

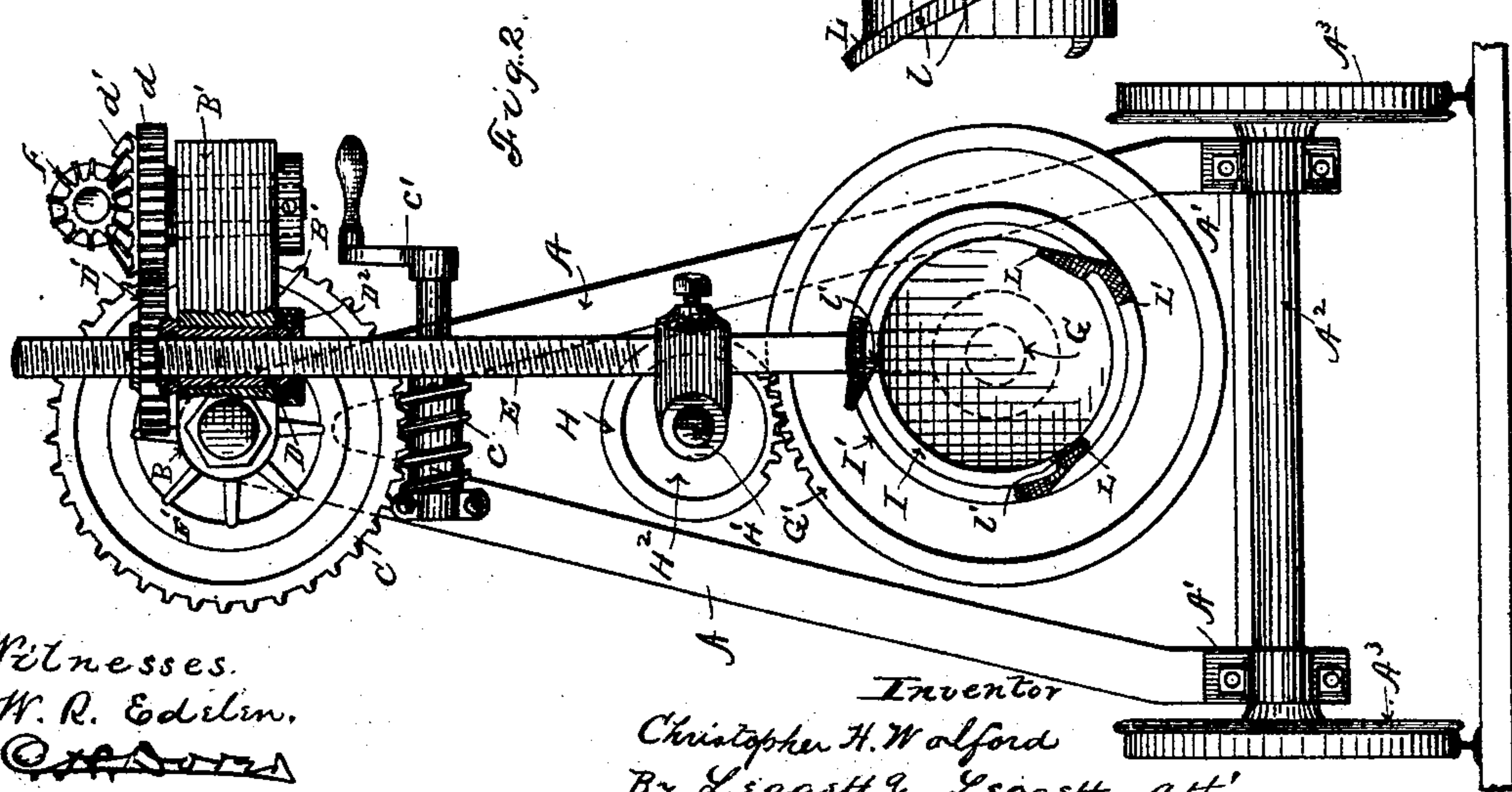
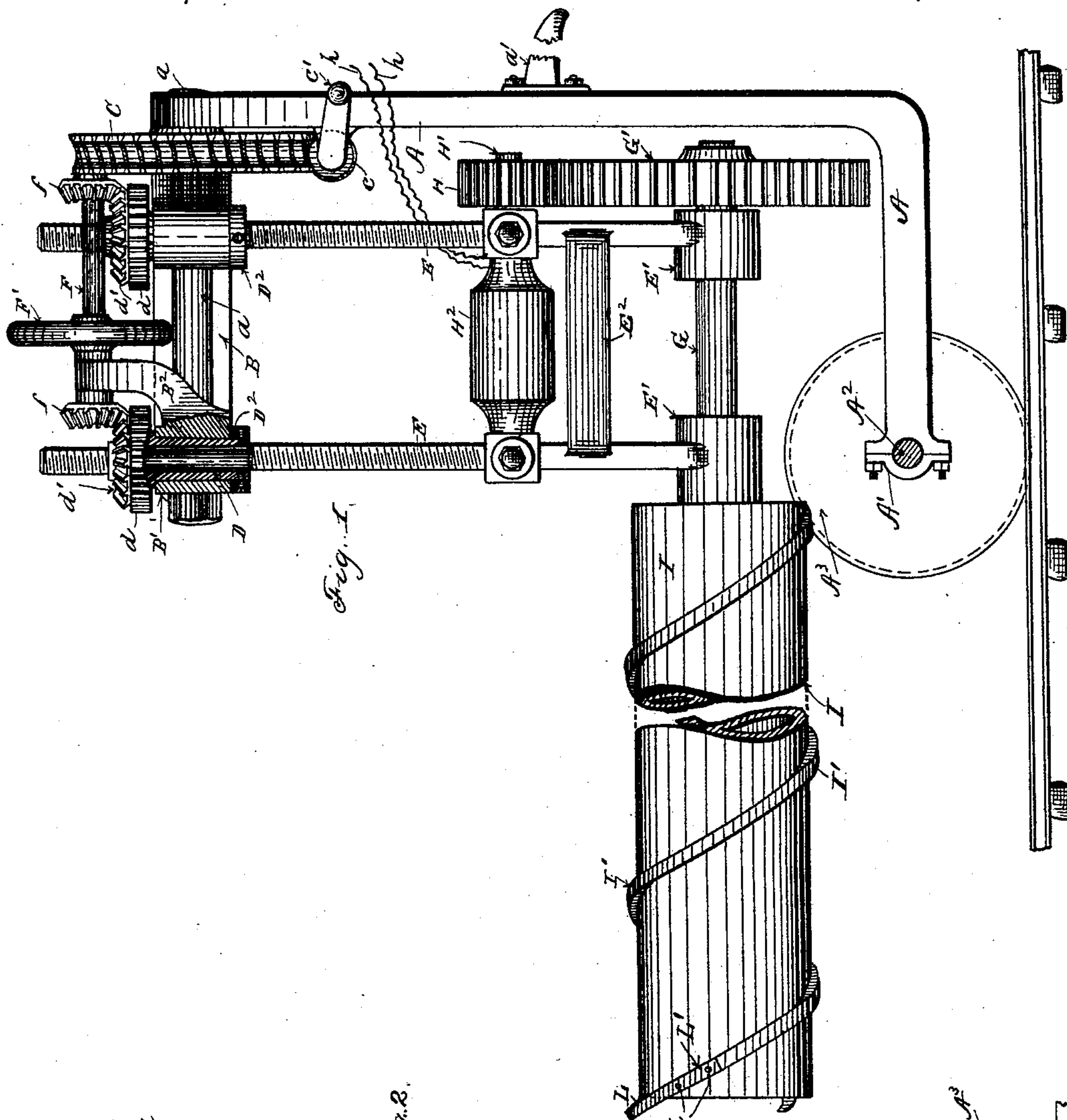
(No Model.)

