

No. 702,608.

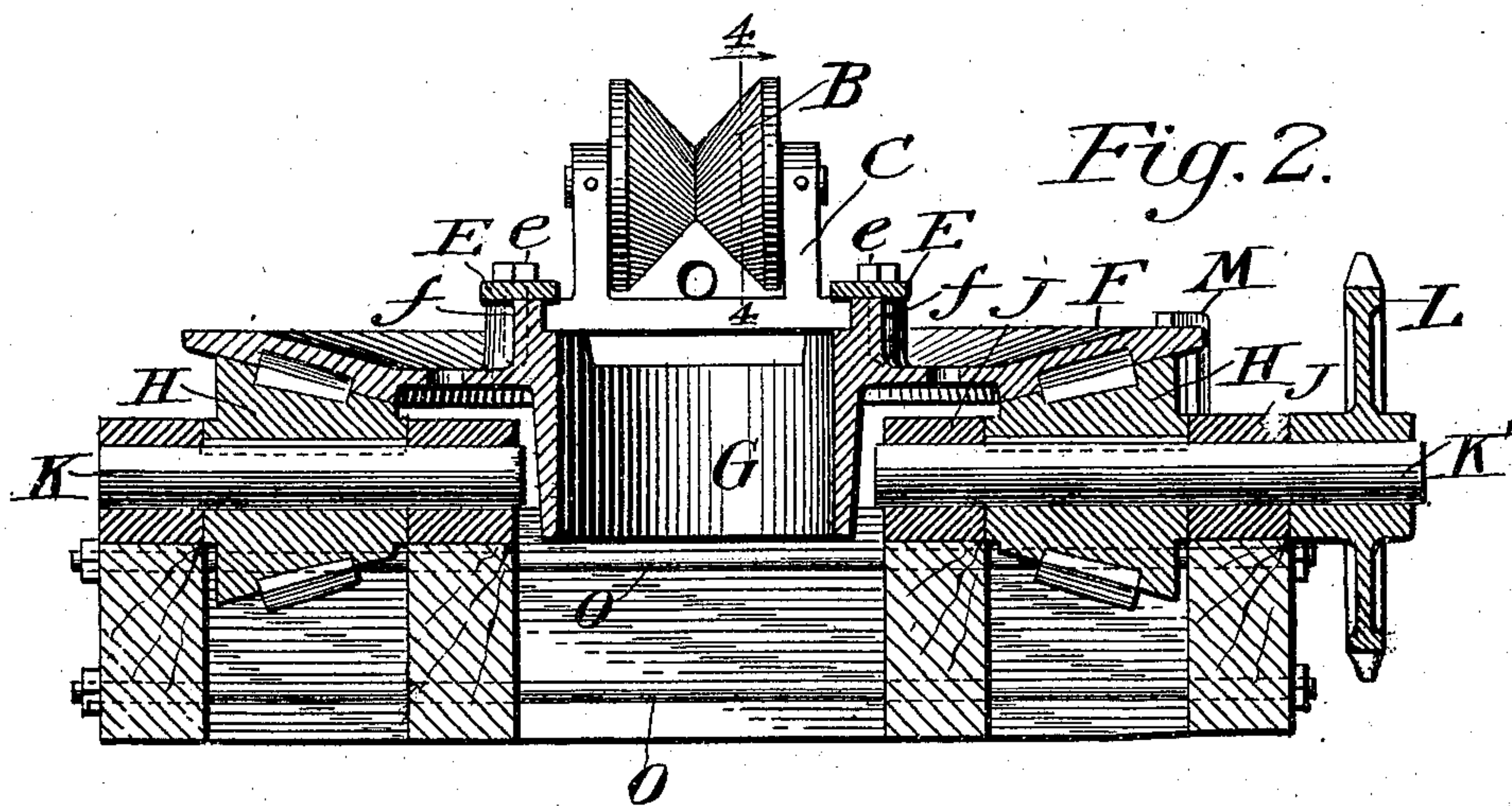
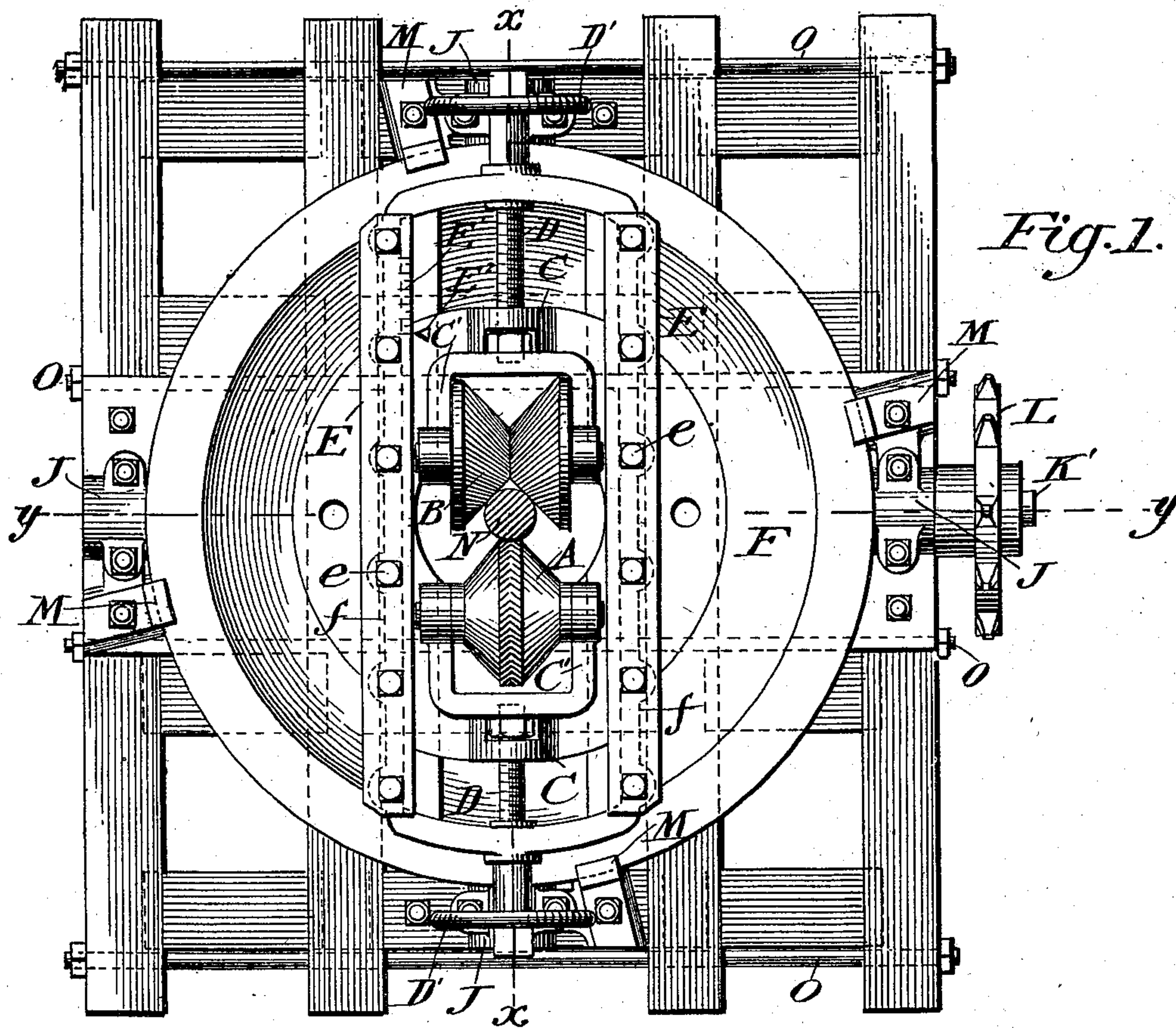
Patented June 17, 1902.

