(No Model.) 2 Sheets—Sheet 1.

P. J. FRANSTZE, F. JOHNSEN, & P. C. WALL.

Coal Mining Machine.

No. 239,479. **Patented March 29, 1881.**

Fig. 1.

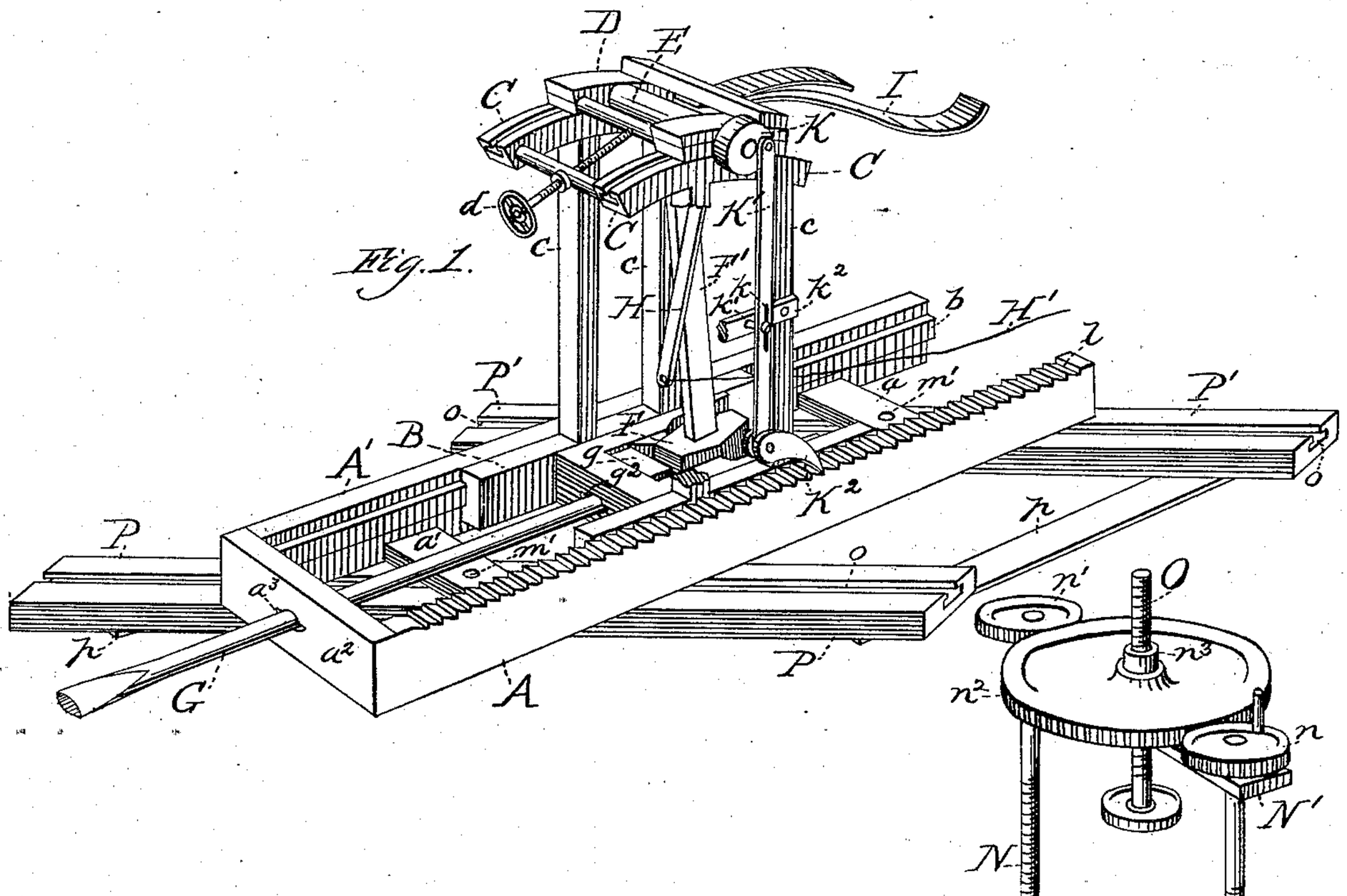
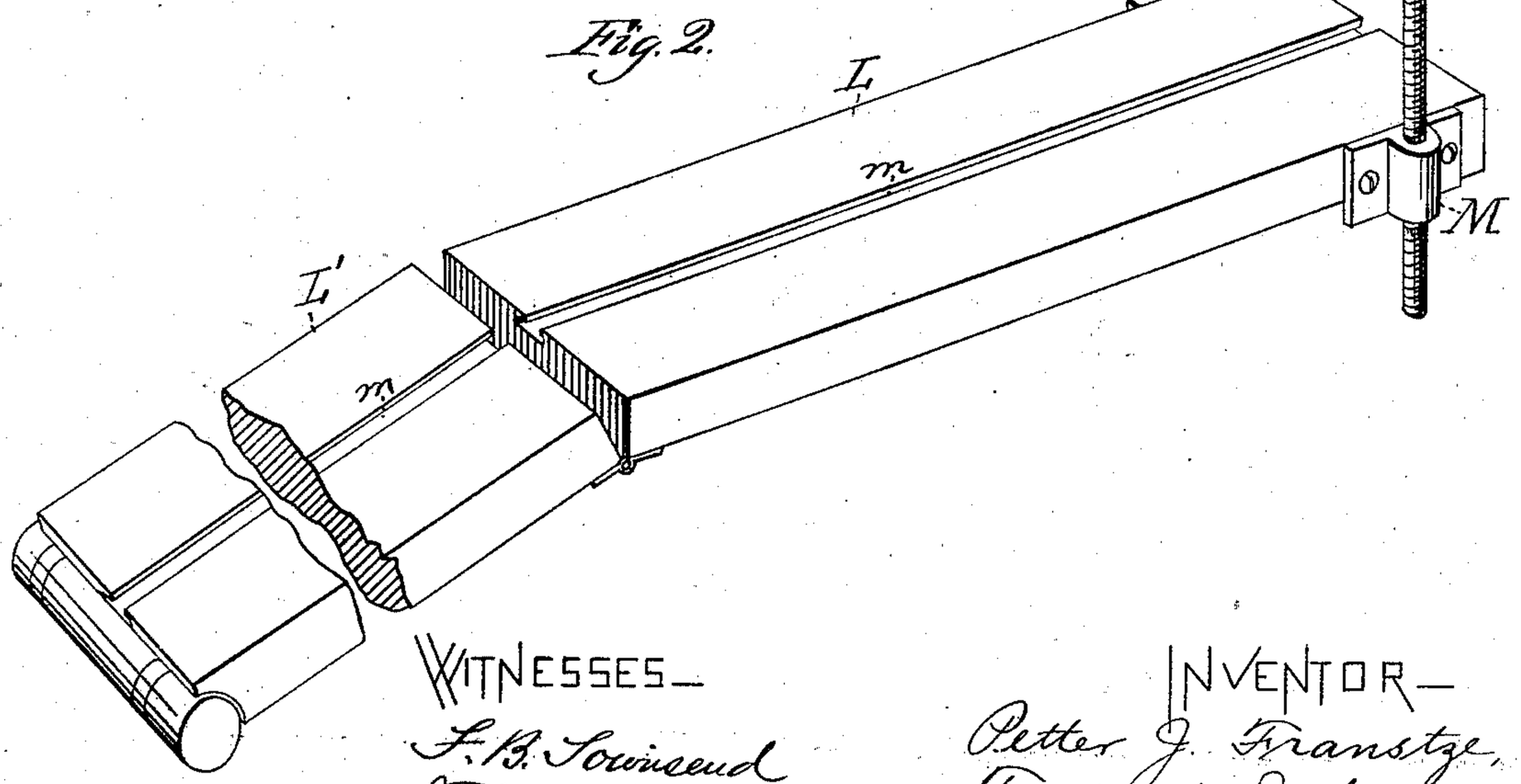