2 Sheets—Sheet 1.

C. H. WOLFORD.
COAL MINING MACHINE.

No. 444,476.

Patented Jan. 13, 1891.



Witnesses.
W. R. Edlin.

Inventor
Christopher H. Wolford
By Leggett & Leggett attys

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Fig. 3.

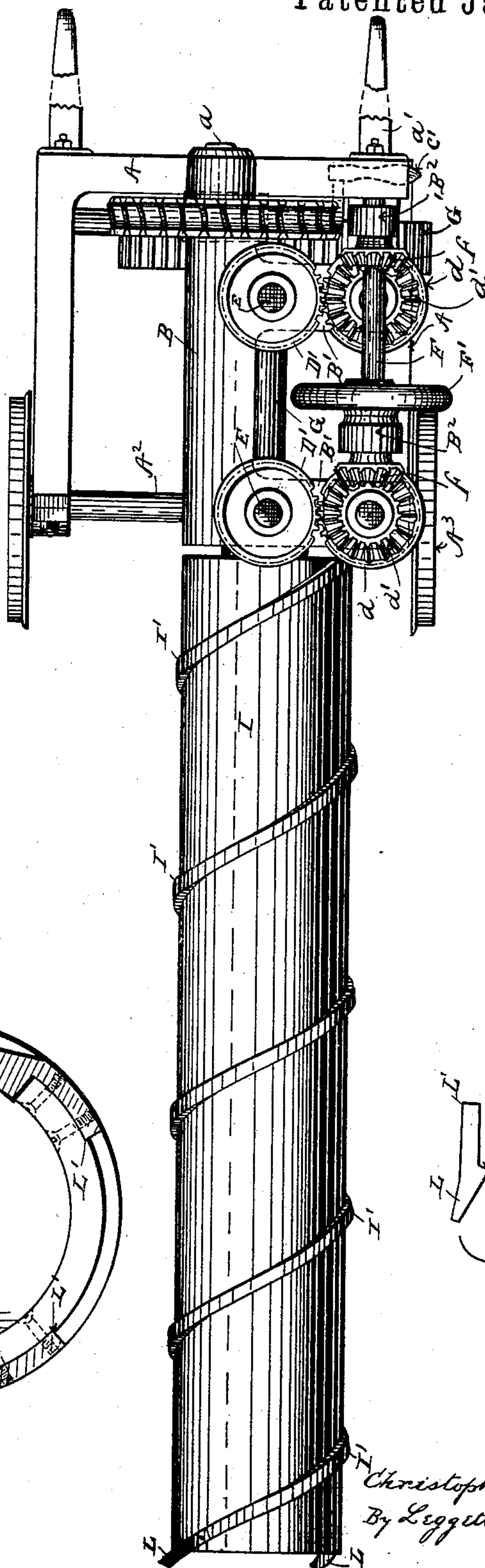


Fig. 4.

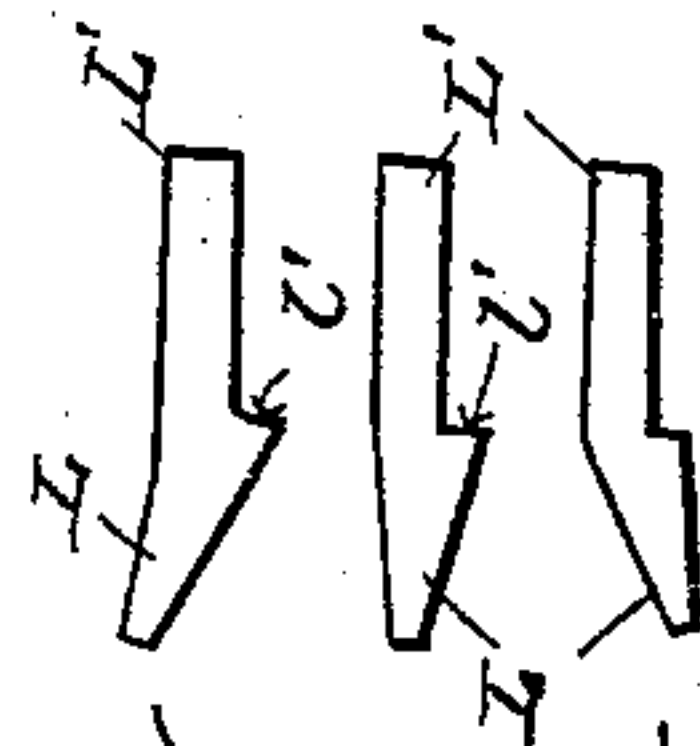
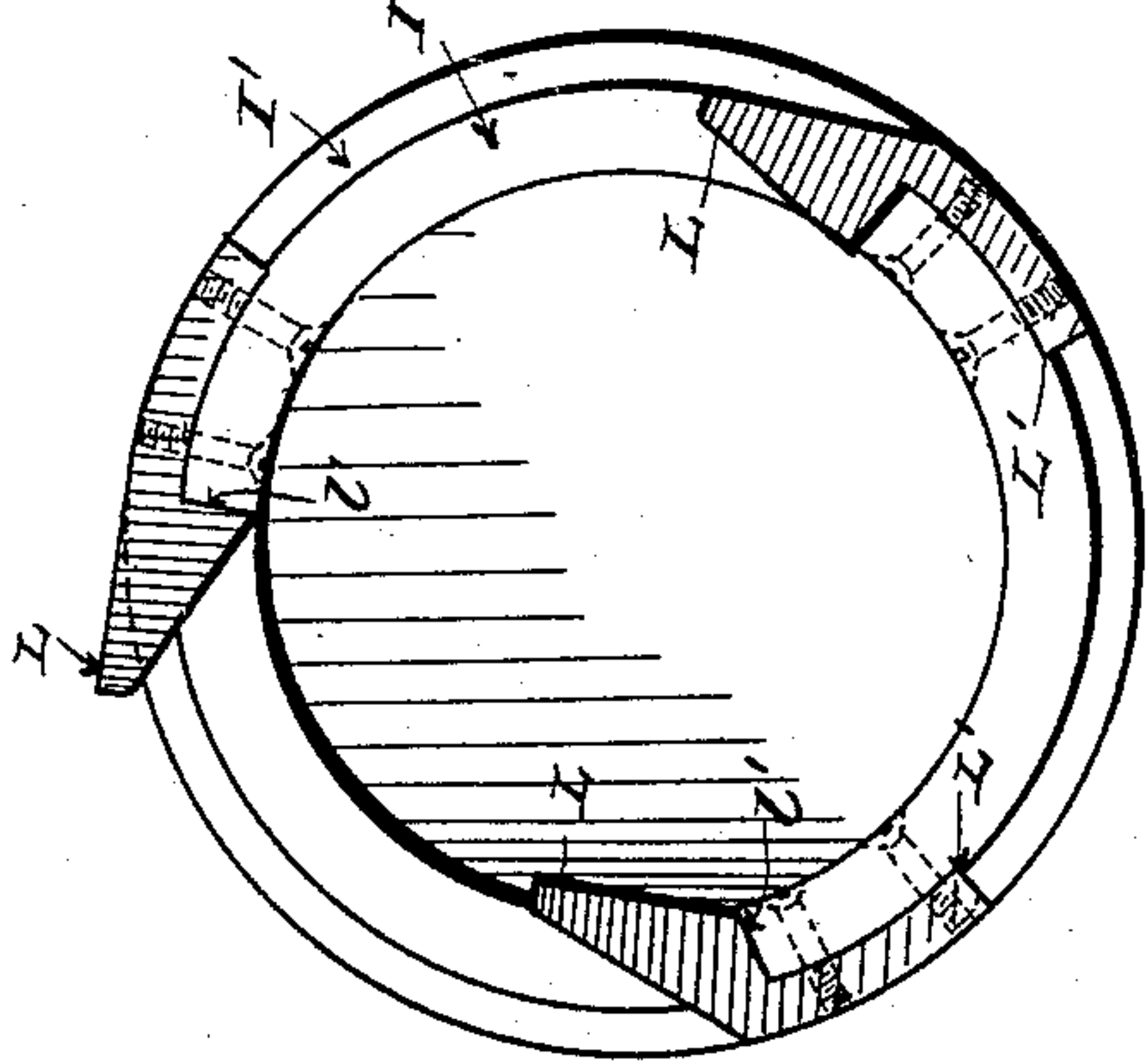


