

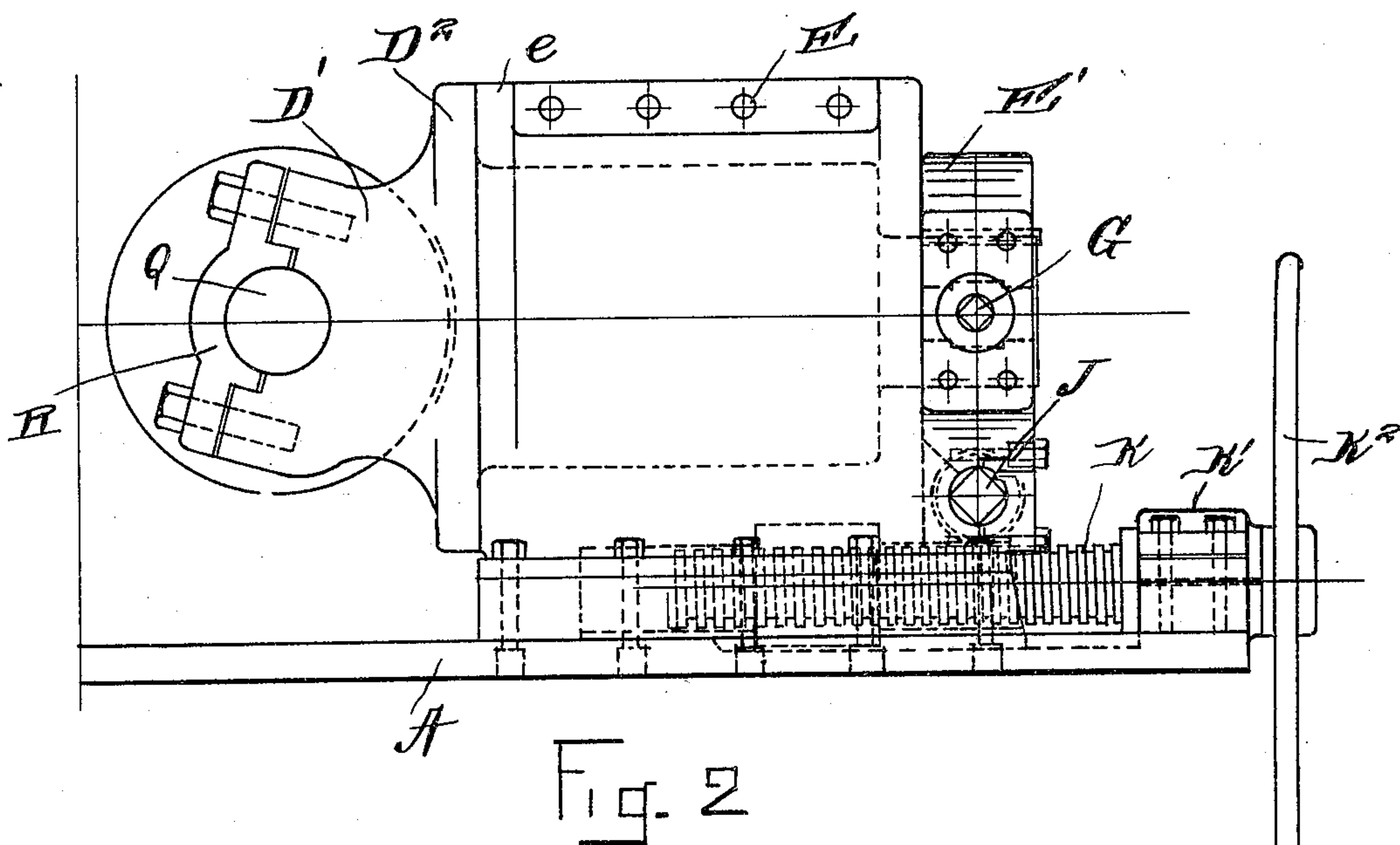
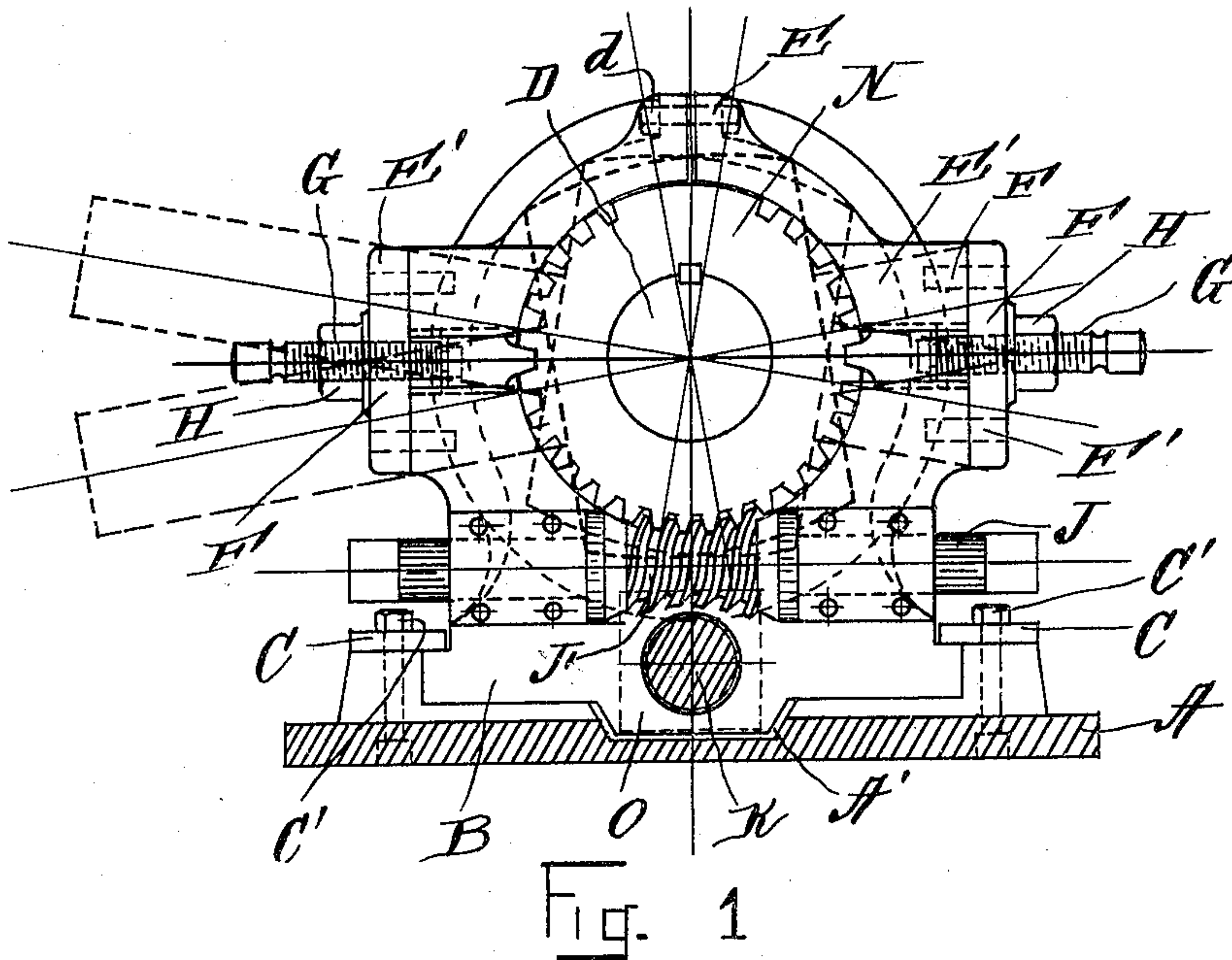
No. 793,636.