Fig. 2.



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(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

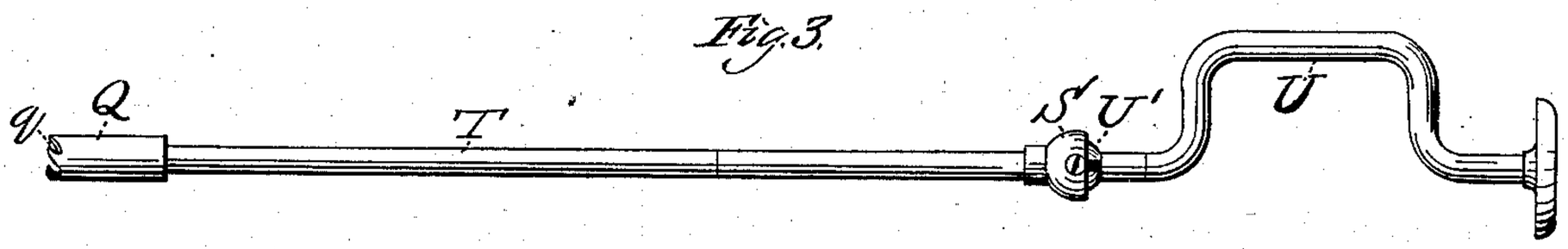


Fig. 4.

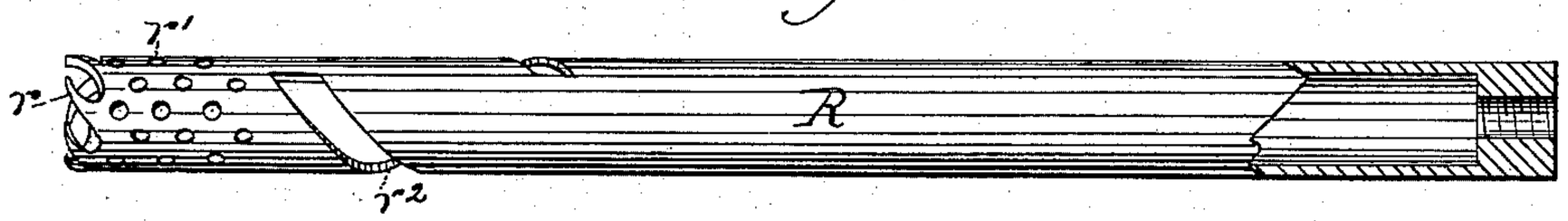


Fig. 5.

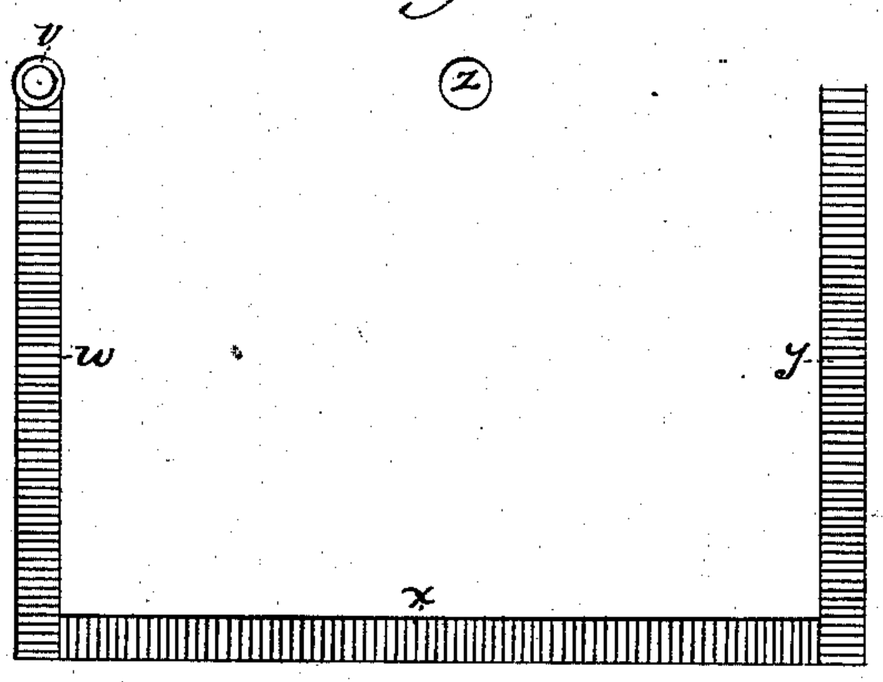
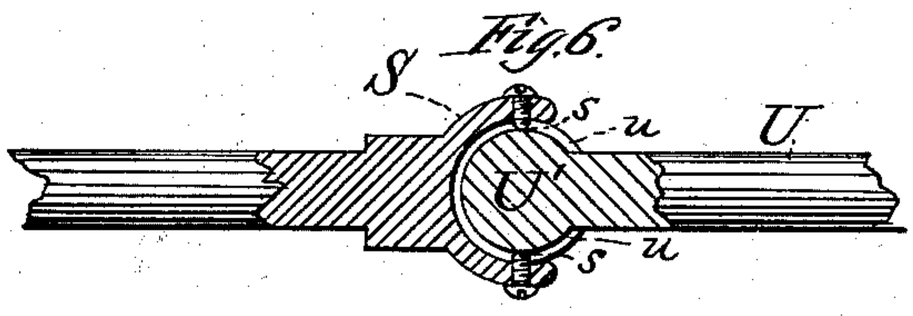