Fig. 5.

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UNITED STATES PATENT OFFICE.

CHRISTOPHER H. WOLFORD, OF CORRY, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO JAMES A. ANDERSON, OF BEDFORD, OHIO.

COAL-MINING MACHINE.

SPECIFICATION forming part of Letters Patent No. 444,476, dated January 13, 1891.

Application filed May 23, 1890. Serial No. 352,932. (No model.)

To all whom it may concern:

Be it known that I, CHRISTOPHER H. WOLFORD, of Corry, in the county of Erie and State of Pennsylvania, have invented certain new and useful Improvements in Coal-Mining Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use the same.

My invention relates to improvements in coal-mining machines; and it consists in certain features of construction and in combination of parts hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 is a side elevation. Fig. 2 is a front end elevation. Fig. 3 is a plan. Fig. 4 is an enlarged end elevation of the cutting mechanism. Fig. 5 shows side elevations in detail of the cutters.

A represents a forked metal standard or frame, the legs thereof diverging downward, these legs being bent forward, as shown, and terminating in boxes A', in which is journaled axle A², the latter having attached wheels A³ for supporting and moving the structure.

To the upper end of the standard or frame is rigidly attached the forwardly-projecting shaft a, on which shaft is mounted sleeve B.

On the sleeve is mounted a worm-gear C, that engages a worm c, the shaft of the latter being journaled in suitable boxes connected with the supporting-frame, this shaft being provided with a hand-crank c' for operating the worm.

