

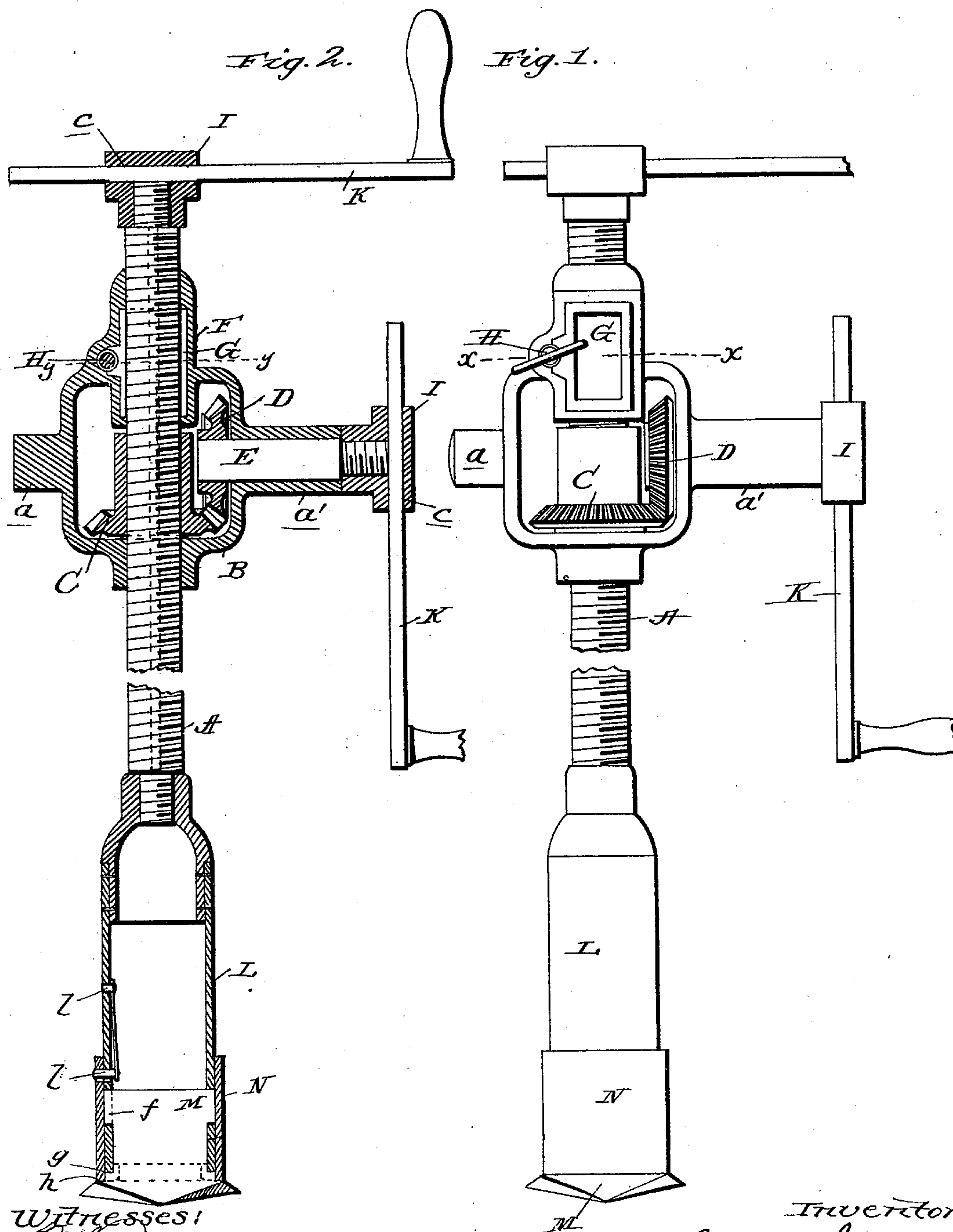
(No Model.)

