

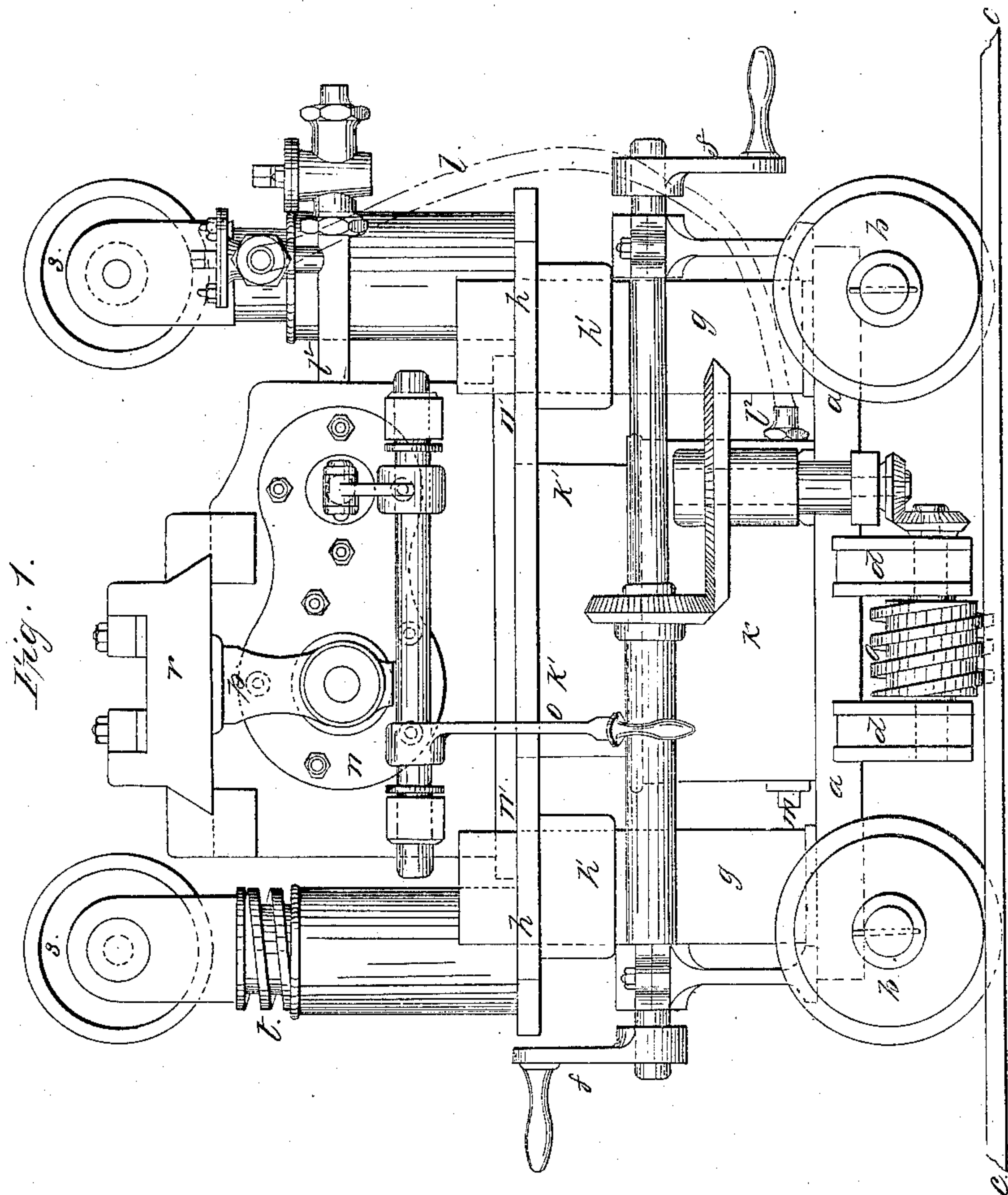
G. E. Donisthorpe,

2 Sheets, Sheet 1.

Mining Machine.

N^o 76, 419.

Patented Apr. 7, 1868.



