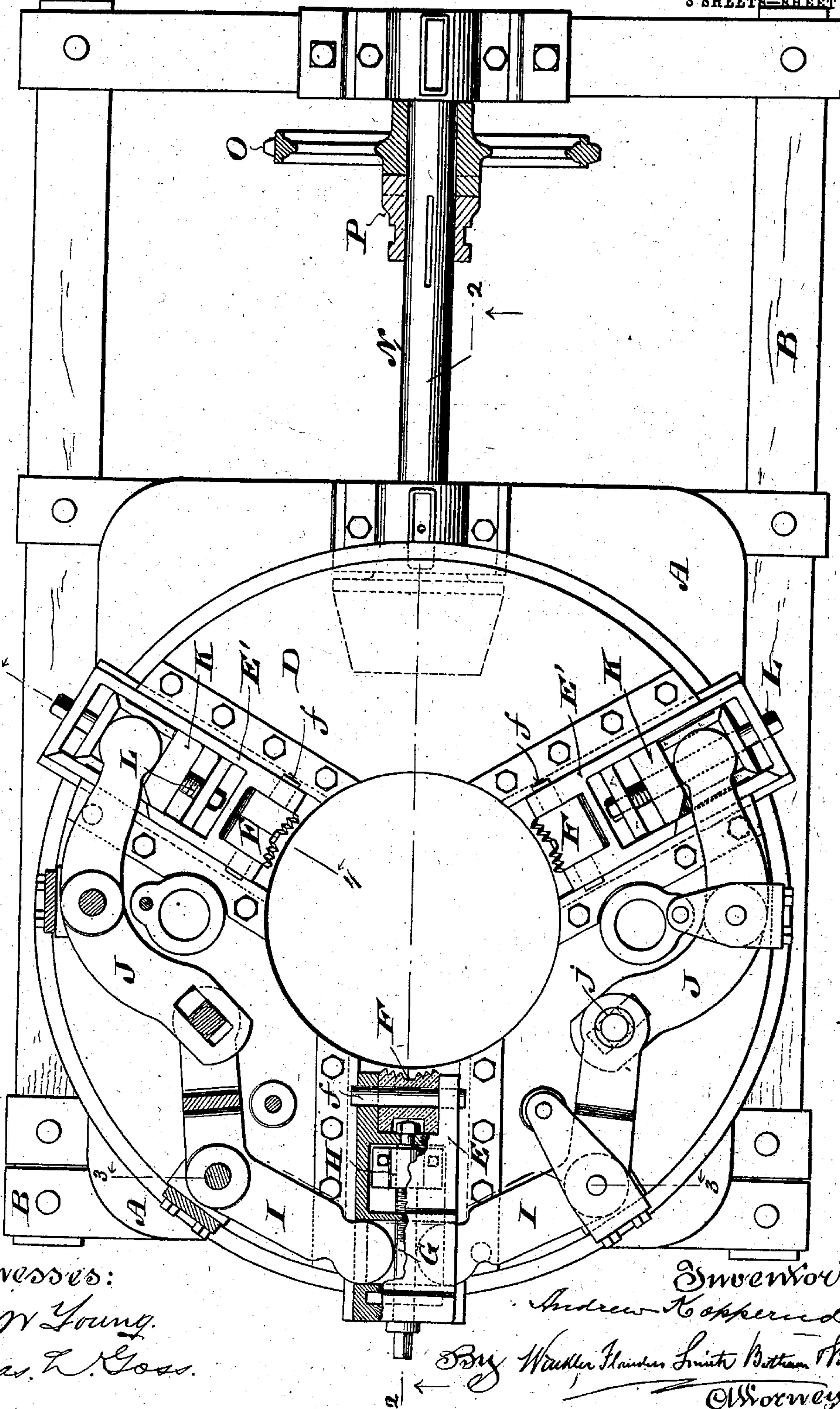


A. KOPPERUD.  
WELL BORING MACHINE.  
APPLICATION FILED APR. 7, 1902.

NO MODEL.

3 SHEETS—SHEET 1.

*Fig. 1.*



Witnesses:  
Geo W Young.  
Chas. L. Goss.

