

No. 674,011.

Patented May 14, 1901.

J. B. NAU & T. BATTERSBY:

CONTINUOUS ROD MILL.

(Application filed Dec. 18, 1900.)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

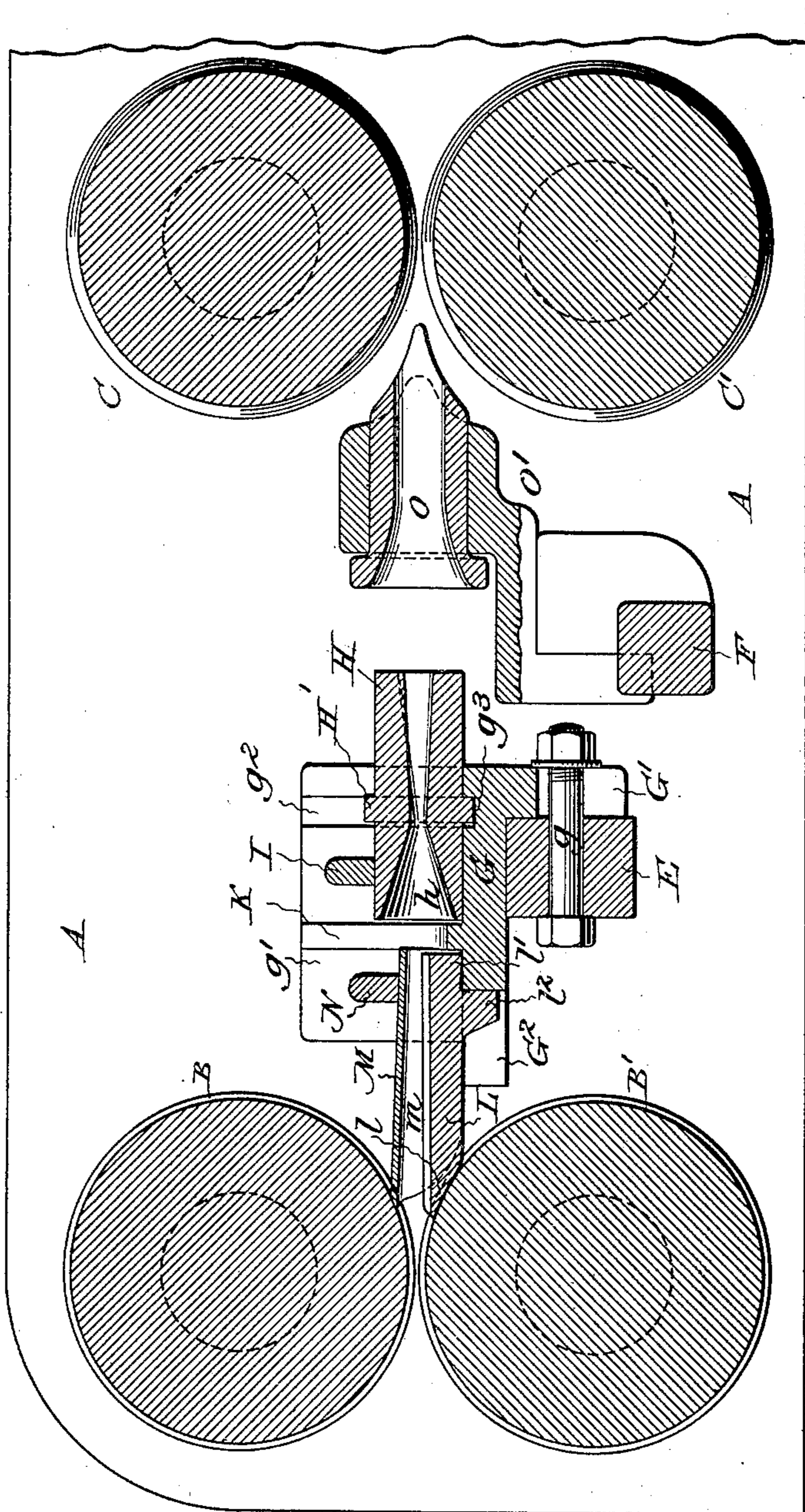
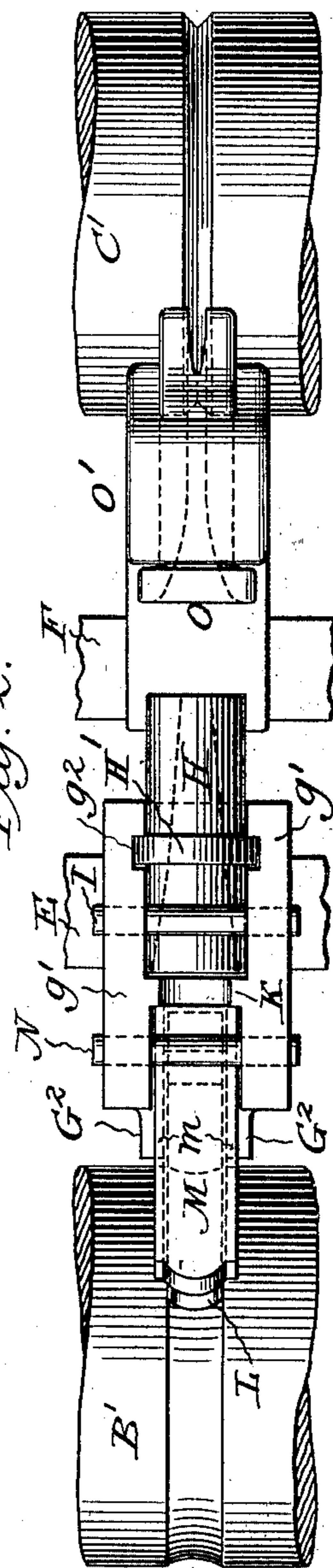