PATENTED JULY 4, 1905.

M. F. CAPRON.  
ADJUSTING MECHANISM FOR BILLET PIERCING MILLS.

APPLICATION FILED AUG. 12, 1904.

3 SHEETS—SHEET 1.



Witnesses:

R. A. Boswell  
A. R. Hough

By

Attorney

M. F. Capron  
Inventor  
Franklin H. Hough

No. 793,636.

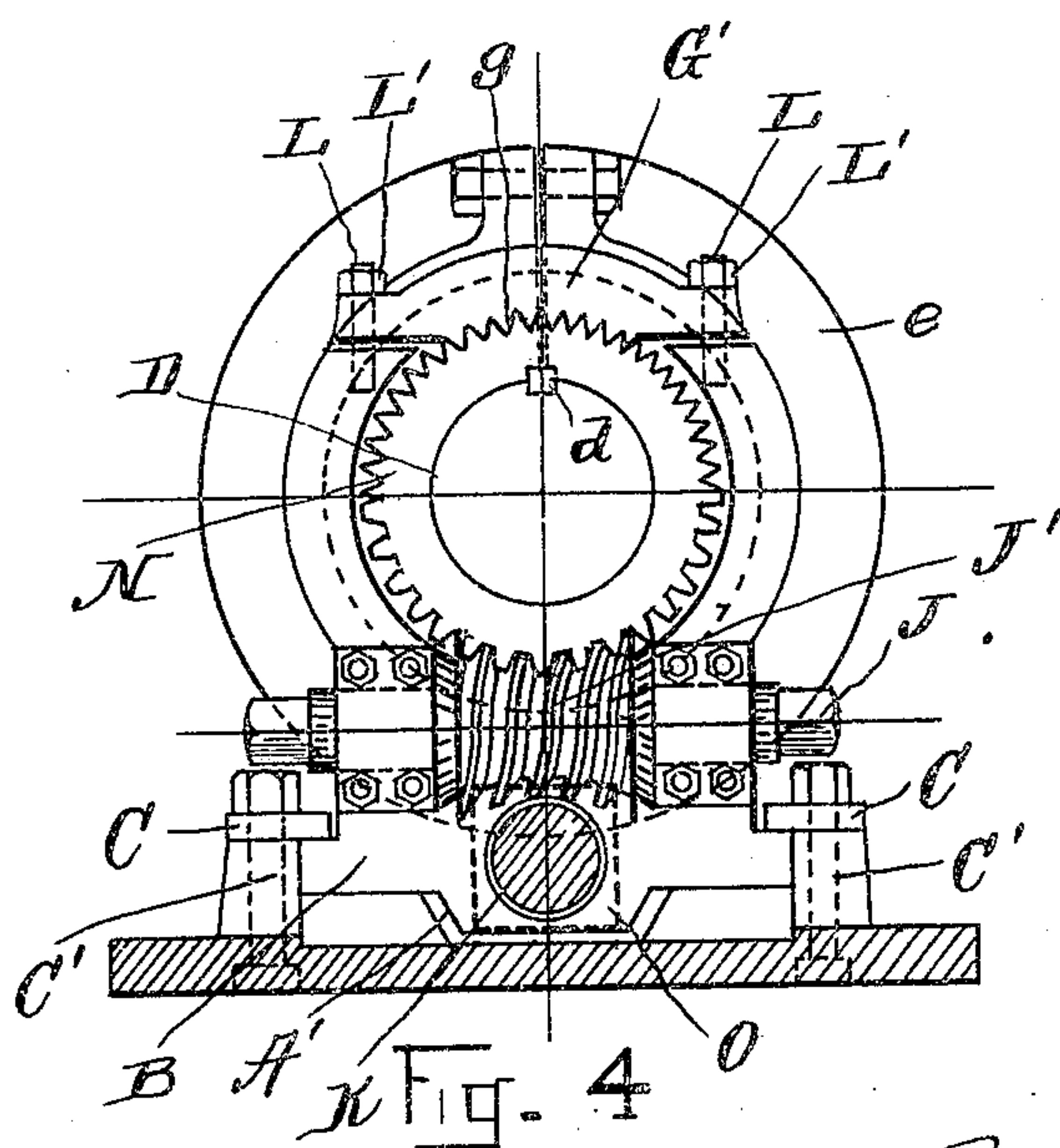
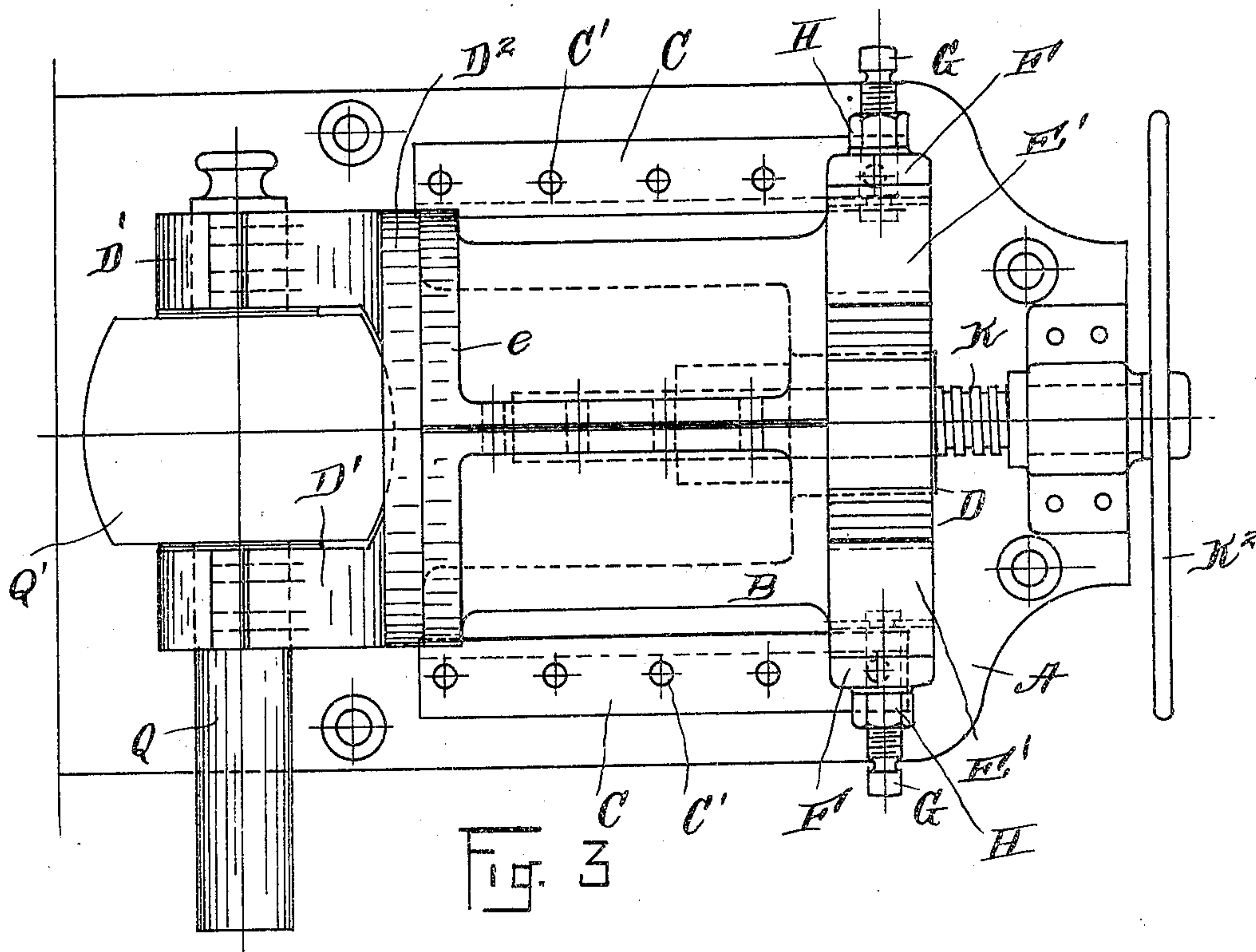
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3 SHEETS—SHEET 2



