(No Model.)

C. WREN.

EXPANDING REAMER.

No. 294,714. Patented Mar. 4, 1884.

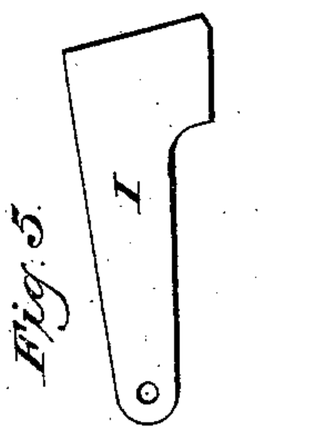

Fig. 5.

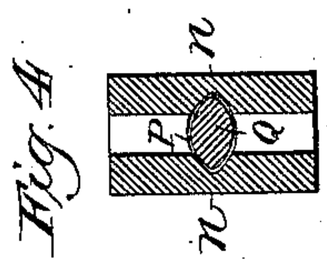

Fig. 4

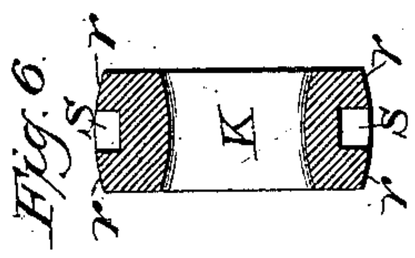

Fig. 6.

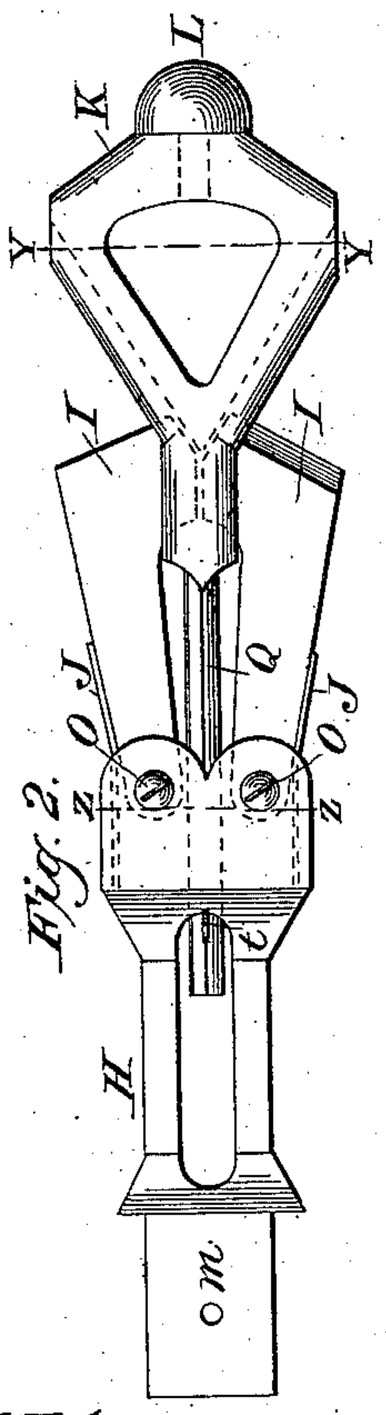

Fig. 2.