2 Sheets—Sheet 1.

G. W. THAYER.  
COAL DRILL.

No. 516,512.

Patented Mar. 13, 1894.



*Witnesses!*

H. Paeder  
M. G. Matthews.

*Inventor*

By Geo. W. Thayer  
James Shuby  
Attorneys

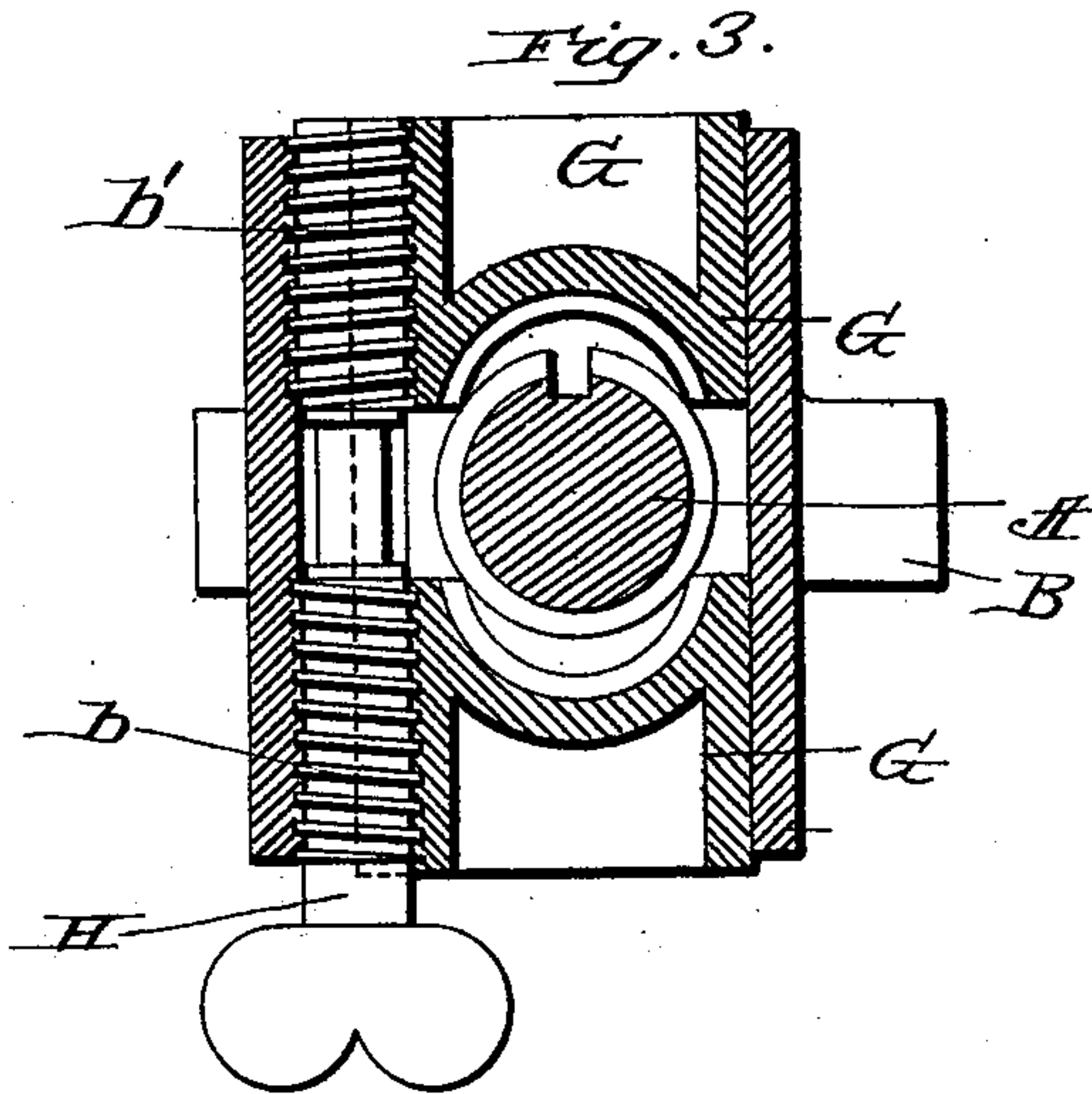