Sleeve B has laterally-projecting lugs B' bored vertically for receiving loosely sleeves D. These sleeves are preferably integral with gears D', that rest on top of the lugs, these sleeves being provided with collars D², engaging the under sides of the lugs. Sleeves D are screw-threaded internally for engaging the screw-threads of shafts E E. Hence by turning these sleeves shafts E E are raised or lowered. The gears D' engage gears d, the latter being mounted on upright rods connected with lugs B'. Gears d on top have beveled teeth d' for engaging beveled pinions ff, the latter being mounted in common on

shaft F. This shaft is provided with a hand-wheel F' for operating the same. The shaft F is supported by arms B², the latter being attachments of lug B'; usually, or, if preferred, these arms may connect with sleeve B. With such construction it is evident that by operating-wheel F' shafts E E may be raised or lowered in unison, and by operating crank c' shafts E E may be swung in a vertical plane, and may be made to stand at any desired angle. Shafts E terminate in heads E', these heads being bored horizontally to receive and provide journal-bearings for shaft G. This shaft is provided with a gear G', the latter engaging pinion H of motor-shaft H'. Preferably an electric motor H² is employed, the motor-frame being rigidly secured to shafts E E. The electric wires h connecting with the motor should have sufficient slack to enable the machine to be moved and operated as may be required. Shafts E are connected by one or more cross-bars E², these shafts and the cross-bars constituting a rigid frame, and the shafts constituting the legs of such frame.

I is a cylinder or large tube, say, ten inches (more or less) in diameter and, say, five or six feet (more or less) in length. This tube has a solid head at the rear end for attaching it to the forward end of shaft G. Tube I is provided externally with a spiral rib I' for discharging the chips. The forward end of the tube is provided with a series of cutters L, these cutters having preferably the same spiral trend as the rib I'. Any number of these cutters may employed, more or less, according to circumstances.

A preferable construction of the cutters is shown, each cutter comprising a shank L', adapted to fit the outside of the tube I, to which it may be secured by screws l, the heads of these screws being countersunk flush with the inner surface of the tube. These cutters should have shoulders l' for engaging the end of the tube, whereby the end-thrust of the cutters is sustained, and preferably the end of the tube is notched to receive these shoulders. The points of the cutters should resemble the points of a pick rather than a chisel, as the design is to break out small pieces of coal with these cutters rather than

to scrape or cut the coal. The points of the cutters do not travel in the same path, but are respectively deflected out or in, so as to cut a groove that will clear the tube and rib
 5 I'. The tube will likely have walls about three-sixteenths or a quarter of an inch in thickness, and the spiral rib will likely be of about the same thickness, so that a groove, say, five-eighths or three-quarters of an inch wide will
 10 be sufficient for the purpose.

In undermining a body of coal with a pick a large quantity of coal is broken so fine that it is of little value, whereas with my improved machine a solid core of coal is left uninjured inside the tube.
 15

The standard or frame A is provided with rearwardly-projecting handles *a' a'* for operating the machine, and as the machine is nearly balanced on wheels *A³* the operator
 20 has no difficulty in managing the machine, which is forced forward by hand to cause the cutters to engage the wall of coal. When one hole has been made, say, the length of cylinder I, the machine is backed out, and a series
 25 of holes may be made side by side so close together as to cut the one into the other, thus forming a continuous chamber for breaking down the coal from above; also, by operating crank *c* the tube I may be turned laterally or
 30 the swinging frame may be reversed, so that holes may be cut several feet from the floor, and by manipulating hand-wheel *F'* the sweep of tube I may be increased or diminished—that is, the swinging frame may be
 35 lengthened or shortened.

What I claim is—

1. The combination, with a coal-mining machine, of a frame, a shaft secured to the upper end of this frame, sleeves revolubly sup-

ported by the shaft, screw-threaded rods 40 passing through the sleeves, a drill secured to the rods, and means for turning the sleeves, whereby the rods and drill are raised or lowered relatively to the frame, substantially as set forth. 45

2. The combination, with a frame, a shaft projecting from the upper end of the latter, a sleeve loosely mounted on said shaft and lugs connected with the said sleeve, and sleeves revolubly supported by the lugs, of a 50 drill, threaded rods extending therefrom into the rotary sleeves, and gearing for swinging the sleeve on the shaft and for rotating the sleeves in the lugs, whereby the drill may be swung laterally and be raised or lowered, substantially as set forth. 55

3. The combination, with a frame mounted on suitable rollers or wheels and having handles thereon, a shaft projecting from the upper end of the frame, a sleeve loosely mounted 60 on the shaft, a worm-gear mounted on the sleeve, and a worm for operating with this worm-gear, whereby the sleeve is rocked, of a hollow drill, a motor, gearing for communicating motion from the motor to the drill, 65 screw-threaded rods extending upward from the drill, revolubly-supported sleeves through which the rods pass, and gearing for rotating said sleeves, whereby the drill is raised or lowered, substantially as set forth. 70

In testimony whereof I sign this specification, in the presence of two witnesses, this 9th day of May, 1890.

CHRISTOPHER H. WOLFORD.

Witnesses:

CHAS. H. DORER,
 WARD HOOVER.