H. Wilverth,

Mining Coal.

No. 26,726. Patented Jan. 3, 1860.

Fig. 4.

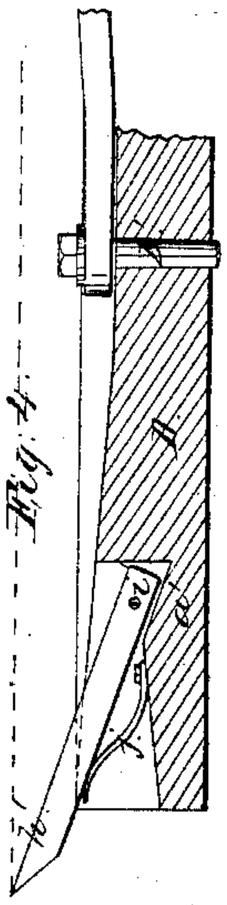


Fig. 3.

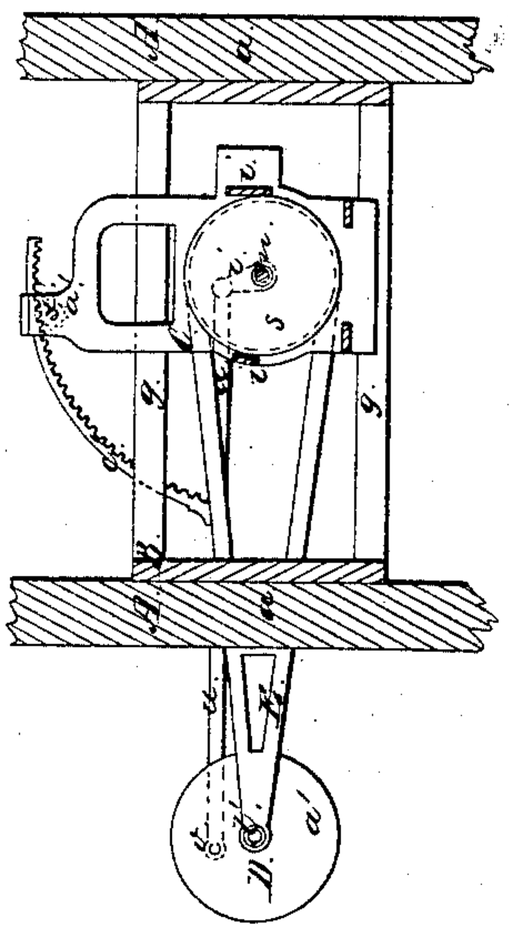


Fig. 1.