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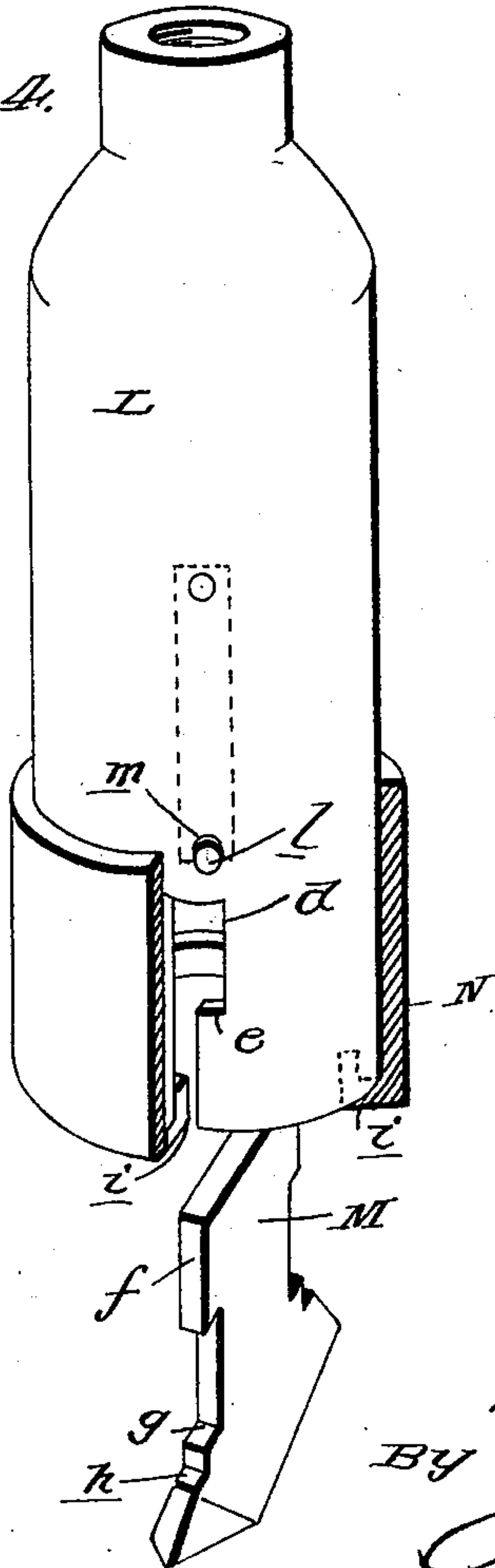
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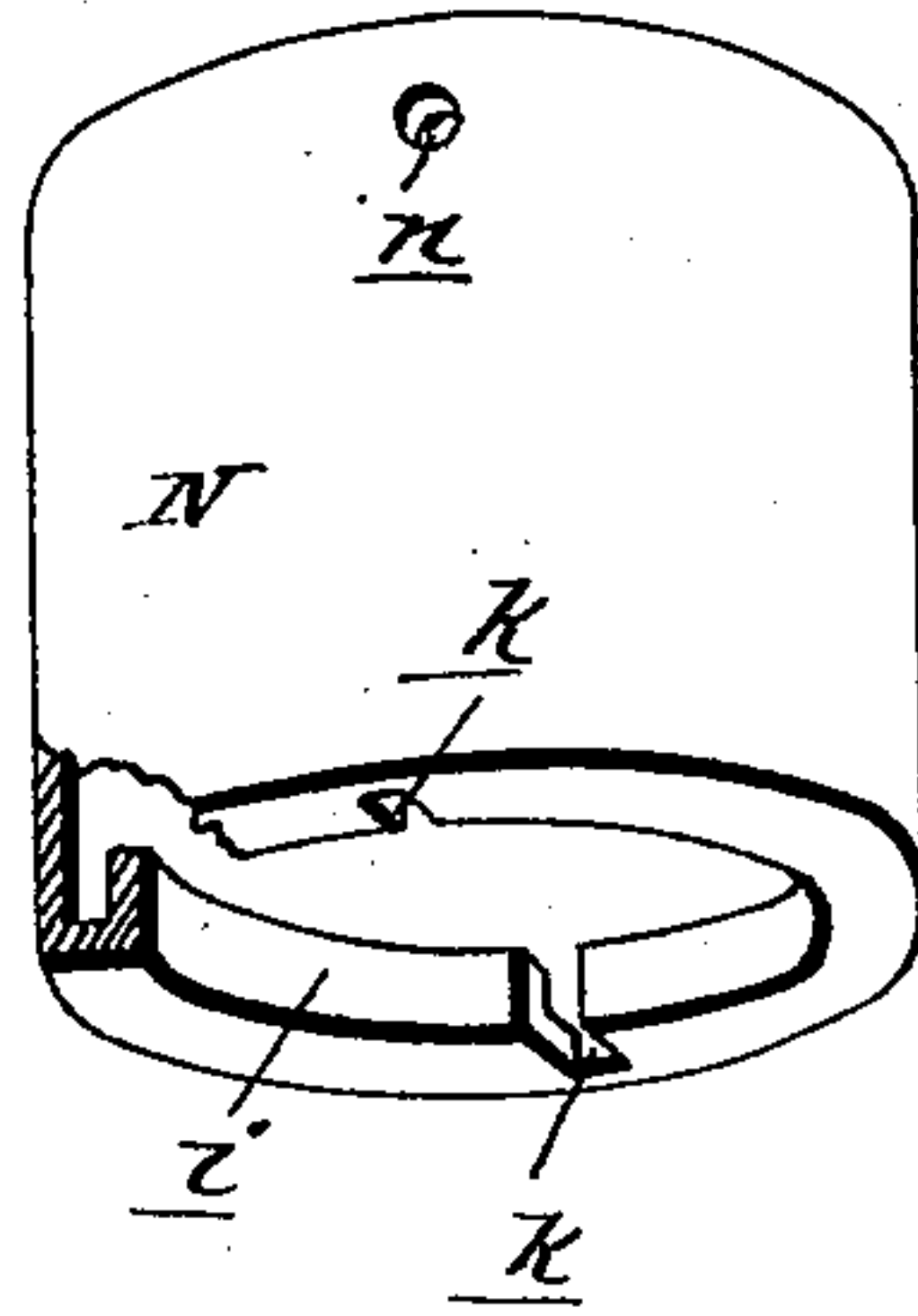
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*Fig. 4.*



