

E. K. & J. M. BRUCE.  
COAL MINING MACHINE.

No. 49,972.

Patented Sept. 19, 1865.

Fig. 1.

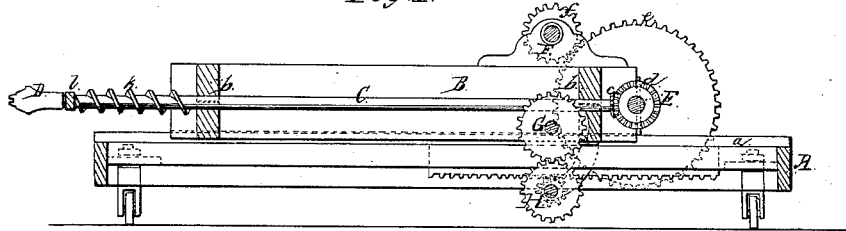


Fig. 2.

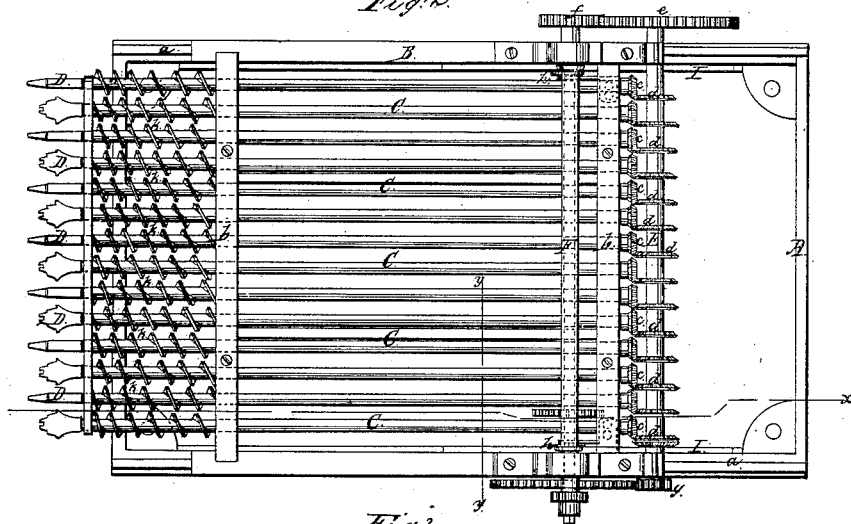
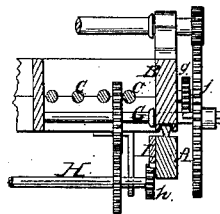


Fig. 3.



Witnesses:  
Wm. Creun,  
Geo. Fusch.

Inventor,  
E. K. & J. M. Bruce.  
By Munn & Co.,  
Attys

# UNITED STATES PATENT OFFICE.

ELGIN K. BRUCE AND JNO. M. BRUCE, OF LIBERTY, PENNSYLVANIA.

## IMPROVED COAL-MINING MACHINE.

Specification forming part of Letters Patent No. 49,972, dated September 19, 1865.

*To all whom it may concern:*

Be it known that we, E. K. BRUCE and J. M. BRUCE, of Liberty, in the county of Allegheny and State of Pennsylvania, have invented a new and Improved Machine for Excavating Coal, &c.; and we do hereby declare that the following is a full, clear, and exact description thereof, which will enable those skilled in the art to make and use the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 represents a longitudinal vertical section of this 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 partial transverse section of the same, the line *y y*, Fig. 2, indicating the plane of section.

Similar letters of reference indicate like parts.

This invention relates to a machine which consists, essentially, of a series of horizontal drills lying parallel with each other and rotated simultaneously by suitable gearing in the rear of the frame, which forms their bearings. The frame moves back and forth in suitable ways in the side timbers of a truck, so that the frame can be fed toward or from the bed of coal to be excavated, while the truck rests on wheels and can be moved in a direction at right angles to the motion of the drill-frame. Each drill-barrel is provided with a spiral flange of gradually-increasing pitch to remove the cuttings, and a head-yoke secured to the drills serves to keep said drills steady and to prevent them from interfering with each other. The shape of the drills is peculiar, they being made with toothed or cut sides and without a center, so that they act on the coal with increased effect. The drills are so arranged that they can be easily removed, and they are made of two lengths, so that one half cut in advance of the other half, whereby the strain on the machine is greatly reduced.

A represents a truck, which rests upon suitable wheels to move on a track in front of the bed of coal to be excavated. The side timbers, *a*, of this truck form the guideways for the frame B. This frame is made of wood or any other suitable material, and it forms the bearings for a series of horizontal spindles, C, the outer ends of which form the drills D. The

journal-boxes of said spindles are so arranged that by removing the caps *b* all the spindles can be taken out, and motion is imparted to the same by bevel-gears *c d* from a shaft, E, which receives its motion by a gear, *e f*, from the main or driving shaft F. This shaft has its bearings in suitable boxes on the top of the frame B, and motion is imparted to it by an engine operated by compressed air, or by any other suitable motive power. The shaft E has its bearings in suitable boxes on the end of the frame B, and it bears at one end the cog-wheel *e*, which gears in the pinion *f* on the driving-shaft, as previously stated, and on its other end a pinion, *g*, which can be made to gear in cog-wheel *j*, that slides back and forth on the shaft G.

The feed-motion is effected by the action of two shafts, G H, which are in gear with each other, and the lower one of which carries pinions *h*, that gear in toothed racks I, secured to the truck-frame A. By the action of these pinions on the racks the frame B is fed toward the bed of coal to be excavated. A suitable reversing-gear serves to carry the frame back, whenever it may be desirable. The feed-shaft H works under the racks, as shown in Figs. 1 and 3, so as to keep the machine steady and prevent the accumulation of dirt in said racks.

The reversing-gear (shown in the drawings) consists of a pinion, *i*, which gears in a large cog-wheel, *j*, that slides back and forth on the shaft G, so that it can be readily thrown in or out of gear. Instead of this, however, other devices may be used, and we do not wish to confine ourselves to the peculiar arrangement represented in the drawings.

The drill-barrels are provided with spiral flanges *k*, of gradually-increasing pitch, to work out the cuttings and prevent the possibility of choking, and a head-yoke, *l*, serves to keep the drills steady, and prevents the same from interfering with each other. The heads or bits D are made with toothed sides and without centers, as clearly shown in Fig. 2, whereby their effect on the bed of coal is increased; and they are of two lengths, so that one half of them cut somewhat in advance of the other half, and thereby they are prevented from locking into each other, and, furthermore, the strain on the machine is reduced.

The truck A is intended to be taken on the track to the breast of the coal, and the drills are used for bearing in to the usual depth of about two and one-half feet, though this depth may be varied according to circumstances. When the full depth has been reached the frame B is moved back and the truck is pushed ahead to the next position. By these means the operation of bearing in is considerably facilitated and much time and labor are saved.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. The combination of the frame B, shafts E F, bevel-gears *c d*, drill-spindles C, truck A, toothed rack I, and feed-shaft H, all constructed and operating substantially as and for the purposes specified.

2. The application to the drills of spiral flanges with gradually-increasing pitch, substantially as and for the purpose described.

ELGIN K. BRUCE.  
JNO. M. BRUCE.

Witnesses:

THOMAS DAVISON,  
MARY E. DAVISON.