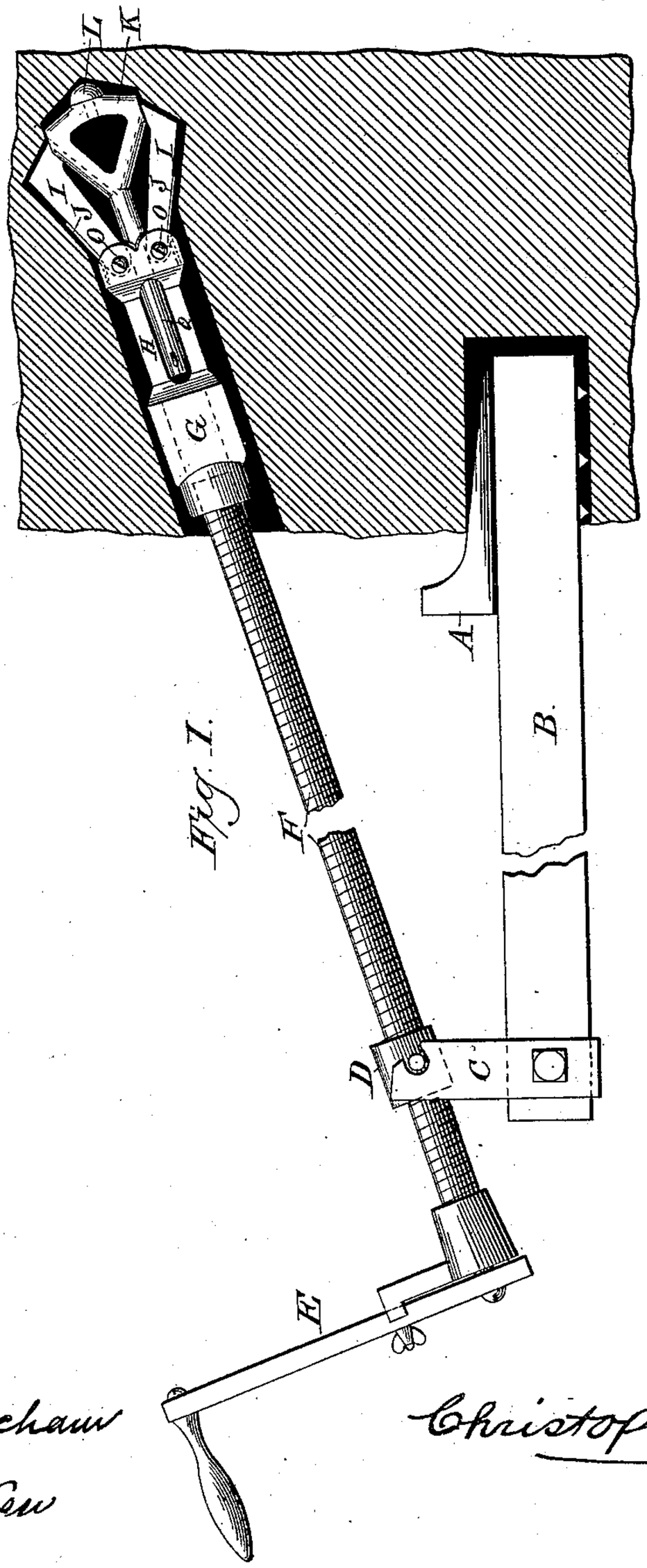

Fig. 1.

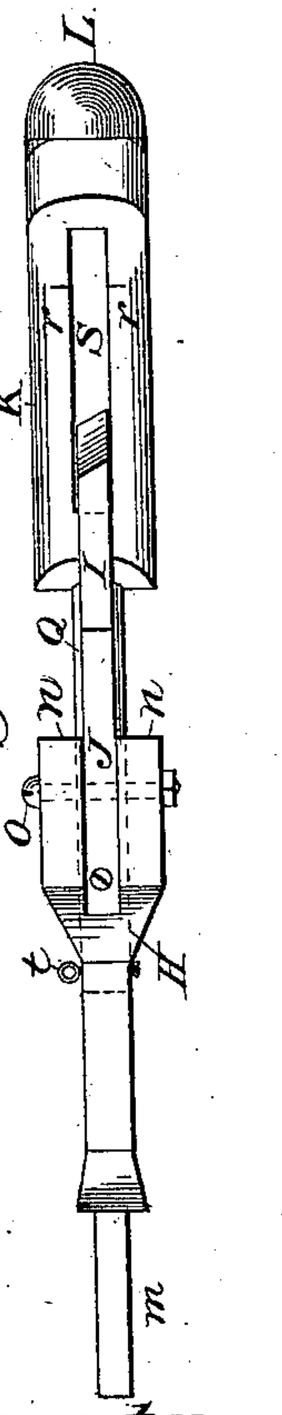

Fig. 3.

Witnesses;

James. Beacham

John F. Wrew

Inventor;

Christopher Wren

UNITED STATES PATENT OFFICE.

CHRISTOPHER WREN, OF PLYMOUTH, PENNSYLVANIA.

EXPANDING REAMER.

SPECIFICATION forming part of Letters Patent No. 294,714, dated March 4, 1884.

Application filed November 16, 1883. (No model.)

To all whom it may concern:

Be it known that I, CHRISTOPHER WREN, a citizen of the United States, residing at Plymouth, in the county of Luzerne and State of Pennsylvania, have invented a certain new and useful Expanding Reamer for use in Coal, (which has not to my knowledge or belief been in public use in the United States for more than two years prior to this application,) of which the following is a specification.