Fig. 6.



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UNITED STATES PATENT OFFICE.

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COAL-MINING MACHINE.

SPECIFICATION forming part of Letters Patent No. 239,479, dated March 29, 1881.

Application filed February 1, 1881. (No model.)

To all whom it may concern:

Be it known that we, PETTER J. FRANSTZE, a subject of the King of Norway and Sweden, residing at Chicago, in the county of Cook and State of Illinois, and FREDERIK JOHNSEN and PEDER C. WALL, citizens of the United States, residing at said Chicago, have invented certain new and useful Improvements in Coal-Mining Machines, of which the following is a specification.

The object we have in view is to produce a machine for mining coal where power is not available, by which large quantities of coal can be mined by hand at less expense and more expeditiously than heretofore; and our invention consists in the peculiar novel devices and combinations of devices employed by us for this purpose, as fully hereinafter explained, and pointed out by the claims.

In the accompanying drawings, forming a part hereof, Figure 1 is a perspective view of the machine arranged to cut a horizontal channel; Fig. 2, a perspective view of the bed upon which the machine is placed for cutting vertical channels; Fig. 3, an elevation of a bit and brace used for boring; Fig. 4, an elevation and partial section of another bit; Fig. 5, a diagram illustrating the method employed by us for mining coal by our machine; and Fig. 6, a section through the universal joint forming a part of our peculiar brace.

Like letters denote corresponding parts in all the figures.

A A′ are two parallel timbers or rails, which are connected on their lower sides by cross-pieces *a a′*, forming a rectangular frame, which is provided at its front end with a guide-board, a^2, having a hole, a^3, for guiding the chisel-drill. The timbers A A′ have ways *b* secured to their inner adjoining sides, upon which slides a rectangular frame or carriage, B. Standards *c* rise from the frame B, and support at a higher elevation curved ways C, upon which rests a frame, D. This frame is adjusted and held upon the ways C by a screw, *d*, operated by a hand-wheel, and turning through a cross-piece connecting the ways C at one end. The frame D has journaled therein the cross-shaft E, from which projects downwardly an arm, F′, carrying on its lower end a hammer, F. This hammer, at the lower end of its stroke, works in the center of the frame B and strikes the square head *g* of the chisel-drill G. The square head *g* of the chisel-drill fits closely the center of the frame B, so that such drill cannot be turned without first withdrawing it somewhat. The shank of the drill passes through a guide-opening, g^2, in a cross-piece of the frame B, which guide-opening g^2 is in line with the opening a^3 of the board a^2.

To the cross-shaft E is also connected an arm, H, to which an operating-rope, H′, is attached. By drawing back on this rope the hammer will be raised against a leaf-spring, I, projecting from the frame D, when, by slackening said rope suddenly, the hammer will be thrown downwardly by the spring I and by its weight, and will strike the head of the chisel-drill. The adjustment of the frame D makes it possible to move the hammer so that it will give the most effective stroke, whether the timbers A A′ are located horizontally or on an incline.