Inventor:  
Andrew Kopperud  
By Wadler Hansen Smith Bottom Piles,  
Norway.



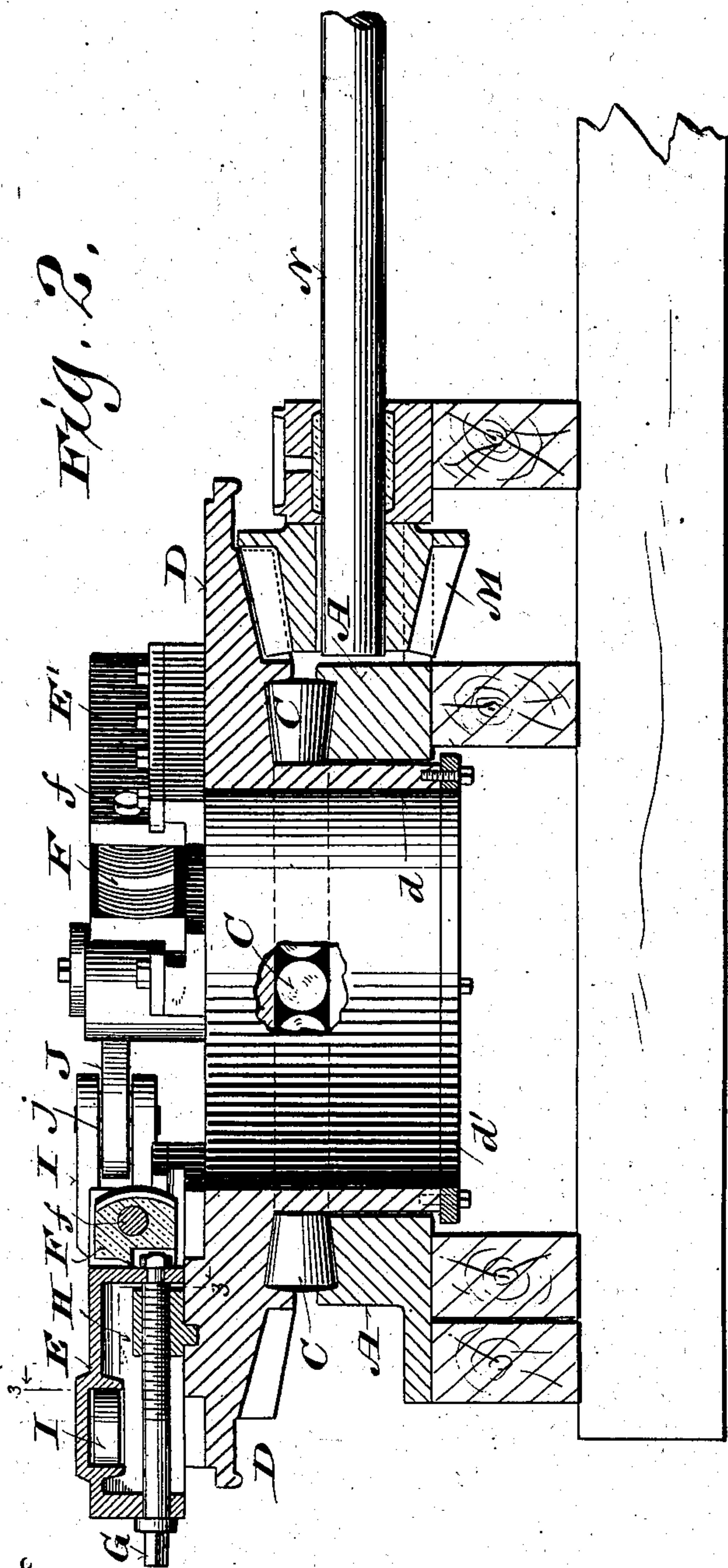
No. 730,272.

PATENTED JUNE 9, 1903.