Fig. 2.



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Fig. 3.

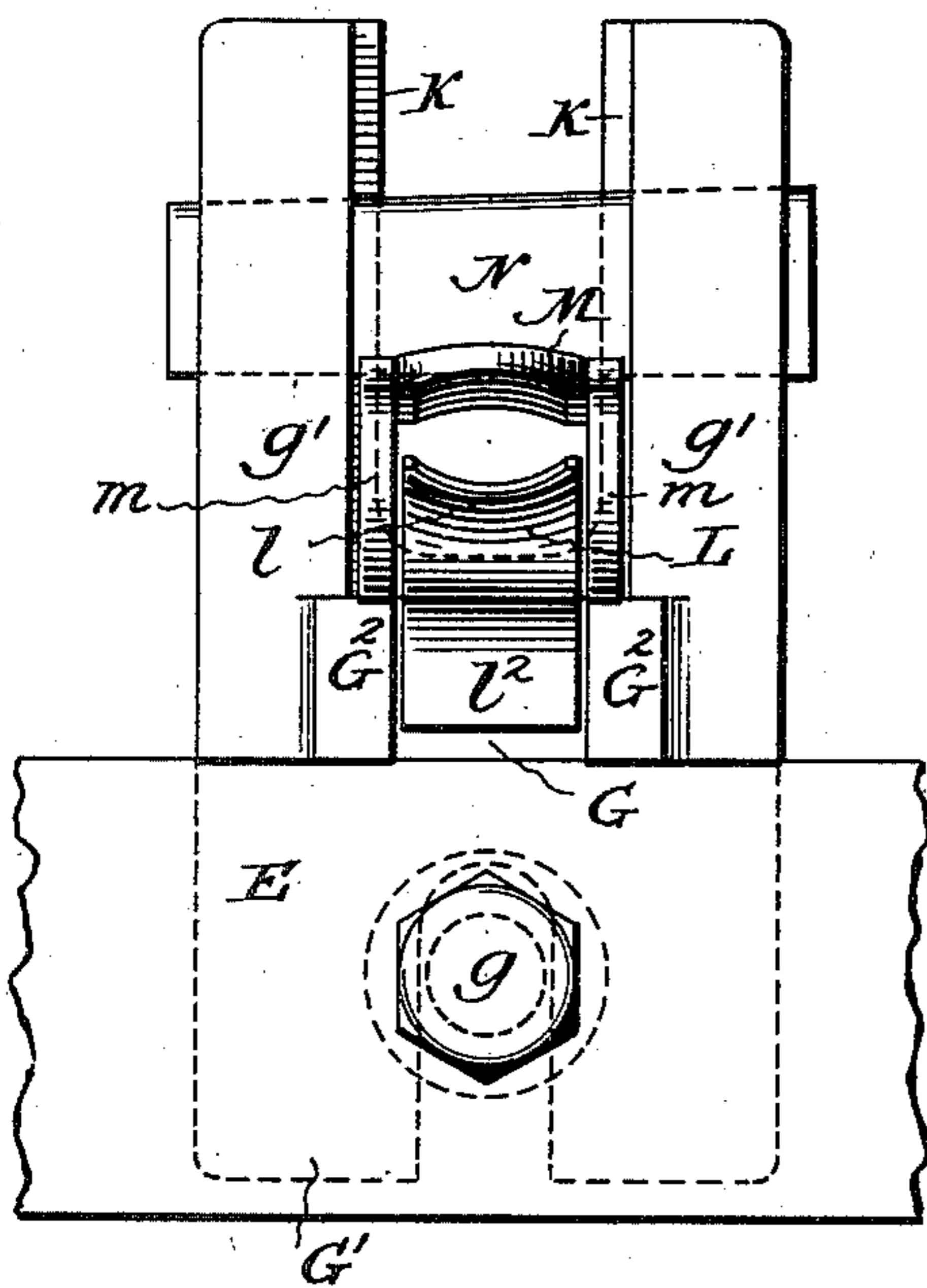


Fig. 4.

