it may readily be adjusted to its normal position, and by advancing the bed the requisite distance the apparatus is ready for another cut.

If desired, the bed or frame A may be mounted upon two wheels only instead of

four, in which case the axle may serve as a fulcrum upon which to tilt the machine, so as to elevate or lower the cutters. The same may be accomplished, however, in a four-wheel machine by means of suitable props or supports, whereby the front end of the bed and carriage may be elevated, so as to bring the revolving cutters into their proper working position.

By the use of a pair of revolving cutters mounted upon the same shaft and revolving together it will be seen that the cutters may be pushed into the coal the entire length of the projecting bar of the sliding carriage. This is of course impossible where a single revolving cutter is used, as in that case the shaft or arbor of the revolving cutter will be in the way, so that a single cutting-disk will cut into the coal only the distance of its own radius. To overcome this coal-mining machines have been constructed with a jib, which protrudes into the coal, and around which an endless chain provided with cutters passes; but experience with that class of machines has demonstrated that the revolving chain is apt to become choked up with the coal-dust, and is also liable to break, while the whole machinery, owing to its necessarily complicated construction, is much more liable to get out of order than the two revolving cutters employed by me in my machine.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In a machine for mining coal, the combination, with the frame having outwardly-flaring upper sides and the parallel beveled guides removably secured to said frame, forming horizontal V-shaped guideways, of the carriage having the diagonal opposite edges of two of its sides formed or provided with horizontal beveled flanges and one or both of the other edges provided with two similar flanges at right angles to each other, substantially as described.

2. The combination, with the bed mounted upon wheels and provided with outwardly-flaring sides, and the removable guides fastened to said frame and beveled to form the horizontal guideways G G', of the removable sliding carriage H, provided with the beveled horizontal flanges $a' a^2 a^3 a^4$, fitting in said guideways G G', the threaded downwardly-projecting boss I, fastened removably to the under side of the carriage, the plate X, having aperture Y, and the revolving feed-screw D, journaled in bearings at opposite ends of the bed and projecting through said boss or plate, according as the carriage is to cut horizontally or vertically, 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:

LOUIS BAGGER,
WM. F. FOLKS.