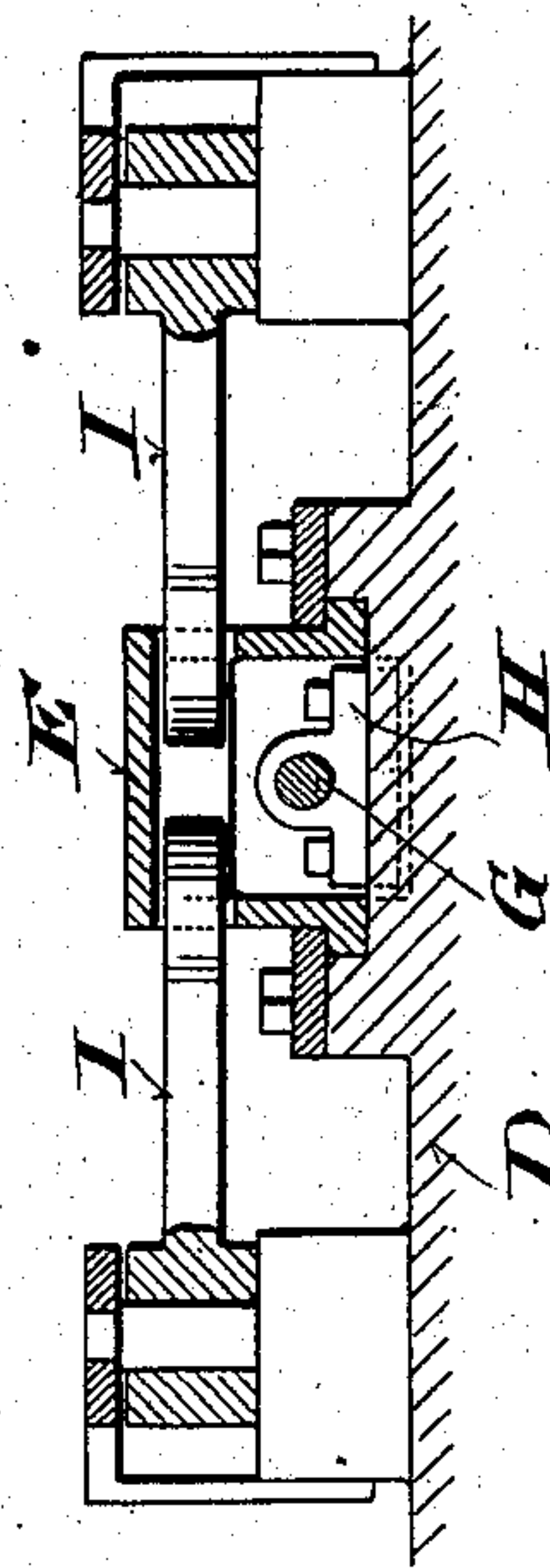
A. KOPPERUD.  
WELL BORING MACHINE.  
APPLICATION FILED APR. 7, 1902.

NO MODEL.

3 SHEETS—SHEET 2.



*Fig. 3.*



Witnesses  
Geo W Young,  
Chas L Ross.

Inventor:  
Andrew Kopperud,  
By Wicker Flauder Smith Patton & Co.,  
Attorneys.

A. KOPPERUD.  
WELL BORING MACHINE.  
APPLICATION FILED APR. 7, 1902.

NO MODEL.

3 SHEETS—SHEET 3.

Fig. 5.