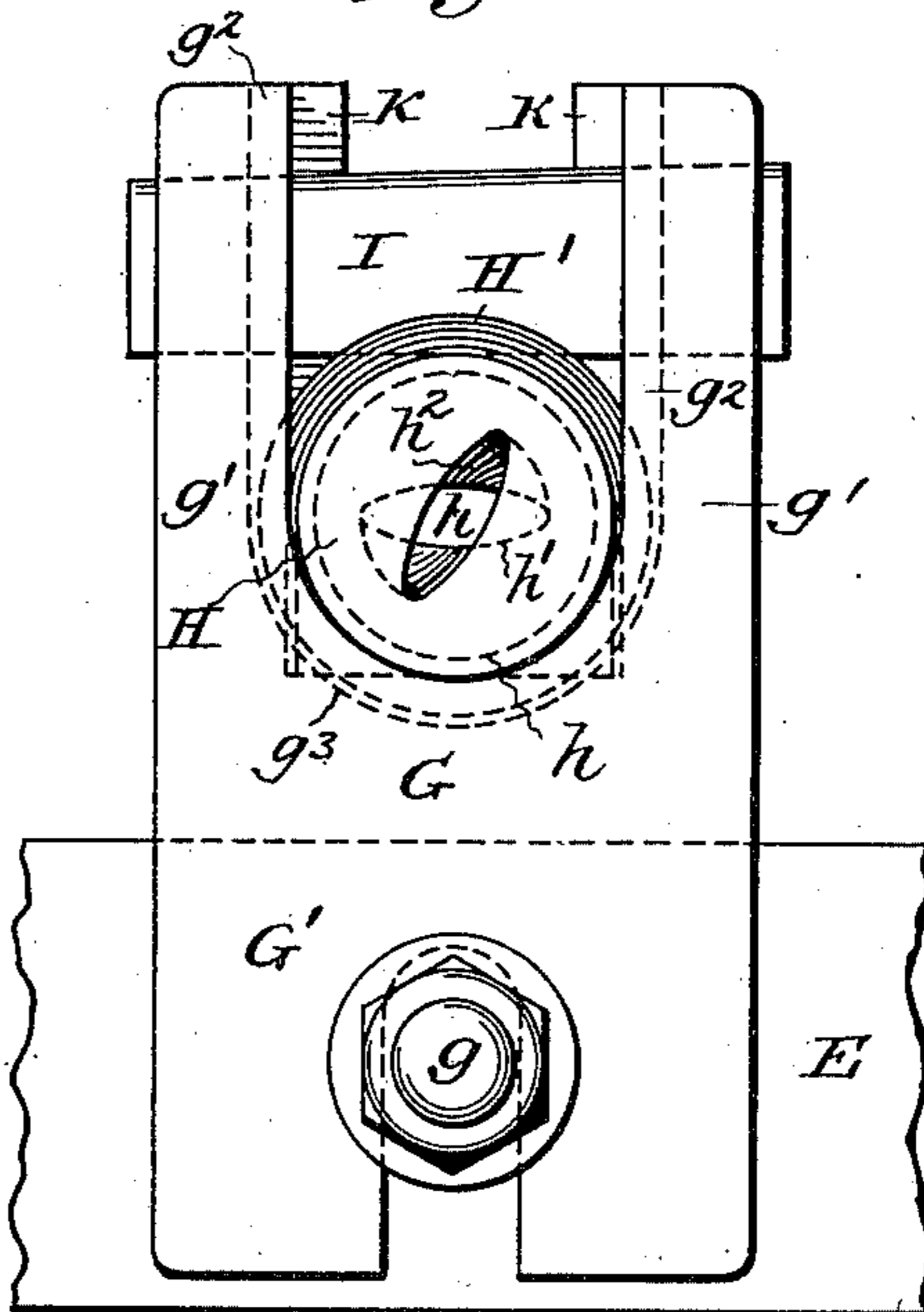