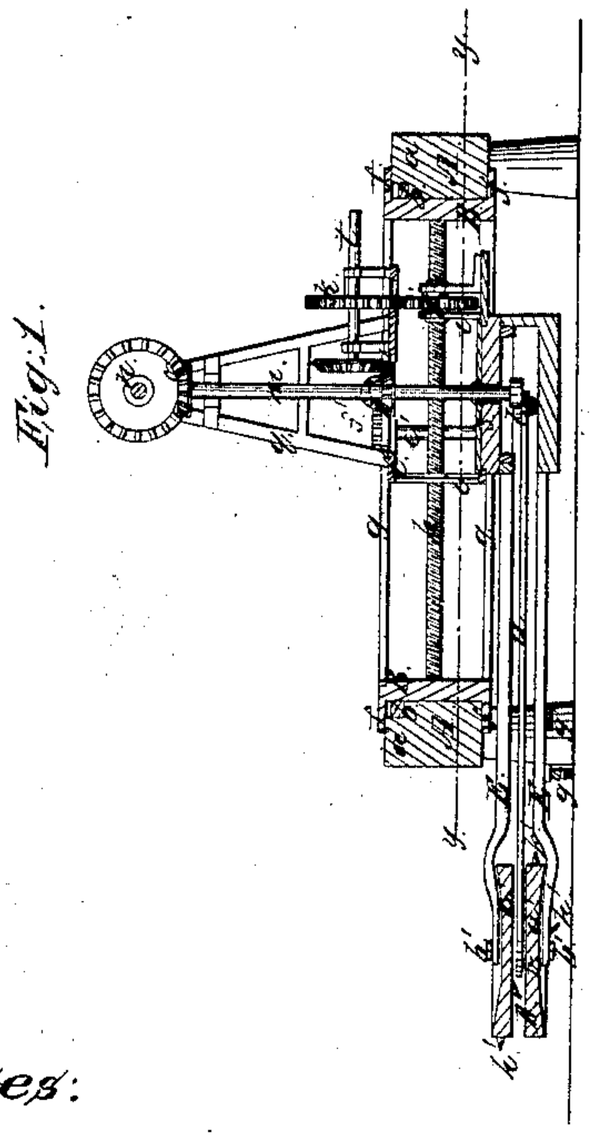
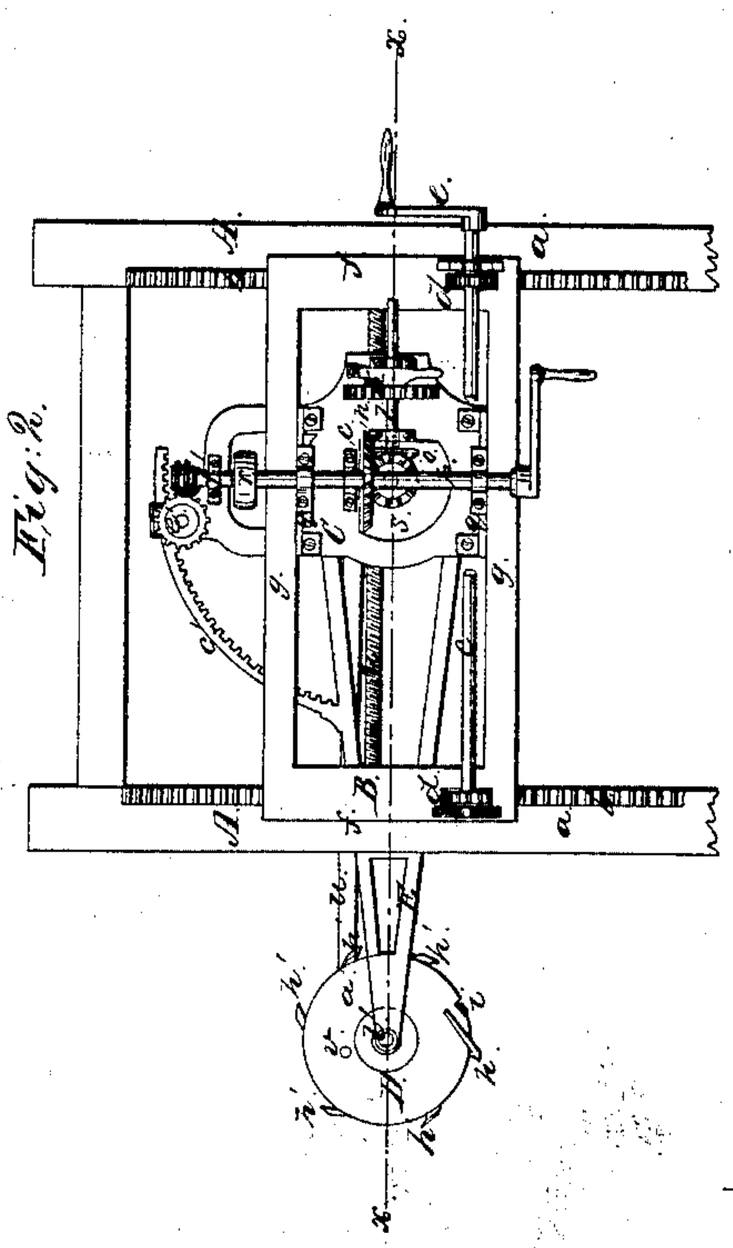


Fig. 2.



Witnesses:

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UNITED STATES PATENT OFFICE.

HENRY WILVERTH, OF CASSEYVILLE, KENTUCKY.

COAL-EXCAVATING MACHINE.

Specification of Letters Patent No. 26,726, dated January 3, 1860.

To all whom it may concern:

Be it known that I, HENRY WILVERTH, of Casseyville, in the county of Union and State of Kentucky, have invented a new and Improved Coal-Excavator; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawing, forming a part of this specification, in which—

Figure 1 represents a longitudinal vertical section of my invention, the line *x*, *x*, Fig. 2, indicating the plane of section. Fig. 2 is a plan or top view of the same. Fig. 3 is a horizontal section taken in the plane indicated by the line *y*, *y*, Fig. 1. Fig. 4 is a detached section of the cutter head on an enlarged scale.

Similar letters of reference in the several figures indicate corresponding parts.

This invention relates to that class of excavators in which a horizontal cutter head is employed, to which a rotary motion is imparted, so that the cutters operate on the ground or other substance to be excavated, as said head rotates; and this invention consists in giving to the rotary cutter head a four-fold motion, so that a long and deep trench can be made before it becomes necessary to move the machine.

This invention consists also in a particular arrangement of the cutters in relation to the cutter head and to the rods which support the same, whereby the trench is made wide enough to admit said head together with the rods and that a deeper trench can be cut out by my excavator than with ordinary machines for the same purpose.

To enable those skilled in the art to make and use my invention I will proceed to describe it.