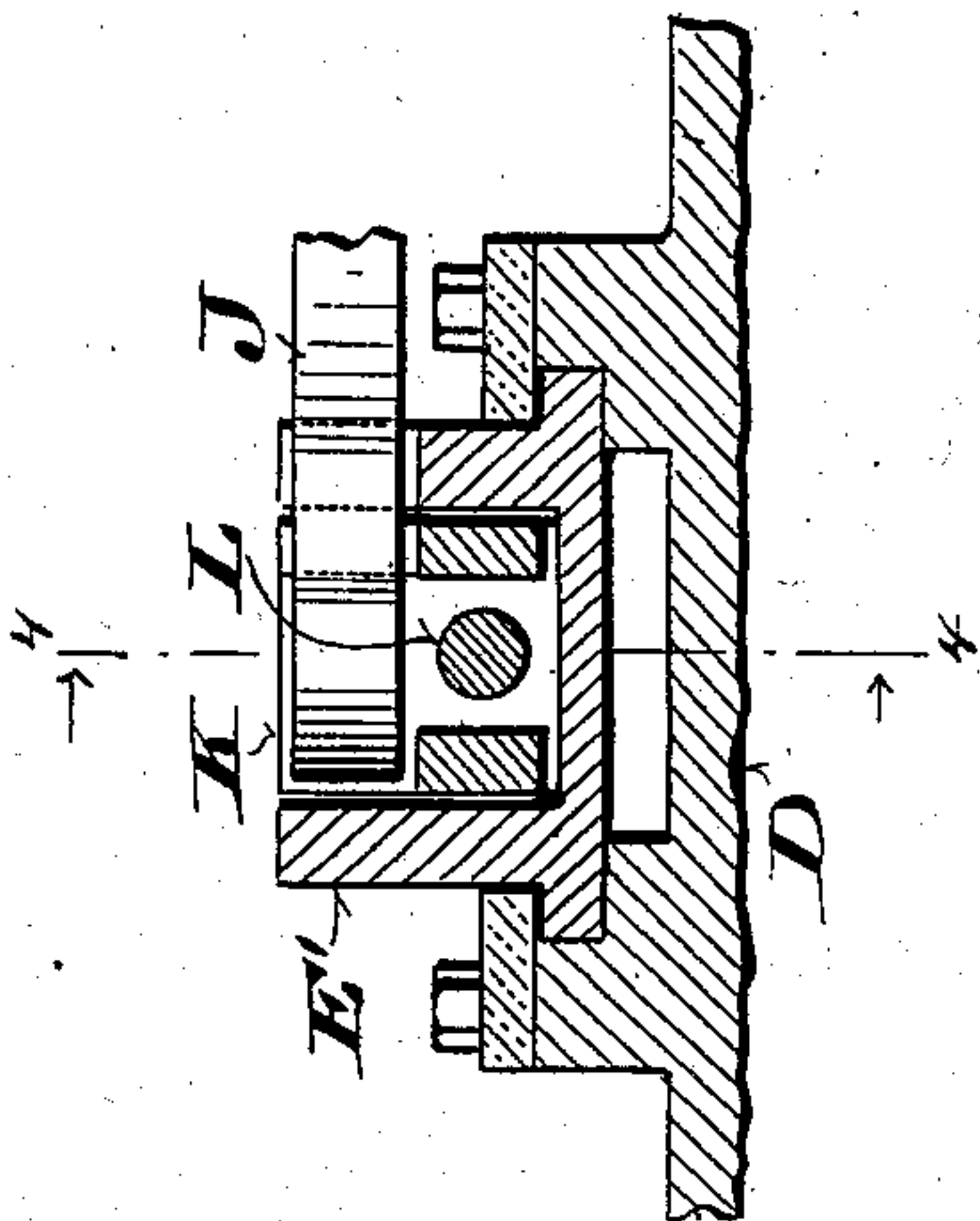


Fig. 4.