My invention relates to expanding reamers in which a threaded box and a screw operate, in conjunction with rotating cutters, inclined planes, and a jam-head, to form at the inner extremity, or along the length of the hole which is made for containing the explosive cartridge in the operation of blasting, a recess or recesses for the reception of said explosive cartridge; and the object of my invention is to provide an expansible reamer which, when closed, may be passed along to any point in a hole that has first been made with a hand-drill or otherwise, which may there be expanded laterally, and which may there be again collapsed and taken out of said hole, leaving the mouth of the hole to remain as it was at first. I attain these objects by means of the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a vertical view, showing all the parts of the reamer in position, together with a supporting-bar, B, the reamer being expanded. Fig. 2 is a view of the reamer detached and closed. Fig. 3 is a view of the reamer on its edge. Fig. 4 is a transverse section of the carrier-arm H on the line *z z*, Fig. 2, and shows the slot *p*, with the stem Q therein. Fig. 5 is a side view of cutter, I, detached. Fig. 6 is a transverse section of head K on the line *y y*, Fig. 2, and shows ribs *r* and channels *s*.

Similar letters refer to similar parts in all the views.

The wedge A, supporting-bar B, and stand C, forming the support of the threaded box D and screw F (shown in the drawings) are no part of my invention.

The reamer is operated in a hole which has first been made with a hand-drill or otherwise, and is specially designed for use in coal and its accompanying slates.

In a threaded box or nut, D, turns a screw, F, to one end of which, by means of a coupling, G, is connected a carrier-arm, H, which carries around the cutters I by means of the lugs *n n*, and also the head K, having an irregular-sided stem, Q, by means of a longitudinal slot, *p*, which receives the stem Q into it.

In case it is desirable to reach a greater depth in the hole than the screw F will reach, the reamer may be extended farther forward by splicing a piece of plain iron, or the spiral-twisted drill used by miners in drilling the initial hole, to the end of screw F by means of suitable couplings.

The jam-head L is secured to one end of head K.

The purposes served by crank E, screw F, and threaded box D are to rotate and feed forward the carrier-arm H and cutters I, and to rotate the head K and jam-head L, which have no forward motion, being pressed backward by jam-head L coming in contact with the inner extremity of the hole, the screw F serving also as a mandrel for carrying the working parts of the reamer.

The carrier-arm H is provided on one end with a suitable tongue, *m*, to fit into coupling G, before mentioned, and on the other end with lugs *n n*, between which the cutters I pass loosely, and are held by the pins O, and with an irregular-sided longitudinal slot, *p*, (see Fig. 4,) of proper size and shape to receive stem Q.

The springs J are secured at one end to carrier-arm H, and at the other end press against the outer edge of cutters I, preventing them from falling outward when being passed along to the desired position in the hole.

The cutters I are made of steel, with holes in them at one end to receive the pins O, are beveled on the other end to present a cutting-edge, and along a portion of their length they are cut away to allow them to span the stem Q, and to meet through a division in said stem, hereinafter referred to.

The head K is provided on one end with an irregular-sided stem, Q, divided along a portion of its length, and also with two or more longitudinal inclined planes, (two in the present instance,) up which the cutters I travel, and are expanded in channels *s*, formed by parallel ribs *r*, (see Fig. 6,) the ribs *r* serving

to guide, steady, and assist in carrying around the cutters I.

t is a pin passing through the loose end of stem Q, to prevent it from drawing out of slot *p*, before mentioned.

The jam-head L is secured to one end of head K, and is made rounded and smooth, so as to present a blunt surface at that part where it rubs against the inner extremity of the cartridge-hole.

The screw F may be driven by a crank applied on its end, as shown; or it may be furnished with suitable bevel-gearing, and be driven on the side by means of a crank, E.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination, in an expanding reamer for use in coal, cutting with a rotary motion, of the crank E, threaded box or nut D, and screw F, having a coupling, G, with a carrier-arm, H, cutters I, springs J, head K, and jam-head L, all substantially as shown and described.

2. A carrier-arm, H, having a tongue, *m*, lugs *n*, and an irregular-shaped longitudinal slot, *p*, through it, substantially as shown and described, and for the purpose set forth.

3. In an expanding coal-reamer operating with a rotary motion and continuous feed by means of a screw, the application of a jam-head, L, to the purpose of attaining a reflex action for the purpose of expanding the cutters, substantially as described and set forth.

4. The combination of the threaded box D, screw F, and crank E, operating in such a manner that the feed is continuous when the reamer is revolved, for the purposes set forth, substantially as shown and described.

CHRISTOPHER WREN.

Witnesses:

JAMES BEACHAM,

WILLIAM BEACHAM.