On one end of the shaft E is a crank arm or disk, K, to which is connected a rod, K′, projecting downwardly, and carrying a pivoted pawl, K^2, on its lower end. At any suitable point throughout its length the rod K′ is provided with a slot, *k*, which works on a pin, *k′*, projecting from a cross-piece, k^2, connecting two of the standards *c*. The timber or rail A, on which the pawl K^2 rests, is provided with ratchet-teeth *l* inclined forward. Now, when the hammer is raised the crank K will be turned, and, swinging the rod K′, the pawl K^2 will engage with one of the ratchet-teeth *l* and the carriage B will be moved forward. When the hammer is dropped the pawl will be moved in the opposite direction, and will advance another tooth on the ratchet. In this manner the chisel-drill will be forced forward, cutting as it goes.

For cutting a vertical channel, we mount the frame A A′ upon the bed shown in Fig. 2. This is composed of two parts, L L′, hinged together, and having a dovetail slot, *m*, which receives the heads of pins *m′* projecting downwardly from the center of the cross-pieces *a a′*.

The part L has screw-threaded ears M secured to its sides at its forward end, through which work screws N, connected at their upper ends by a plate, N′. The screws N have gear-wheels n n' on their ends above the plate N′, which are connected by an intermediate gear-wheel, n^2, turning on a sleeve, n^3, projecting up from plate N′. One of the gear-wheels has a crank-handle, by turning which the screws will be revolved simultaneously. Another screw, O, turns upwardly through the sleeve n^3, and is operated by a hand-wheel on its lower end. The screws N bear against the bottom of the tunnel or driftway, while the screw O is forced into the top or ceiling of the same. By turning the screws N the part L of the bed will be raised or lowered for advancing the drill in the channel it is cutting. By holding the part L′ of the bed it will act as a brace to support the part L in a horizontal position.

For cutting a horizontal channel, the machine is mounted on the bed shown in Fig. 1. This bed is composed of rails P P′, having grooves o, which receive the heads of the pins m'. The rails P P′ are connected by pivoted pieces p, which allow the rails to be moved toward and away from each other, so that the frame A A′ can be placed square across the driftway or oblique thereto. The frame A A′ is moved bodily upon this bed for each advance cut of the chisel-drill.

There are used in connection with our machine the bits and brace shown in Figs. 3, 4, and 6. The bit Q, Fig. 3, is a short bit used for starting a hole. It is made of pipe with cutting-teeth q formed on its front end. The bit R, Fig. 4, is a longer bit, also formed of pipe, and has cutting-teeth r and clearing-holes and slots r' r^2. These bits are adapted to be secured by screw-joints directly to the brace-socket S, or (if the depth of the hole make them necessary) intermediate rods, T, can be used. The brace-socket S is a hemispherical socket, and has two studs, s, projecting through its walls at opposite points. These studs are preferably screws, as shown. The brace U is constructed with a spherical end, U′, having a groove, u, extending around it in the direction of the length of the brace. When the spherical end of the brace is placed in the socket the studs s will engage with the groove u and a universal joint will be formed, which will permit the turning of the bit by the brace, even if it is not convenient to bring them in line with each other. After the bore has been started the boring can be done through the guide-openings of the machine.

The manner of using our machine is illustrated in the diagram, Fig. 5. We first bore a hole at v; then we mount the machine in position on bed L L′ and cut the vertical channel w; then shift the machine to its other bed and give the chisel-drill a quarter-turn and cut the horizontal channel x, and then reset the machine on its first bed, turn back the drill, and cut the vertical channel y. The central hole, z, is then bored and a charge of blasting-powder is placed therein, which, being exploded, breaks down the large block of coal included between the three channels.

What we claim as our invention is—

1. In a coal-mining machine, the combination, with the frame A A′, of the carriage B traveling thereon, the shaft E, carrying the swinging hammer F, the crank K, slotted rod K′, pawl K^2, and ratchet-teeth l, for advancing the hammer-carriage, substantially as described and shown.

2. In a coal-mining machine, the combination, with the frame A A′, carriage B, and elevated ways C, of the frame D, adjustable upon such ways C, and the swinging hammer F F′, carried by such frame D, substantially as described and shown.

3. In a coal-mining machine, the combination, with the frames, of the bed L L′, adjustable vertically by means of screws N and O, substantially as described and shown.

4. In a coal-mining machine, the combination, with the cutting-frames, of the rails P P′, connected by pivoted bars p, substantially as described and shown.

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