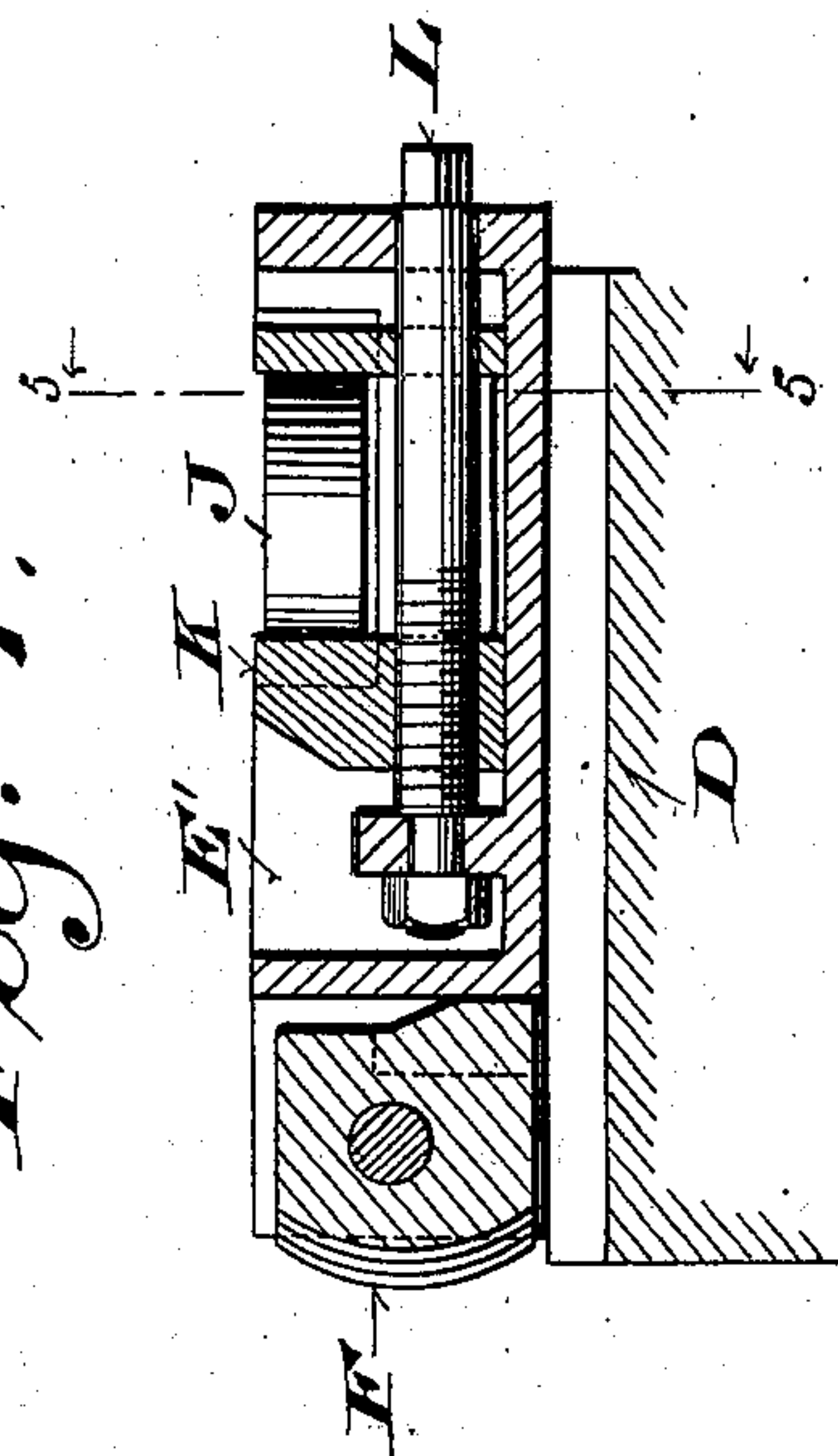
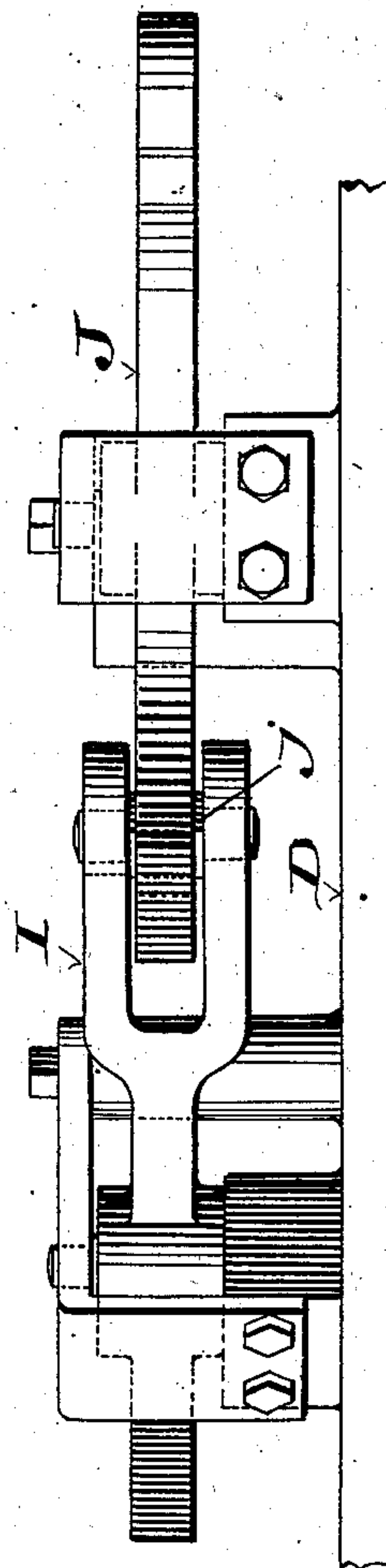