Witnesses:

R. A. Boswell.  
A. L. George.

By

Attorney

M. F. Capron

Inventor

Inventor  
Franklin H. Hong

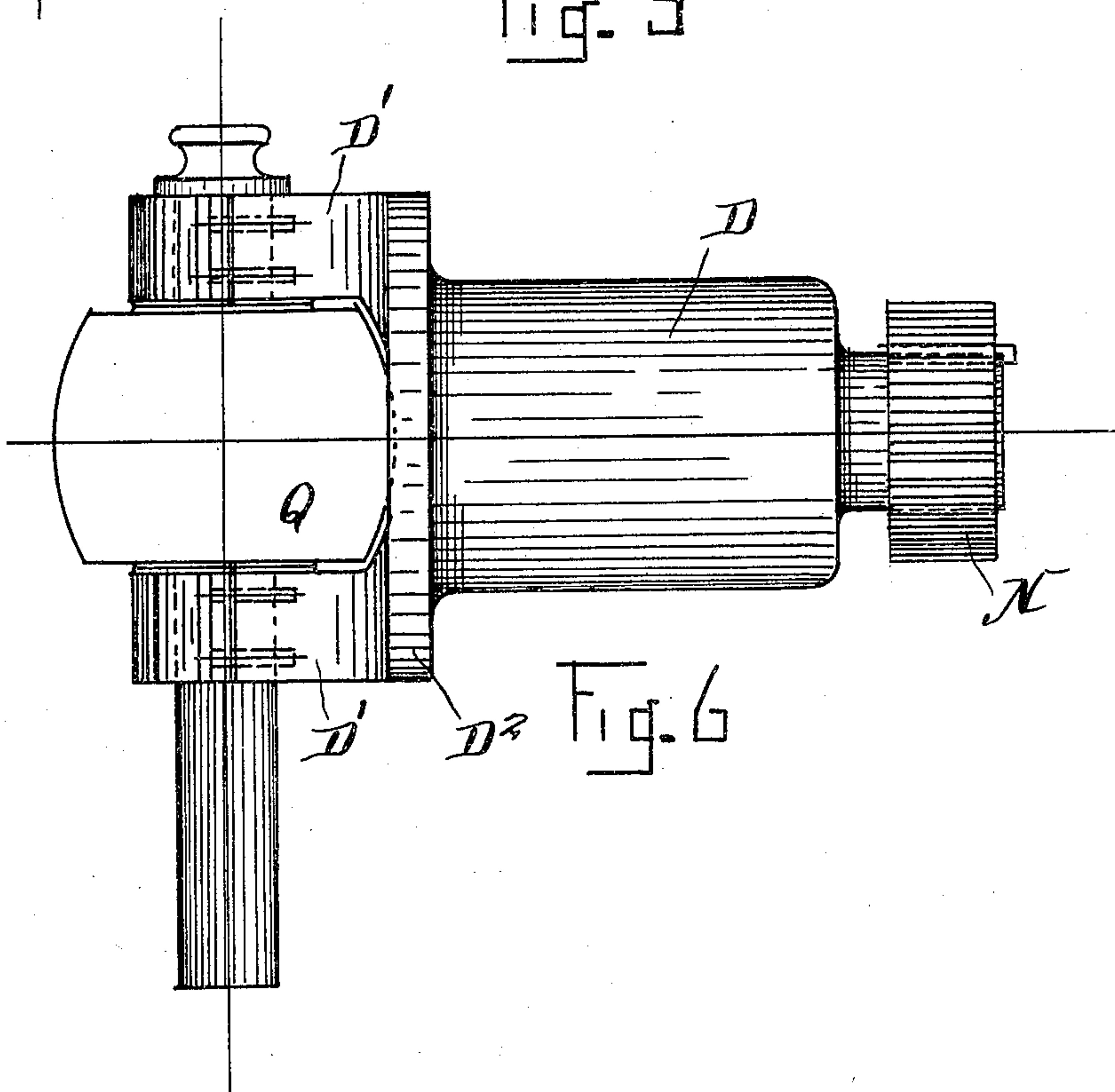