F. J. WOODS.
WELL BORING MACHINE.

(Application filed Oct. 4, 1901.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses:
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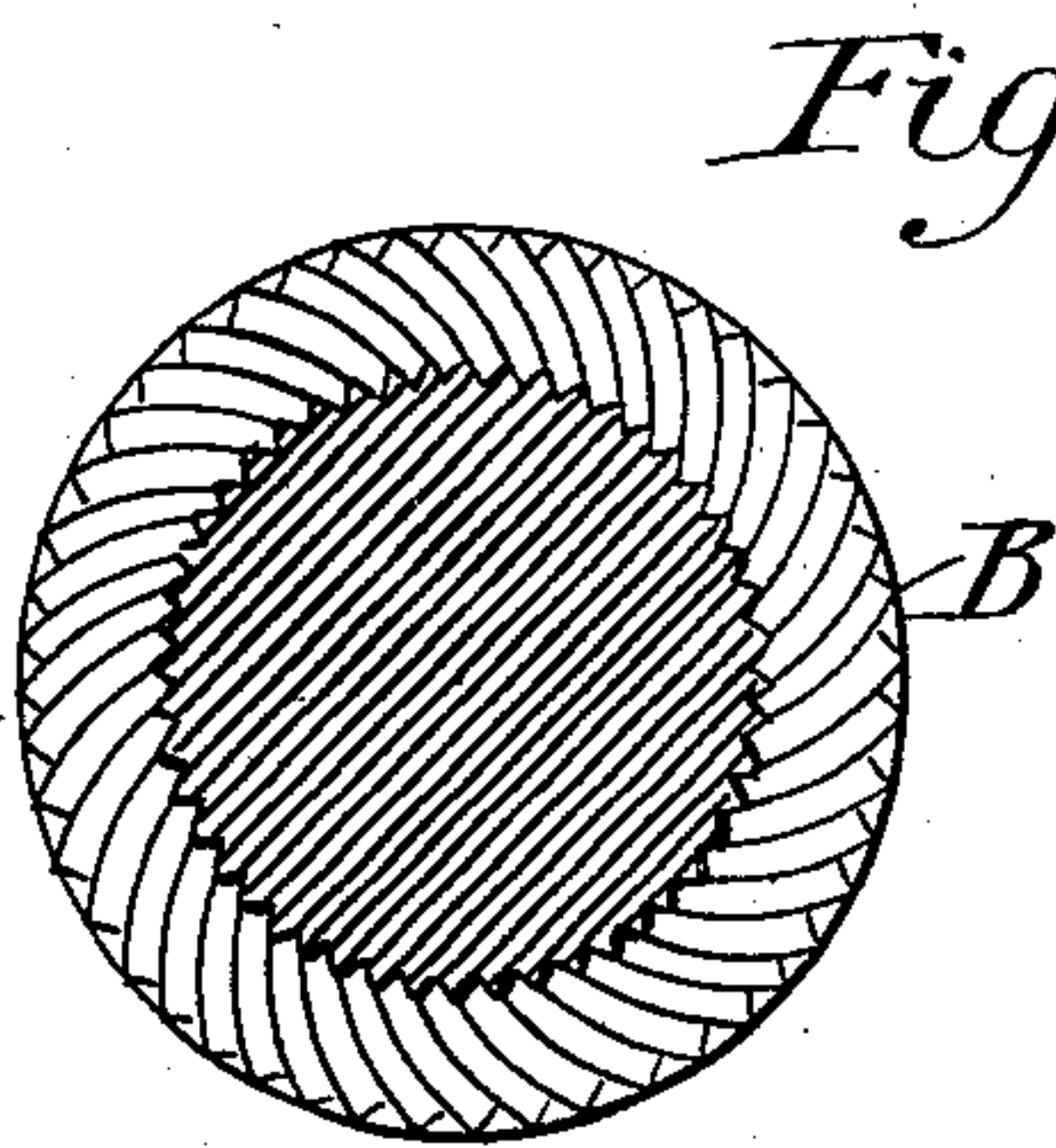
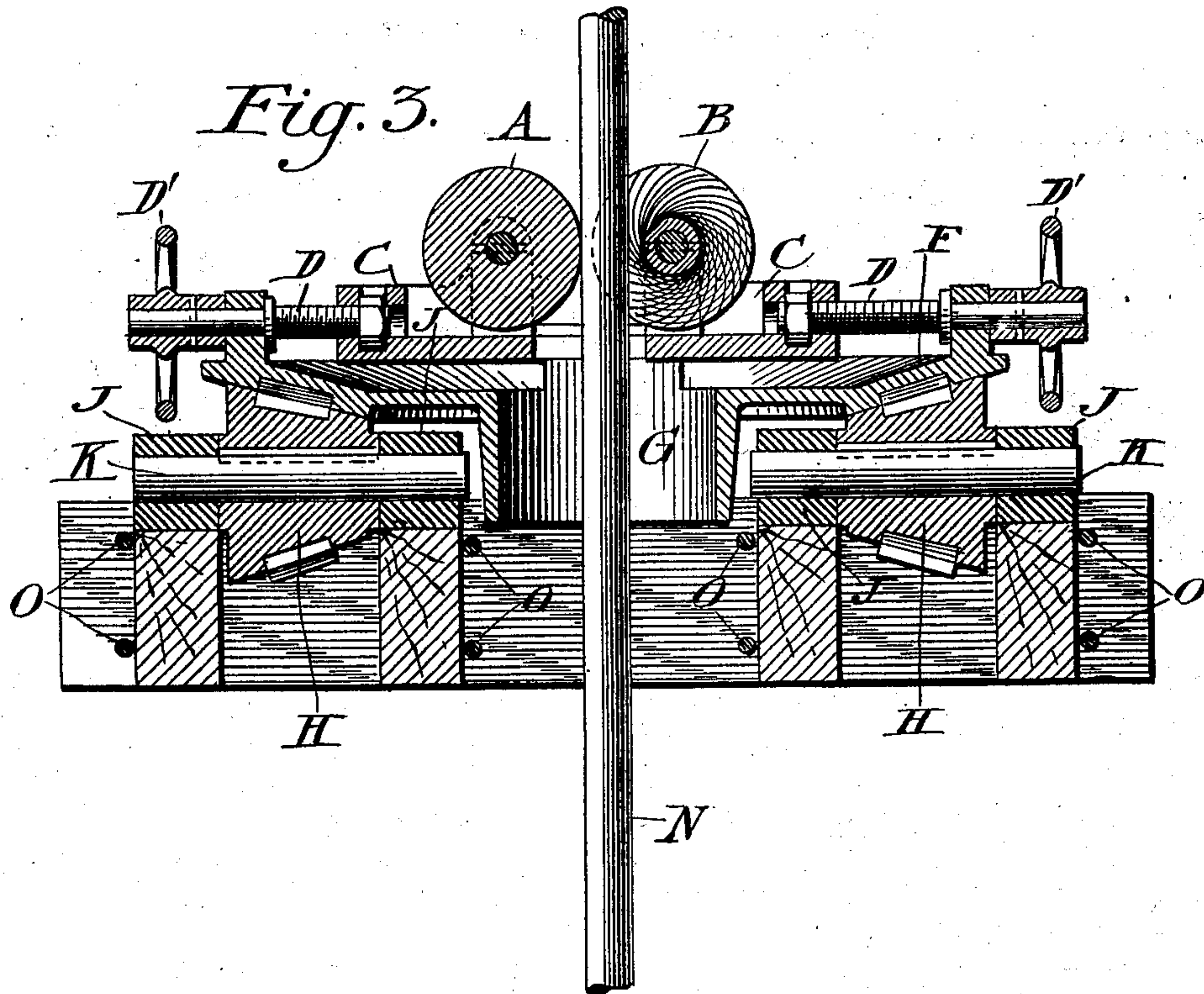
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2 Sheets—Sheet 2.