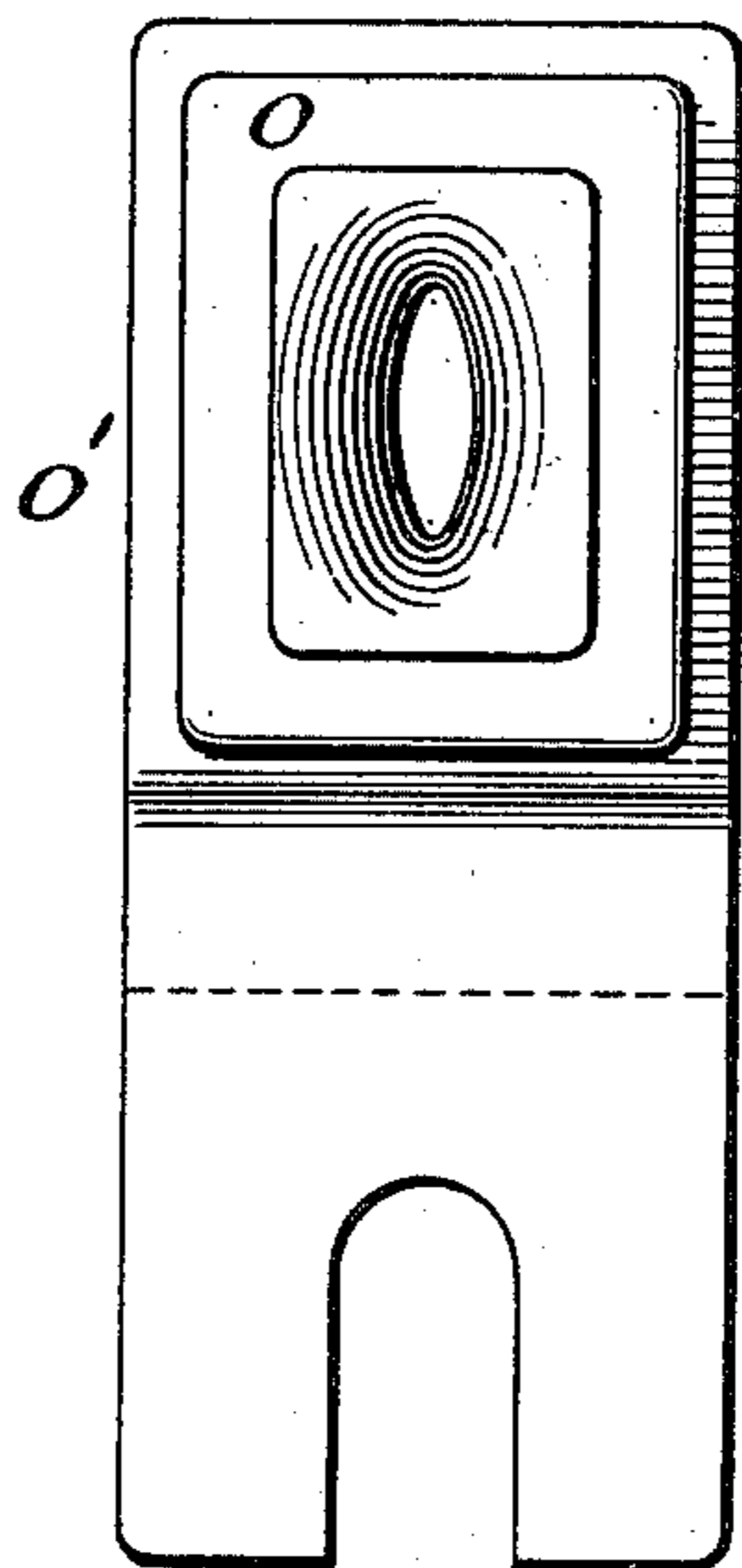