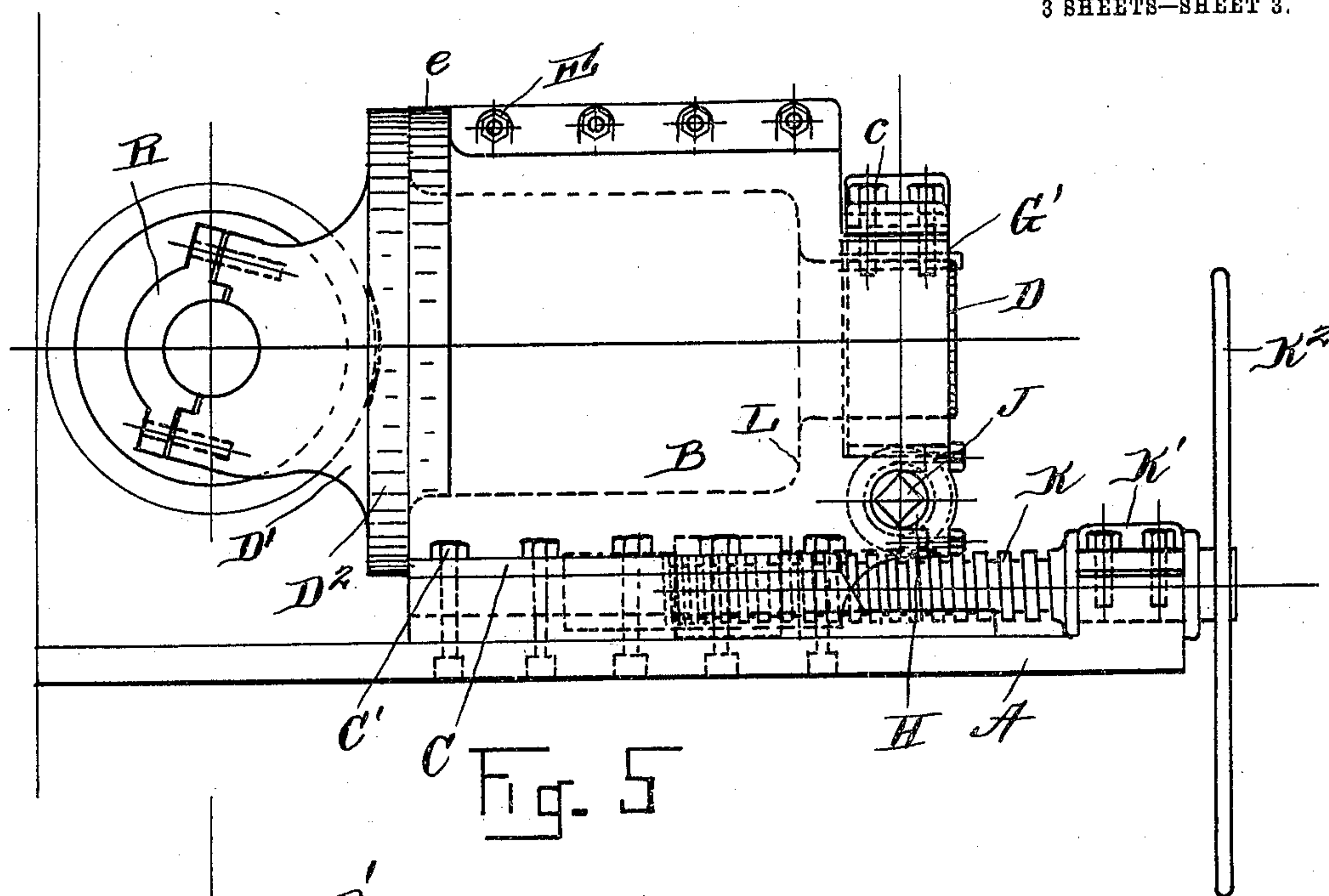
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3 SHEETS—SHEET 3.