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UNITED STATES PATENT OFFICE.

FRANK J. WOODS, OF SAN ANTONIO, TEXAS.

WELL-BORING MACHINE.

SPECIFICATION forming part of Letters Patent No. 702,608, dated June 17, 1902.

Application filed October 4, 1901. Serial No. 77,574. (No model.)

To all whom it may concern:

Be it known that I, FRANK J. WOODS, a citizen of the United States, residing at San Antonio, in the county of Bexar and State of Texas, have invented certain new and useful Improvements in Well-Boring Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention relates to well-boring machines, and more particularly to the parts of said machines embracing mechanism for gripping and rotating drill-rods and pipes and at the same time permitting the necessary endwise and longitudinal movement thereof.

My invention further relates to improved means for mounting the gripping-rollers and rotary head or table.

The object of my invention is to provide an improved mechanism composed of as few parts as possible, which will effectively grip and rotate a drill-rod or pipe containing coupling and reducing-nipples, or composed of lengths or sections of varying diameters without impeding the end movement or deranging the central position of said drill-rod or pipe, and without delaying the progress of the machine, to adjust or change any part or parts thereof, also to improve the means for gripping the drill-rod or pipe and to eliminate the tendency to split or longitudinally furrow the latter, which would render the same liable to open and twist off when subject to high pressure during the progress of boring.

In the accompanying drawings, forming a part of this specification, Figure 1 is a top plan view. Fig. 2 is a vertical cross-section taken on the line *yy* of Fig. 1. Fig. 3 is a vertical cross-section taken on the line *xx* of Fig. 1. Fig. 4 is a detail section taken on line 4 4 of Fig. 2.

Referring more particularly to the drawings, A denotes a double conical-shaped roll having the basis of the cones joined and provided at their junction with a milled surface composed of depressions or grooves running diagonal to the horizontal axis of the roller, as shown in Fig. 1.

B denotes a double conical-shaped roll with the apexes of the cones joined, the sides of the cones having milled surfaces consisting of curvilinear depressions or grooves radiat-

ing from the apexes of the cones and extending in spiral form to the basis thereof. The two rolls together form a clutch or grip for the pipe or drill-rod, composed of a male member A and female member B, adapted, as hereinafter described, to grip a pipe or rod of varying diameter and affording three bearing-surfaces, two by the female member, while the male member has a single bearing-surface adapted to bear on the pipe or rod diametrically opposite a point midway between the two bearing-surfaces of the female member. The rod or pipe is thus held true with a grip composed of but two rolls, while three bearing-surfaces are afforded. The curvilinear and diagonal depressions in said surfaces bite the pipe or rod crosswise and diagonal of its grain, and thus avoid the tendency to split or open the pipe or its couplings or longitudinally furrow the same.