Fig. 5.



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UNITED STATES PATENT OFFICE.

JOHN B. NAU AND THOMAS BATTERSBY, OF ASTORIA, NEW YORK.

CONTINUOUS ROD-MILL.

SPECIFICATION forming part of Letters Patent No. 674,011, dated May 14, 1901.

Application filed December 18, 1900. Serial No. 40,276. (No model.)

To all whom it may concern:

Be it known that we, JOHN B. NAU and THOMAS BATTERSBY, citizens of the United States, residing in Astoria, Long Island, New York city, State of New York, have invented certain new and useful Improvements in Continuous Rod-Mills, of which the following is a specification.

The invention relates particularly to the twisting-guide which receives a rod from one set of rolls and gives it a partial rotation to present it properly to the grooves of an adjacent set of rolls. Ordinarily the rolls of a continuous rod-mill are so grooved that the shape of the bar operated upon by them is alternately changed from an oval cross-section to a square or diamond shaped cross-section of reduced area, and vice versa, alternately, the number of operations being determined by the number of sets of rolls in the series which act to gradually reduce the rod to a decreasing cross-sectional area.

Heretofore twisting-guides placed between the rolls to receive the rod from one set of rolls and deliver it to the adjacent set have been employed; but their use has been attended by the objection that the rod emerging from a set of rolls will sometimes escape the twister, requiring the stopping of the mill for a short time and occasioning annoyance, trouble, and expense.

Heretofore there have been employed twisting-guides either made in one piece or divided longitudinally and composed, essentially, of the twisting-guide proper, one open end of which is arranged adjacent to the grooves in the delivery-rolls to receive the rod therefrom. If such a device is made in one piece or in two pieces which may be clamped together, it has been found that it is difficult to adjust the open end of the guide properly contiguous or adjacent to the grooves in the delivery-rolls and that if the proper contiguity to the groove of the upper roll, for instance, is established there is a liability of there not being a fit between the lower part of the guide and the groove of the lower roll, and vice versa, and therefore, and as those familiar with continuous rod-mills understand, it not infrequently happens in practice that the rod emerging from the groove of the delivery-roll does not enter the twisting-guide,

to be properly led to the next set of rolls, but finding its way, through lack of contact, between the rolls and the guide it escapes outside, and so becomes mere scrap-iron.