Witnesses:  
R. A. Boswell.  
A. L. Hough

By

Attorney

M. F. Capron  
Inventor  
Franklin H. Hough



# UNITED STATES PATENT OFFICE.

MARSHALL F. CAPRON, OF DETROIT, MICHIGAN.

## ADJUSTING MECHANISM FOR BILLET-PIERCING MILLS.

SPECIFICATION forming part of Letters Patent No. 793,636, dated July 4, 1905.

Application filed August 12, 1904. Serial No. 220,551.

*To all whom it may concern:*

Be it known that I, MARSHALL F. CAPRON, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Adjusting Mechanism for Billet-Piercing Mills; 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, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to new and useful improvements in billet-piercing machines designed especially for making seamless tubes; and the object of the invention is to generally improve upon and render more efficient this class of machines, and in carrying out the present invention it is my purpose to produce a machine in which great stability and strength are obtained, especially in connection with the yoke-carrying rolls, whereby a perfect contact of the revolving rolls with the passing billet is insured. To attain this object, I construct the housing and the yoke carried thereby so as to move together in and out on suitable guides, whereby a perfect contact is maintained between the yoke and substantial shoulders of the carriage regardless of the diameter of the passing billet.

Another object of the present invention resides in the provision of means for adjusting and holding the yoke-carrying member in a fixed position and in such a manner that great strength and stability are afforded for holding the yokes in adjusted positions, while the rolls carried by the yokes are in contact with the moving billet being pierced.

To attain these objects and others, I produce various combinations and arrangements of parts, which will be hereinafter fully described and then specifically defined in the appended claims.