*Fig. 5.*



Witnesses:

*C. H. Raider*  
*H. G. Matthews.*

Inventor

*Geo. W. Thayer*

BY

*James J. Sheehy*

Attorney



# UNITED STATES PATENT OFFICE.

GEORGE W. THAYER, OF OTTUMWA, IOWA.

## COAL-DRILL.

SPECIFICATION forming part of Letters Patent No. 516,512, dated March 13, 1894.

Application filed October 13, 1893. Serial No. 488,066. (No model.)

*To all whom it may concern:*

Be it known that I, GEORGE W. THAYER, a citizen of the United States, residing at Ottumwa, in the county of Wapello and State of Iowa, have invented certain new and useful Improvements in Coal-Drills; and I do 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 appertains to make and use the same.

My invention relates to improvements in coal drills; and its novelty will be fully understood from the following description and claims when taken in connection with the annexed drawings, in which—

Figure 1, is an elevation of a drill embodying my invention. Fig. 2, is a longitudinal section of the same with parts in elevation. Fig. 3, is an enlarged, transverse section taken in the plane indicated by the line  $x, x$ , of Fig. 2, and the line  $y, y$ , of Fig. 2. Fig. 4, is a perspective view, partly broken away, illustrating the cutter head, the cutter and the sleeve for effecting a connection between the cutter head and cutter, and Fig. 5, is a perspective view, partly in section illustrating the said sleeve.