Fig. 6.



Witnesses:

Geo. W. Young.

Chas. L. Goss.

Inventor:

Andrew Kopperud.

By Wm. H. H. Smith & Co. Attorneys

Attorneys.



# UNITED STATES PATENT OFFICE.

ANDREW KOPPERUD, OF MILWAUKEE, WISCONSIN.

## WELL-BORING MACHINE.

SPECIFICATION forming part of Letters Patent No. 730,272, dated June 9, 1903.

Application filed April 7, 1902. Serial No. 101,771. (No model.)

*To all whom it may concern:*

Be it known that I, ANDREW KOPPERUD, a subject of the King of Sweden and Norway, residing at Milwaukee, in the county of Milwaukee and State of Wisconsin, have invented certain new and useful Improvements in Well-Boring Machines, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

The main objects of this invention are to facilitate the adjustment of the pipe-gripping jaws or dogs for pipes of different sizes and for centering the pipe in the machine and generally to improve the construction and operation of machines of this class.

It consists in certain novel features of construction and in the arrangement and combinations of parts, substantially as hereinafter particularly described, and defined in the claims.

In the accompanying drawings like letters designate the same parts in the several figures.

Figure 1 is a plan view of a well-boring machine embodying my invention, certain parts of the machine being shown in section. Fig. 2 is a vertical section on the line 2 2, Fig. 1. Fig. 3 is a vertical section on the lines 3 3, Figs. 1 and 2. Fig. 4 is a similar section on the line 4 4, Fig. 1. Fig. 5 is a cross-section on the line 5 5, Fig. 4; and Fig. 6 is a detail view, on an enlarged scale, as seen from the bottom with reference to Fig. 1 of the lever connections between two adjacent gripping jaws or dogs.

A is a base-plate and ring mounted in a horizontal position upon a suitable frame B. This ring is formed on the upper side with a groove or channel in which a series of tapering rollers C are held. Upon these rollers an annular gear or rotary jaw-carrier D is mounted. This gear is formed with a depending flange *d*, which extends loosely through the ring A, and to its lower end is attached an outwardly-projecting ring *d'* for holding it in place in said ring A.

On top of the gear D are mounted radially-movable slides E and E', each of which is provided at its inner end with a vertically ribbed and grooved gripping jaw or dog F, mounted on a cross-pin *f*, extending through it and

the sides of the slide. The grooved and ribbed faces of these jaws, which are presented toward the center of the gear D, are preferably curved or rounded in a vertical direction, as shown in Figs. 2 and 4, and the jaws are squared on the bottom and back to limit their oscillation on the pin *f* and to hold their working faces in the proper relation to the tube or pipe, which passes loosely downward through the gear D. However, in place of jaws or dogs of the particular construction and shape herein shown and described jaws or dogs of any other suitable construction and shape may be employed within the scope of my invention, which relates more particularly to the means for adjusting the jaws or dogs. A screw G, swiveled in the slide E and engaging a nut H, attached to gear D, serves to adjust said slide toward and from the center of said gear.

I I are angular levers fulcrumed between their ends on the gear D and pivotally engaged at one end with the slide E on opposite sides thereof. J J are similar levers fulcrumed between their ends on the gear D and pivotally connected at one end with the levers I. At their opposite ends the levers J are engaged with pivot-blocks K, which are movably mounted in the slides E' and are adjusted lengthwise thereof by means of screws L, swiveled in said slides and threaded in said blocks. Each of the screws G and L is squared at its outer end to receive a wrench for turning it.