My invention is illustrated in the accompanying drawings, which, with the letters of reference marked thereon, form a part of this application, and in which drawings similar let-

ters of reference indicate like parts in the views, in which—

Figure 1 is a cross-sectional view through a portion of the frame of my machine and showing the elevation and means for rocking the shank portion of the roll-carrying yoke and also means for holding the same in an adjusted position. Fig. 2 is a side elevation of the apparatus illustrated in Fig. 1. Fig. 3 is a top plan view of the apparatus illustrated in Fig. 1. Fig. 4 is a sectional view through the frame of the machine, showing the elevation and a slightly-modified form for holding the yoke in an adjusted position. Fig. 5 is a side elevation of the modified form illustrated in Fig. 4, and Fig. 6 is a plan view of the yoke-arm removed from the housing and illustrating a shoulder which coöperates with the end of the housing to hold the yoke firmly while the roll is in operation.

In the drawings I have illustrated but a portion of the machine employed in piercing billets, as the two rolls forming the operative parts of the machine are of identical construction.

Reference now being had to the details of the drawings by letter, A designates the base of the machine, which is of solid metallic construction and has a recess A' on the upper face thereof, in which a carriage B rests and has a longitudinal movement. In order to hold the carriage to the base of the apparatus, plates C are provided, which are held, by means of bolts C', to the bed of the machine, the inner edges of said plates overhanging the raised portion of the base, as shown clearly in Fig. 1 of the drawings. By the provision of said plates, held in the manner shown, it will be observed that an efficient means is afforded for holding the carriage within the guides and allowing the carriage to be removed from the bed-plate when desired. The said carriage B is chambered to receive the shank portion D of the yoke, which is provided with arms D', in which the shaft of the roll Q is journaled, and said carriage is split along its upper median line, and clamping-bolts E are passed through flanges along the marginal edge of the split portion, whereby said sections of the



carriage may be clamped against the circumference of the portion D of the yoke, securely holding the same in an adjusted position.

E' designates projections from the carriage at positions diametrically opposite, and each of said projections carries a plate F, which is held to said projections by means of bolts F', and each of said plates has a threaded aperture to receive an adjusting-screw G, upon the threaded circumference of which are jam-nuts H, adapted to bear against the outer faces of said plates in the manner illustrated in Fig. 1 of the drawings. The said adjusting-screws are adapted to have a longitudinal play through apertures horizontally formed in the walls of said carriage, and their inner ends are designed to engage notches formed in the circumference of a combined pinion and worm wheel N, which is fixed, by means of a key *d*, to the contracted end of the shank portion D of said yoke. Mounted transversely in suitable bearings upon said carriage is a worm-shaft J, having a threaded portion J', and which is slightly concave and adapted to engage the worm-teeth upon the pinion N, whereby as the shaft J is rotated in one direction or another a rocking movement may be imparted to the yoke. The ends of the shaft J are squared for the convenience of turning the said shaft by means of a wrench.

Seated in a recess in the under side of the carriage is a nut O, the bore of which is threaded and is fitted upon a shaft K, which is mounted in suitable bearings K' upon the bed-plate, and has a hand-operating wheel K<sup>2</sup> fixed thereto, whereby the carriage may be given an in-and-out movement for the purpose of adjusting the roll carried by the yoke to suit the diameter of the passing billet. (Not shown.)

Referring to Fig. 5 of the drawings, it will be observed that the yoke has a circular shoulder D<sup>2</sup>, from which arms D' extend forward and are substantially braced by their inner portions flaring into said shoulder. Said shoulder D<sup>2</sup> is adapted to have a large frictional contact-surface against flanges *e* of the carriage, as shown clearly in the drawings. This contact-surface between the shoulder and the enlarged or flanged end of the carriage is an important essential to the satisfactory operation of a machine of this character, as it is absolutely necessary to reinforce the yoke-carrying rolls and cause the same to be held substantially under the immense pressure which comes upon the yoke during the operation of piercing billets, and in order to have this constant frictional contact means is provided for moving the whole carriage and yoke horizontally to and from each other and at the same time provide a simple and efficient means for separating the rolls, if found desirable for any purpose. Mounted in each yoke is a shaft Q, upon which a roll Q' of the usual construction is fixed, and said shaft Q

is held to the arms of the yoke by means of a suitable boxing R.

In Figs. 4 and 5 of the drawings I have illustrated a slight modification of the means for holding the yoke in an adjusted position, in which modification the oppositely-disposed set-screws G are dispensed with and in their stead a segment-plate G' is utilized, the under edge of which is concave and provided with serrations adapted to engage the teeth upon the upper portion of the combined pinion and worm-wheel N, and said segment is held to the carriage by means of bolts L and nuts L' fitted thereto. Said segment-plate G' acts as a clamp to securely hold the yoke in an adjusted position.