In the said drawings, similar letters designate corresponding parts throughout the several views, referring to which—

A, indicates the feed-rod of the drill which is exteriorly threaded and is preferably provided with a spline groove, as illustrated; and B, indicates the boxing which surrounds and supports the feed-rod. This boxing B, is preferably of the form shown so as to receive within it the gear wheels C, and D, and it is provided with the lateral trunnions  $a, a'$ , the latter of which is hollow as illustrated, so as to afford a bearing for the crank shaft E, presently described. The said boxing B, is furthermore provided with a frame F, which is by preference, of a general rectangular form; and in this frame are arranged the slidable sections G, which have their inner ends threaded and are designed to engage the threads of the feed-rod, so that when said rod is rotated it will be fed or moved through the boxing. These rod engaging-sections G, are also provided in one of their sides (see Fig. 3.)

with threads for the engagement of the oppositely directly threads  $b, b'$ , of the screw H, which turns in the boxing and is provided with a suitable head, as shown. By this construction, it will be perceived that the sections G, may be readily moved out of engagement with the rod A, to permit the rod to move loosely through the boxing; and it will also be seen that the said sections may as readily be moved into engagement with the rod at any point in the length thereof so as to cause the rod to move endwise when it is rotated.

As better shown in Fig. 2, of the drawings, the outer ends of the rod A, and the shaft E, are preferably reduced and threaded, for the engagement of the crank connecting nut I, which is preferably used alternatively upon the rod A, and the shaft E, although a nut may be employed in conjunction with each shaft, as illustrated, if desired. These nuts I, are provided with a threaded bore to engage the ends of the rod A, or shaft E, and they are also provided with a socket  $c$ , which is disposed at an angle to the threaded bore with which it communicates and is designed to receive a bar or crank as K. In securing a bar or crank on the rod A, or shaft E, it is simply necessary to turn the nut I, partly upon the rod or shaft and then pass the bar or crank K, into or through the socket  $c$ , and continue turning the nut until the end of the rod or shaft binds against the bar or handle when the same will be securely fixed against casual disconnection.

L, indicates the cutter head of the drill which is preferably tubular and is provided with a threaded bore to receive the end of the feed rod.

M, indicates the cutter, and N, indicates the collar, which serves to effect a connection between the cutter and head.

The cutter head L, is provided at its lower end and at diametrically-opposite points with open slots as  $d$ , which have their upper portion enlarged in width as illustrated so as to form the shoulders  $e$ . These slots  $d$ , are designed to receive the cutter M, which has its side edges recessed as shown so as to form the head  $f$ , and the shoulders  $g$ , and  $h$ , for a purpose presently described. The collar N is



provided at its lower end with the inwardly and upwardly bent flange *i*, and with diametrically opposite notches as *k*; and the said collar is connected with the head L, by the spring-pressed stud *l*, which is designed to take through apertures *m*, and *n*, with which the head and collar are provided, as illustrated.

To effect a connection of the cutter M, to the head L, by the means described, it is simply necessary to place the collar N, upon the cutter-head so that the lower end of said head will rest in the flange *i*, and the notches *k*, will be in alignment with the slots *d*. The head *f*, of the cutter is then introduced through the notches *k*, into the slots *d*, and is raised until it rests above the shoulders *e*, when the collar N, is turned upon the head L, until the stud *l*, enters the aperture *n*. When this takes place it will be seen that the shoulders *g*, will rest against the lower edge of the head L, and the shoulder *h*, against the lower edge of the collar N, and the cutter will be fixedly secured in position. To remove the cutter when it is dulled or broken, it is simply necessary to disengage the stud *l*, from the collar N, when said collar may be turned so as to carry the notches *k*, into alignment with the slots *d*, and permit the cutter to drop out. The cutter M, as will be readily observed is of such a size that a miner may carry a number in his pocket; and by reason of the construction described it will be seen that when a cutter is dulled or broken the miner may quickly and easily remove the same and may as quickly secure a new cutter in the head, which is a desideratum. Again it will be seen that should the head L, be broken or damaged it may be readily removed and a new head secured in position without the objectionable necessity of carrying the entire machine to a machinist.