C C denote sliding blocks having arms C', provided with horizontal bearings in which the male and female rolls are mounted, said arms forming housings for the rolls and their forward lower ends flanged to form sliding bearings, as shown in Fig. 2. D D denote adjusting-screws for said blocks operated by hand-wheels D' to adjust the gripping-rolls A B to accommodate drill-rods or pipes of different diameters.

E E denote clamping-plates attached to the rotary head or table, hereinafter described, by means of headed screw-bolts *e*, which clamp the sliding blocks C C in slideways, hereinafter mentioned, yet allow said blocks to slide freely to and from the center of the rotary head or table when operated by the hand-wheels D D to grip or release the rod, pipe, or for passing couplings and reducing-nipples. E' denotes a measuring-scale arranged upon one of said clamping-plates in rear of the female member of the clutch, and E² denotes an indicator-point registering on said scale and attached to the sliding block on which said female member is moved. In operation said point is directed to the figure corresponding with the diameter of the drill-rod or pipe to be used in order that it may at all times be centrally located to revolve in its true vertical axis.

F denotes the rotary head or table, having on its upper face an oblong continuous ledge

f, arranged across said head and embracing the central opening therein. Through the ends of said ledge are arranged bearings for the passage of the adjusting-screws *D D*, as shown in Fig. 1, while the sides of the ledge are recessed to form ways for the sliding blocks *C C*, as shown in Fig. 2. The sides of the ledge also form a support to which the clamping-plates *E E* are secured by the bolts

10 *e*. The rotary head is provided with the usual central opening for the passage of the drill-rod or pipe *N*. Upon the under side of the head surrounding said opening I provide a mud-flange *G*. Cogs are also provided upon

15 the under side of the head, which are shrouded from base to pitch-line, as shown in Figs. 2 and 3, and mesh with like cogs hereinafter mentioned.

H denotes beveled pinions, preferably four in number, arranged under the rotary head at points diametrically opposite and meshing with its cogs. The cogs of said pinions are shrouded from base to pitch-line, and both the shroudings of the cogs of the head and

25 that of the cogs of the pinions come together on the pitch-line, thus forming an antifrictional bearing for the head. This construction also affords a much steadier movement for the head, holds it more firmly in position,

30 lessens the vibration, and thus insures a true vertical movement for the drill-rod or pipe as it is gripped, turned, and feeds downward. Said pinions are keyed to shafts *K K'*, journaled in the frame, as shown in the drawings,

35 and one of said shafts *K'* is made longer and provided with a sprocket-wheel *L*, to which power is applied. The four pinions are of the same size and are interchangeable, so that in the event of worn or broken cogs on the

40 driving-pinion it can be changed to another pinion of the set, thus insuring much durability and economy, and where such wear or breakage occurs while a well is being bored much time and annoyance are saved.

45 The frame upon which the head and its driving-gear are mounted is preferably of wood reinforced and braced by tie-rods *O*. In this

frame are securely bolted the journal-boxes *J*, eight in number, in which are journaled said shaftings *K K'*.

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M denotes pockets formed in the journal-boxes, to which are bolted stays *M'* for holding the rotary head or table in place.

Having shown and described my invention, what I claim, and desire to secure by Letters

55 Patent, is—

1. In a well-boring machine, the combination of the revoluble pipe or drill-rod clutch mounted in horizontal bearings having biting-surfaces milled into a series of curvilinear

60 grooves or depressions for the purposes specified.

2. A clutch for operating a drill-rod or pipe of a well-boring machine comprising two or more revoluble members having their biting-

65 surfaces milled in oblique grooves or depressions which intersect the grain of said pipe or rod.

3. In a well-boring machine, the combination of a revoluble head having cogs thereon

70 meshing with a driving-pinion, of a series of idler-pinions meshing with said cogs which together with the driving-pinion support said head and which are interchangeable with the driving-pinion to drive said head.

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4. The combination of the rotary head having shrouded beveled cogs, a driving-pinion having shrouded beveled cogs meshing with the cogs of the head, a series of idler-pinions having shrouded beveled cogs meshing with

80 the cogs of the head each interchangeable with the driving-pinion to drive the head the shrouding of the cogs of the head and those of the pinions being arranged on the pitch-line whereby an antifrictional support is

85 formed for the head and it is held against lateral play.

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

FRANK J. WOODS.

Witnesses:

GRACE HAMILTON,
L. H. COLEY.