A represents a frame constructed of timber and so arranged that it can be carried from place to place. This frame forms the guide for the frame, B, which in its turn forms a guide for a second frame, C, that supports the machine; and secured to the longitudinal timbers, *a*, of said guide frame, A, are the toothed racks, *b*, and a shaft, *c*, extending over and secured to the top of the frame, B, is provided with two pinions, *d*, which gear into said racks, and a crank, *e*, on the end of the shaft, *c*, serves to impart to the same a rotary motion, whereby the frame, B, together with the whole machine may be shifted over the entire length of the timbers, *a*. The frame, B, is furnished with flanges, *f*, that overlap the edges of the timbers, *a*, as clearly shown in Fig. 1, so that a steady motion is given to it when the shaft, *c*, is rotated.

The frame, C, in its turn is fitted between the transverse bars, *g*, of said sliding frame, B, in such a manner that it moves in a direction at right angles to the direction in which the frame, B, is moved by rotating the shaft, *c*. Motion is imparted to the frame, C, by means of a screw shaft, *h*, that has its bearings in the end pieces of the frame, B, and which screws into standards, *i*, on the sides of the frame, C, so that for each revolution of said screw shaft the frame, C, is moved over the distance of one thread of the screw.

The screw shaft, *h*, receives its motion by means of a cog wheel, *j*, that is firmly secured to the same, and which gears into a similar cog wheel, *k*, on an arbor, *l*, to which motion is imparted from the vertical shaft, *m*, by means of a bevel gear, *n*, and this vertical shaft is rotated by means of another bevel gear, *o*, from the driving shaft, *p*. This shaft has its bearings in standards, *q*, which are secured to the top of the frame, C, and motion is imparted to it from some source of motion by means of the pulley, *r*.

The vertical shaft, *m*, extends down through the bottom plate, *s*, of the frame, C, and secured to its lower end is the crank, *t*, which connects by means of a rod, *u*, with an eccentric wrist pin, *v*, on the cutter head, D. This cutter head is formed of two distinct disks, *a'*, which are united and kept at the proper distance by the wrist pin, *v*, and both parts are made to rotate on pivots, *b'*, in arms, E, which extend from the bottom plate, *s*, of the frame, C, to a suitable distance beyond the longitudinal timbers, *a*, of the frame, A.

The bottom plate, *s*, is so arranged that it rotates freely around the vertical shaft, *m*, and secured to one of the arms, E, is a toothed arc, *c'*, that gears into a pinion, *d'*, at the under end of a vertical arbor, *e'*, to which a slow rotary motion is imparted from the vertical shaft, *m*, by means of a suitable gearing arranged on the horizontal arbor, *f'*. By this arrangement the cutter head, D, is caused to sweep through a portion of a circle, the center of which coincides with the center of the vertical arbor, *m*, and the radius of which depends upon the length of the arms, E. The lowest one of the arms, E, is sup-

ported by a pendant, g', the sides of which at the same time determine the length of the arc through which the cutter head is allowed to move, and said arm travels on a roller, g'', that materially facilitates its motion. Thus the cutter head, D, receives a four-fold motion: It rotates around the pivots, b', in the arms, E; it sweeps through an arc described from the center of the vertical shaft, m, by means of the motion imparted to it through the agency of the toothed arc, c'; it slides toward and from the spot on which the cutters are expected to act by means of the screw shaft, h, and it can be moved over the whole length of the timbers, a, by means of the toothed racks, b, shaft, c, and pinion, d, so that a long and deep trench can be excavated without moving the frame, A.

In order to open the trench wide enough to enable the cutter head, together with the arms, E, to move freely in the same, the cutters, h', are secured on the top and bottom of the disks, a', in an inclined position, as clearly shown in Fig. 4, fetching the points of the cutters beyond the outer surfaces of the arms, E. The inner ends of said cutters are secured to the disks, a', by means of pivots, i', and springs, j', serve to throw the points up. At the same time the cutters are allowed to yield if they run against an obstruction which would otherwise cause an injury, and by reason of this yielding quality they are also allowed to pass through, between the arms, E, the same being so arranged that they are depressed as soon as they come in contact with said arms. By these means, the trench, opened by said cutters is rendered sufficiently wide to admit of the cutter head, together with the arms, E, and to allow these parts to move freely therein, so that the motion of the cutter head, imparted to it by means of the toothed arc, c', is not interfered with, whatever the depth of the trench may be.

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

1. The arrangement and combination of the frames, A B C, together with the toothed racks, b, and shaft, c, or their equivalents, and with the screw shaft, h, arms, E, cutter head, D, and toothed arc, c', or its equivalent, substantially in the manner and for the purpose herein specified.

2. The cutters, h', arranged substantially as described, in combination with the disks, a', springs, j', and pivots, i', or their equivalents for the purpose set forth.

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Witnesses:
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