The connection between each pair of levers I and J is made by means of a pin *j*, journaled at its ends in the forked end of one of said levers and squared between its journals to fit and slide in a longitudinal slot in the other lever.

The nut H, which is bolted to the gear D, is formed on the under side with a rib or projection, which fits into a corresponding socket or opening in said gear to relieve the bolts of strain.

The gear D is turned, as shown in Figs. 1 and 2, by means of a pinion M on a shaft N, which is provided with a loose sprocket-wheel O and a clutch P for starting and stopping the machine.

In the operation of the machine the pipe or tube for boring or drilling the well is inserted



through the opening in the gear D, and the jaws F are simultaneously adjusted by means of the screw G to properly grip the same and cause it to turn with the gear D, any movement of the slide E and its jaw F in or out producing, through the connecting-levers I and J, a corresponding movement of the slides E' and their jaws. To exactly center the pipe or tube with the gear D, the slides E', with their jaws, are adjusted independently of each other and of the slide E and its jaw by means of the screws L.

Various changes in details of construction and arrangement of parts may be made within the spirit and intended scope of the invention.

I claim—

1. In a well-boring machine the combination of a rotary jaw-carrier provided with radially-movable jaws and levers connecting said jaws so that the adjustment of one will produce a like and simultaneous adjustment of the others, substantially as described.

2. In a well-boring machine the combination of a rotary jaw-carrier provided with radially-movable jaws, an adjusting-screw connecting one of said jaws with said carrier, and levers connecting the same jaw with the other jaws, substantially as described.

3. In a well-boring machine the combination of a rotary jaw-carrier provided with radially-movable jaws, a screw adapted to adjust one of said jaws toward and from the center of said carrier, and levers connected with that jaw and adjustably connected with the other jaws, substantially as described.

4. In a well-boring machine the combination of a rotary jaw-carrier having radially-movable slides provided at their inner ends with jaws, an adjusting-screw connecting one of said slides with said carrier, and levers connecting said slide with the other slides whereby all the jaws are adjusted simultaneously alike, substantially as described.

5. In a well-boring machine the combination of a rotary jaw-carrier having radially-movable slides provided with pipe-gripping jaws, a screw adjustably connecting one of said slides with said carrier, and levers connected with each other in pairs and with adjacent slides and adapted to produce a like and simultaneous movement of the jaws, substantially as described.

6. In a well-boring machine the combination of a rotary jaw-carrier having radially-movable slides provided with jaws, a screw

adjustably connecting one of said slides with said carrier, levers connecting adjacent slides and adapted to produce a like simultaneous adjustment of the jaws and screws for separately adjusting some of the jaws, substantially as described.

7. In a well-boring machine the combination of a rotary jaw-carrier having radially-adjustable slides provided with jaws which are pivoted therein on cross-pins and have vertically curved and ribbed working faces, a screw adjustably connecting one of the slides with said carrier, and levers fulcrumed on said carrier and pivotally connected with each other and with adjacent slides, substantially as described.

8. In a well-boring machine the combination of a rotary jaw-carrier having radially-movable slides provided with jaws, an adjusting-screw connecting one of the slides with said carrier, pivot-blocks adjustably connected by screws with the other slides, and levers fulcrumed on said carrier and connecting said pivot-blocks with the slide which is connected by a screw with the carrier, substantially as described.

9. In a well-boring machine the combination of an annular gear supported by an annular bearing and having radially-movable slides provided at their inner ends with pipe-gripping jaws, an adjusting screw connecting one of the slides with said gear, levers connecting that slide with the other slides which are adjustably connected with said levers, and a driving-shaft provided with a pinion meshing with said gear, substantially as described.

10. In a well-boring machine the combination of a rotary jaw-carrier having radially-movable slides provided with jaws, an adjusting-screw connecting one of said slides with the carrier and levers fulcrumed on said carrier and connecting that slide with each of the others, said levers having rounded ends loosely engaged with said slides and connected at their other ends one with another by a squared pin journaled in one and passing through a slot in the other, substantially as described.

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

ANDREW KOPPERUD.

Witnesses:

CHAS. L. GOSS,  
ALICE E. GOSS.