The invention is designed to obviate this difficulty; and it consists in an apparatus which, besides a twister proper, which may be formed in one piece or for convenience of manufacture be divided longitudinally and the two parts appropriately secured together when the twister is in operation, comprises a straight guide arrangement placed between the delivery-rolls and the twister proper and made of two separable pieces, of which the upper one or top cover can always be put in close contact with the upper roll, the groove of which it will snugly fit, and the lower one or bottom guide will always be in close contact with the lower roll. These two pieces—top cover and bottom guide—will form a complete closure, and on account of their close contact with the delivery-rolls the rod will be safely led through them to the twister, which in its turn will deliver it properly to the next set of rolls.

In the accompanying drawings, which illustrate our invention embodied in a form which we have by experience demonstrated to be practical and efficient, and which is the form now best known to us, Figure 1 is a vertical section at right angles to the axes of the rolls, showing two sets of rolls of a continuous rod-mill having an indefinite number of sets of rolls; Fig. 2, a plan view, omitting the housing or side frame, which appears in Fig. 1; Fig. 3, an elevation, on an enlarged scale, of the rod-receiving end of the guide arrangement; Fig. 4, a similar elevation, on an enlarged scale, of the rod-delivery end of the twister; Fig. 5, an elevation, on an enlarged scale, of the receiving end of the ordinary entry-guide for receiving a rod from the twister and directing it to the grooves of the succeeding set of rolls.

A indicates the side frames or housings in which the sets of rolls B B' and C C' are mounted.

E and F are cross-bars extending between the side frames and located between the two sets of rolls.

The frame or support of the twisting-guide, called "guide-box," may be constructed as

follows: It has a bottom G, which at one end, that we will term the "rear" end, has a downwardly-extending or vertical flange G', slotted to receive the bolt g, that clamps it to the cross-bar E. From the front end of the bottom and at each side thereof are horizontally-projecting parallel parts G², and at the sides are vertical walls or side plates g' g'. Near the rear of the frame the side walls are formed with opposite vertical grooves or recesses g², which are connected at their bottom by a corresponding circular groove or recess g³ in the bottom plate. The twisting-guide or twister is formed with a surrounding annular flange H', which fits in these grooves, the twister being dropped in from the top. The exterior surfaces of the twister being cylindrical, the twister rests upon the correspondingly-curved face of the bottom G of the guide-box and when set in the desired position may be rigidly held by any appropriate means, as by a wedge-bar I, passing through apertures in the side plates g'. Of course it would be feasible in many cases to form the face of the bottom plate flat and correspondingly shape the under face of the twister; but the construction described is preferred, as it permits of circumferential adjustment should it be desired. In front of the front end of the twister there is an inwardly-projecting rib or flange K, extending along both side plates and across the bottom, as seen in the various figures. In front of this rib the two separable parts of the straight guide arrangement are mounted. The bottom piece L has its front end formed, as at l, to conform to the groove in the lower roll, to which it is to be applied and which in the drawings happens to be a groove for rolling the rod to an oval cross-section with its longer axis horizontal. Its rear end l' rests upon the flat face of the bottom G in front of the rib or flange K, and adjacent to this end there is a downwardly-extending projection l², which abuts against the front edge of the bottom G. The upper face of this bottom piece L is straight longitudinally and concave transversely, so that it is appropriately shaped to receive the oval rod from the rolls. The upper portion or cover M of the guide or channel has side flanges m, which extend downwardly and fit loosely against the side edges of the bottom piece L. At the rear the side flanges of the cover-piece M rest upon the horizontal projections G² G² of the bottom of the frame and also upon the bottom of the frame immediately in front of the rib or flange K. The forward end of the cover M of the guide is shaped, as shown, to conform to the groove in the upper roll and may be accurately fitted or adjusted thereto, and then held securely in position by any appropriate means, as by a wedge-bar N. Any slight vertical adjustment that may be desired of the end of the part M contiguous to the rolls may be effected by placing pieces, for instance, of sheet metal between the edges of the side flanges and the part upon which it rests.

When properly set, the part M is securely held by any appropriate means, as by a wedge-bar N. The lower part L of the guide is held in position by the lower roll, in the groove of which it lies, while any end thrust of this part is transmitted by the lug or projection l² to the bottom plate G.