Witnesses:
W. H. Cowley
Thos. Gussakoff

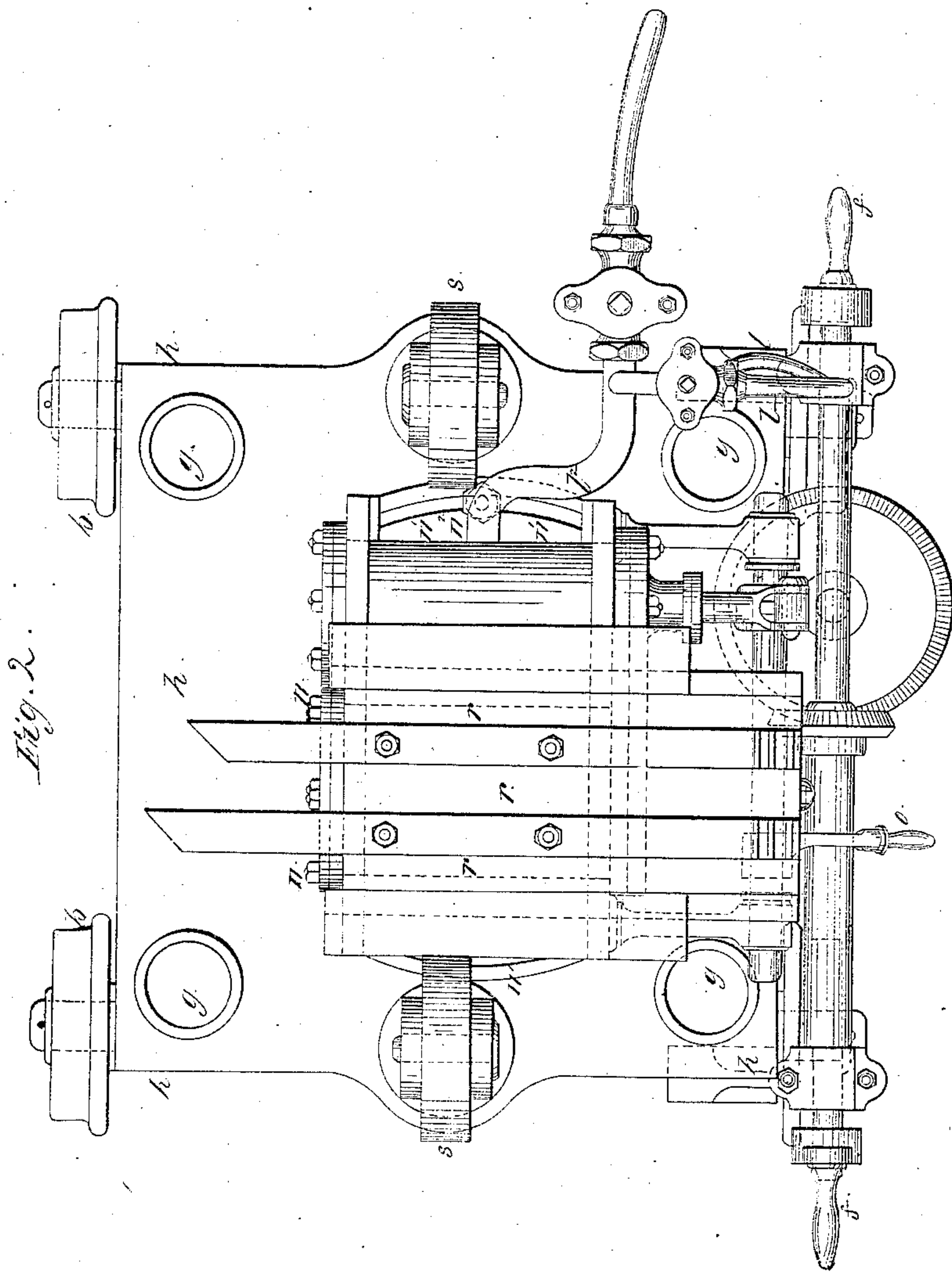
Inventor:
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Inventor:
G. E. Donisthorpe

United States Patent Office.

GEORGE EDMUND DONISTHORPE, OF LEEDS, ENGLAND.

Letters Patent No. 76,419, dated April 7, 1868; patented in England, March 8, 1866.

IMPROVED COAL-MINING MACHINE.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL TO WHOM IT MAY CONCERN:

Be it known that I, GEORGE EDMUND DONISTHORPE, of Leeds, in the county of York, England, a subject of the Queen of Great Britain, have invented or discovered new and useful "Improvements in Machinery for Cutting Coal;" and I, the said GEORGE EDMUND DONISTHORPE, do hereby declare the nature of the said invention, and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement thereof; that is to say—

This invention has for its object improvements in machinery for cutting coal. In coal-cutting by machinery, it is now usual to employ a carriage with the cutter and apparatus mounted upon it, and this carriage travels along rails laid along the face of the coal; hence it results that the cut is made in a line parallel to the rails, except in so far as the line of cut may be varied by hand-adjustment. Now, in place of following the line of the rails, which, as the rails are rigid, is approximately a straight line, it is usually required that the cut should follow accurately the line of the roof or floor of the working. This being so, I, according to my invention, employ the roof or floor as a guide for the cutter. This I prefer to do by mounting on the carriage, as I have heretofore practised, an air-cylinder with a piston or plunger in it, which, when air is admitted to the cylinder, presses a roller or rollers firmly against the roof, so as to steady the carriage between the rails and roof, but in place of, as heretofore, mounting the cutting-apparatus on the carriage, which runs on and is guided by the rails, I fix it to or connect it with the rising and falling piston or plunger, which is pressed constantly up towards the roof, as already explained. By this means the groove formed by the cutting-apparatus may very readily be made close up to the roof of the mine, in place of at the floor of the mine, as heretofore usual. The cutting-apparatus which I prefer to employ, is an air-cylinder and piston, giving a rectilinear motion to a cutter or cutters fixed to the piston-rod. The same carriage may have two or more sets of cutting-apparatus mounted upon it. It is evident that in a similar manner the cutting-apparatus may be guided from the floor, but not, I think, so conveniently. Similar arrangements are applicable where water under pressure is used as the motive-power. In the drawings hereunto annexed, I have shown, at—

Figure 1, a side view, and at

Figure 2 a plan of a machine, in which the cutting-apparatus is carried by the piston or plunger of an air-cylinder, as above described.