In adjusting the roll-carrying yoke, the bolts through the flange of the carriage first being loosened, the shank portion of the yoke will be free to rotate as the worm-shaft is turned in one direction or the other. When the adjustment is secured, the said screws G are turned so that their inner ends will engage notches diametrically opposite in the circumference of the pinion-wheel, and the bolts E, passing through the flanges adjacent to the split portion of the carriage, are drawn tight and the yoke is securely held, with the shoulder thereof having contact over the entire face thereon against the flanged end of the carriage, and by reason of the suitable bearing between the carriage and the yoke the latter will securely hold the roll against the heavy pressure which comes upon the same while the rolls are in contact with the billet and driving the same longitudinally over the mandrel for piercing the same.

While I have shown a particular form of apparatus illustrating the features of my invention, it will be understood that I may vary the detailed construction of the invention, if desired, without in any way departing from the spirit of the invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. An adjusting mechanism for rolls of billet-piercing machines, comprising in combination with a bed-plate, a chambered carriage guided thereon, a roll-carrying yoke provided with a shank portion mounted in the chambered portion of said carriage, a roll carried by said yoke, a pinion-wheel fixed to the shank portion of said yoke, a worm-shaft engaging the teeth of said pinion-wheel, and adapted to rock the yoke, and means for holding said yoke in an adjusted position, as set forth.

2. An adjusting mechanism for rolls of billet-piercing machines, comprising in combination with a bed-plate, a chambered carriage guided thereon, a roll-carrying yoke provided with a shank portion mounted in the chambered portion of said carriage, a roll carried by said yoke, a pinion-wheel fixed to the shank



portion of said yoke, a worm-shaft engaging the teeth of said pinion-wheel and designed to rock the yoke, screws adapted to engage the teeth of said pinion-wheel and hold the same in an adjusted position, as set forth.

3. An adjusting mechanism for rolls of billet-piercing machines, comprising in combination with a bed-plate, a chambered carriage, and means for moving the same, plates detachably held upon the bed-plate and adapted to retain the carriage in place, a roll-carrying yoke having a shank portion, mounted in the chambered portion of the carriage, a roll carried by said yoke a pinion-wheel fixed to the shank portion of the yoke, a worm-shaft journaled on the carriage and engaging the teeth of said pinion-wheel and adjusting-screws for engaging the teeth of said pinion, as set forth.

4. An adjusting mechanism for rolls of billet-piercing machines, comprising in combination with a bed-plate, a chambered carriage guided thereon, means for operating said carriage, a yoke provided with a shank portion mounted in the chambered portion of the carriage, a roll carried by said yoke a pinion-wheel keyed to the shank portion of the yoke, a worm-shaft journaled upon the carriage and engaging the teeth in said pinion-wheel, oppositely-disposed set-screws mounted in apertures of the carriage and designed to engage the teeth of said pinion-wheel, as set forth.

5. An adjusting mechanism for rolls of billet-piercing mills, comprising in combination with a bed-plate, a chambered carriage guided thereon and having a split wall, means for driving the carriage, a worm-shaft journaled

upon the carriage, a yoke provided with a shank portion mounted in the chambered portion of the carriage, a roll carried by said yoke bolts for clamping the carriage in contact with the shank portion of the yoke, a pinion fixed to said shank portion, oppositely-disposed set-screws, threaded plates secured to the carriage, and in which said screws are mounted, the inner ends of said screws having contracted portions designed to engage the teeth of said pinion-wheel, as set forth.

6. A mechanism for adjusting the rolls of a billet-piercing mill, comprising in combination with a bed-plate, a chambered carriage, having the upper marginal portion thereof split, with flanges formed in its split edge, bolts passing through said flanges, a yoke, having a shank portion fitted in the chambered portion of said carriage, adapted to be frictionally engaged by the walls of the carriage, a pinion-wheel keyed to the shank portion of the yoke, a worm-shaft journaled upon the carriage, and in engagement with the teeth of said pinion-wheel, set-screws mounted upon the carriage, and adapted to engage teeth diametrically opposite in the circumference of the pinion-wheel, said yoke having a shoulder adapted to have contact with an end of said carriage and the flange thereon, as set forth.

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

MARSHALL F. CAPRON.

Witnesses:

TURNER STANTON,  
JOHN FOLEY.