The opening h of the twister proper, H, adjacent to the guide M L is circular in cross-section, as seen by the dotted circle, also marked h in Fig. 4. Its cross-section then gradually changes until at its most contracted part it is oval in cross-section with its axis horizontal, as indicated by the dotted lines h', Fig. 4. From thence to the rear or exit end of the twister this passage, oval in cross-section, twists until the longer axis of the oval is in the position or about the position, with reference to a horizontal line, such as shown in Fig. 4, where the opening is marked h². The purpose is to turn the bar through ninety degrees—i. e., so that its longer axis will be vertical; but in order to accomplish this it is not necessary that the exit-opening of the twister should have its longer axis vertical; but, on the contrary, such axis may be at an angle to a horizontal line and the impetus or rotary momentum of the rod emerging from the twister will bring its longer axis into a vertical position. This is well understood. The angle at which the longer axis of the delivery-opening of the twister may stand depends upon the speed of the rolls and the weight of the rod being acted upon. From the twisting-guide the rod passes to an ordinary entry-guide O, mounted in a guide-box O', secured to the cross-bar F. In the front or receiving end of this guide the opening is or may be wider in cross-section, and from thence tapers until at its most contracted part it is oval with the longer axis vertical, as indicated in Fig. 5.

We have shown the twisting-guide so shaped as to receive an oval rod with its longer axis horizontal and effect its turning ultimately to an angle of ninety degrees to bring its longer axis vertical. As indicated in Fig. 2, the succeeding set of rolls C C' has grooves to reduce the rod to a square or diamond shaped cross-section. The twisting devices for receiving a rod of such cross-section from the rolls C C' would be in all respects the same as would the entry-guide, except that their interior opening would be of proper cross-section to receive and act upon a rod of square or diamond shaped cross-section. This is well understood, and in ordinary twisting devices for continuous rod-mills the dies are so alternated in character.

We claim as our invention—

1. In a continuous rod-mill the combination of the twisting-guide, a guide-box upon which it is mounted and the separate guide or channel placed between the delivery-rolls and twisting-guide proper and composed of upper and lower parts independently held in the guide-box and respectively adapted to be

independently fitted to the groove of the upper roll and the groove of the lower roll.

2. In a continuous rod-mill the combination of the twisting-guide, its frame or support, its flange-and-groove connection by which the guide is adjustably mounted in its support and a separate guide-channel placed between the delivery-rolls and twisting-guide proper and composed of upper and lower parts independently held in the guide-box and respectively adapted to be independently fitted to the grooves of the upper and lower rolls.

3. In a continuous rod-mill, the combination with a suitably-mounted twisting-guide, of a guide or channel mounted in front of the twisting-guide and composed of separate upper and lower parts independently mounted and respectively adapted to be independently fitted to the upper and lower grooves of the rolls.

4. In a continuous rod-mill the combination with a suitably-mounted twisting-guide, of a guide or channel suitably mounted in front of it and composed of two separately-adjustable parts, a bottom portion whose forward end may be fitted to the groove of the lower roll of the mill and a top portion having side flanges embracing the sides of the

lower portion and whose end may be independently fitted to the groove of the upper roll.

5. In a continuous rod-mill the combination of a circumferentially-adjustable twisting-guide and a guide or channel mounted in front of it, composed of two independently-adjustable parts, a bottom piece fitting the groove in the lower roll and a top piece fitting the groove of the upper roll and having side flanges embracing the sides of the lower part.

6. In a continuous rod-mill, the combination with a suitably-mounted circumferentially-adjustable twisting-guide, of a guide or channel mounted in front of it composed of two separately-formed and independently-mounted adjustable parts, a lower part fitting the groove of the lower roll of the mill, and an upper part adapted to be independently fitted to the groove of the upper roll.

In testimony whereof we have hereunto subscribed our names.

JOHN B. NAU.
THOS. BATTERSBY.

Witnesses:

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J. R. THOMPSON.