In each of these views the machine is shown to be supported on rails attached to iron sleepers or bearers.

The machine is composed of a frame, *a*, supported on wheels *b*, which run on the rails *c c'*. The frame *a* has brackets *d* projecting out from it, which carry a worm, *e*. This worm gears with the rack formed in the face of the rail *c*, and is for the purpose of moving forward the machine. The gearing for transmitting motion to the worm *e* from the hand-wheels *f* is clearly shown in the drawings. At each of the four corners of the frame *a* is a hollow upright, *g*. These uprights form guides, on which a bed or plate, *h*, that carries the cutting-apparatus, is capable of rising and falling. Where the uprights *g* pass through the plate *h*, bosses, *h'*, are formed on its under side, in order that the plate may rise and fall truly. Upon the centre of the carriage *a* is fixed an air-cylinder, *k*, fitted with a piston or plunger, *k'*, upon the top of which the plate *h* rests. Compressed air can be admitted into the cylinder below the piston or plunger, through the flexible pipe *l*, which, by a union joint, *l'*, is connected with a pipe passing from the bottom of the cylinder. Air can be allowed to escape from the cylinder by a tap, *m*, on a pipe leading from the bottom of the opposite side of the cylinder. By this means the plate *h* can be raised or lowered. On the top of the plate *h* is the cutting-apparatus, which in the arrangement shown in the drawing, is composed of an air-cylinder, *n*, carried by a plate, *n'*, which is capable of turning on a circular boss, formed on the top of the plate *h*, so that the cylinder *n* may be set at any desired angle to the frame, and fixed in position by binding-screws *n''*, as shown. Compressed air can be admitted alternately to opposite ends of the cylinder *n*, by a slide-valve actuated by the lever *o*. The piston-rod of the cylinder *n* is, by a cross-head, *p*, connected with a slide, *r*, that works in guides formed on the top of the cylinder. The slide *r* carries the cutters that are to form a groove in or above the coal. The cutters are by preference fixed to the slide in the following manner: On the under side of the stems of the cutters, teeth are formed similar to ratchet-teeth, and on the top of the slide are corresponding teeth, into which the teeth of the cutter-

stems enter; the stems of the cutters are then held down by bolts and nuts. By fastening the cutters in this manner, the cutters can readily be removed to be sharpened; they can also be set to project to any desired distance from the end of the slide *r*, as nearly the whole of the length of the slide is furnished with ratchet-teeth, and the teeth on the cutter-bars can be inserted between any of these teeth. On the top of the plate *h* are also two wheels *s s*, carried by stems capable of rising or falling in vertical guides formed on the top of the plate. One of these wheels is pressed upwards by a spiral spring, *t*, the other can be set at any desired height by means of a set-screw.

When the machine is at work, air is admitted into the cylinder *k*, to cause the table *h* to rise and press the wheels *s* against the roof of the working, and the wheels are by preference arranged to run in shallow grooves previously cut for them. The height to which the table *h* can be raised by the air-cylinder, and consequently the height at which the cutting-apparatus shall work, is regulated by the height that the fixed wheel *s* is set above the frame. The other wheel *s* is pressed upwards by a spiral spring, as above mentioned, in order that both wheels may at all times bear against the roof of the working, notwithstanding any irregularities in its surface. After that air has been admitted to the cylinder *k*, the cutters carried by the slide *p* are set to work by alternately raising and lowering the valve-lever *o*, and at the same time the machine is moved forward by turning one or other of the hand-wheels *f*. By this means the cutters will be caused to form a groove parallel with the roof of the working. The groove may either be in the coal itself, or, as I believe to be preferable, it may be in the narrow soft layer of shale which is frequently found immediately above the vein of coal. The cutters are adjusted to work in this layer by adjusting the height of the wheels *s* from the top of the table *h*, as above described. When a groove of material is thus removed from above the vein of coal, the coal below may in many cases be readily separated into blocks by wedges, commencing to use the wedges near the top of the vein of coal, and gradually working downwards, as the upper part of the vein of coal is removed. Although I prefer to arrange the machine so that it may cut a groove close to the roof of the working, yet machines constructed in the manner above described may be arranged to cut grooves either below the coal or into the coal itself, at any desired height from the bottom of the vein or seam.

Having thus described the nature of my invention, and the manner of performing the same, I would have it understood that what I claim, is—

The so mounting the cutting-apparatus of machinery employed in getting coal or other mineral, that the cutting-apparatus may, whilst at work, rise or fall independently of the truck or carriage of the machine, substantially as herein described.

Also the carrying the cutting-apparatus on the top of the plunger of an air-cylinder, carried by the truck of the machine, so that the cutting-apparatus may cut a groove close up to the roof of the mine, substantially as herein described.

G. E. DONISTHORPE.

Witnesses:

W. H. COWLEY,
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