In the practical operation of the drill, the trunnions *a*, *a'*, are journaled in a suitable support and the feed rod A, is fitted with a cutter head as L. The drill is then ready for operation and rotary motion may be applied to the rod A, direct, through the medium of a crank connected to the end thereof, or may be applied through the medium of the shaft E, gear D, and gear C, the latter being provided with a spline or feather to engage the groove in the rod.

It will be noticed from the foregoing description taken in connection with the drawings that my improved drill is both simple and advantageous and that it embodies no parts that are likely to get out of order. It will also be noticed that any frictional wear that may take place, may be readily taken up by bringing the sections G, closer together.

I am well aware that it is old in rock drills to provide in conjunction with a threaded feed rod, a feed mechanism comprising a nut made in two sections and having springs in-

terposed between the contiguous edges of the sections and adapted to press and hold them out of engagement with the rod, slidable jaws engaging the nut sections, and a shaft having oppositely directed threads in engagement with the slidable jaws and adapted to move said jaws toward the rod to press the nut sections into engagement therewith and away from the rod to enable the springs between the nut sections to press them out of engagement with the rod. This construction however, is objectionable for the reason that the springs between the nut sections are easily broken and are liable after slight use to become so weak as to be unable to press the sections entirely out of engagement with the feed rod so as to permit of longitudinal adjustment thereof; and it is therefore inferior to my improved construction in which the threads are formed upon the inner sides of the slidable sections and are positively moved into and out of engagement with the feed rod by the manipulation of a screw.

Having described my invention, what I claim is—

1. In a drill, the combination with a rotary threaded rod or shaft and a crank; of a coupling nut having a threaded bore to receive the threaded end of the rod or shaft and also having a socket arranged at the inner end of the bore and disposed at an angle thereto; the said socket being adapted to receive the crank and the crank being adapted to rotate the nut so that the crank will be bound against the end of the rod or shaft, substantially as specified.

2. In a drill, the combination with a cutter-head having slots as *d*, at its lower end the said slots having their upper portions enlarged so as to form shoulders as *e*; of a cutter provided with a head *f*, adapted to engage the shoulders *e*, of the slots *d*, a collar for holding the head of the cutter in engagement with the shoulders *e*, and a suitable means for fixing the collar with respect to the cutter head, substantially as and for the purpose set forth.

3. In a drill, the combination with a tubular cutter head having slots *d*, at its lower end provided with shoulders as *e*, and a cutter having a head as *f*, to engage the shoulders *e*, and also having shoulders as *g*, *h*; of a collar as N, having an upwardly and inwardly extending flange provided with notches as *k*, and a suitable means for securing the collar upon the cutter head, substantially as and for the purpose set forth.

4. In a drill, the combination with a feed rod having a threaded end; of a tubular cutter-head having a threaded bore to receive the feed rod and also having slots as *d*, at one end provided with shoulders as *e*, a cutter having a head as *f*, to engage the shoulders *e*, and also having shoulders as *g*, *h*, a



collar as N, having an inwardly and upwardly  
extending flange provided with diametrical  
notches as *k*, and also having an aperture as  
*n*, and a spring pressed stud carried by the  
5 cutter-head and adapted to engage the aper-  
ture *n*, of the collar, all substantially as and  
for the purpose set forth.

In testimony whereof I affix my signature in  
presence of two witnesses.

GEO. W. THAYER.

Witnesses:

GEO. A. BROWN,  
EMMA ANDERSON.