

No. 750,026.

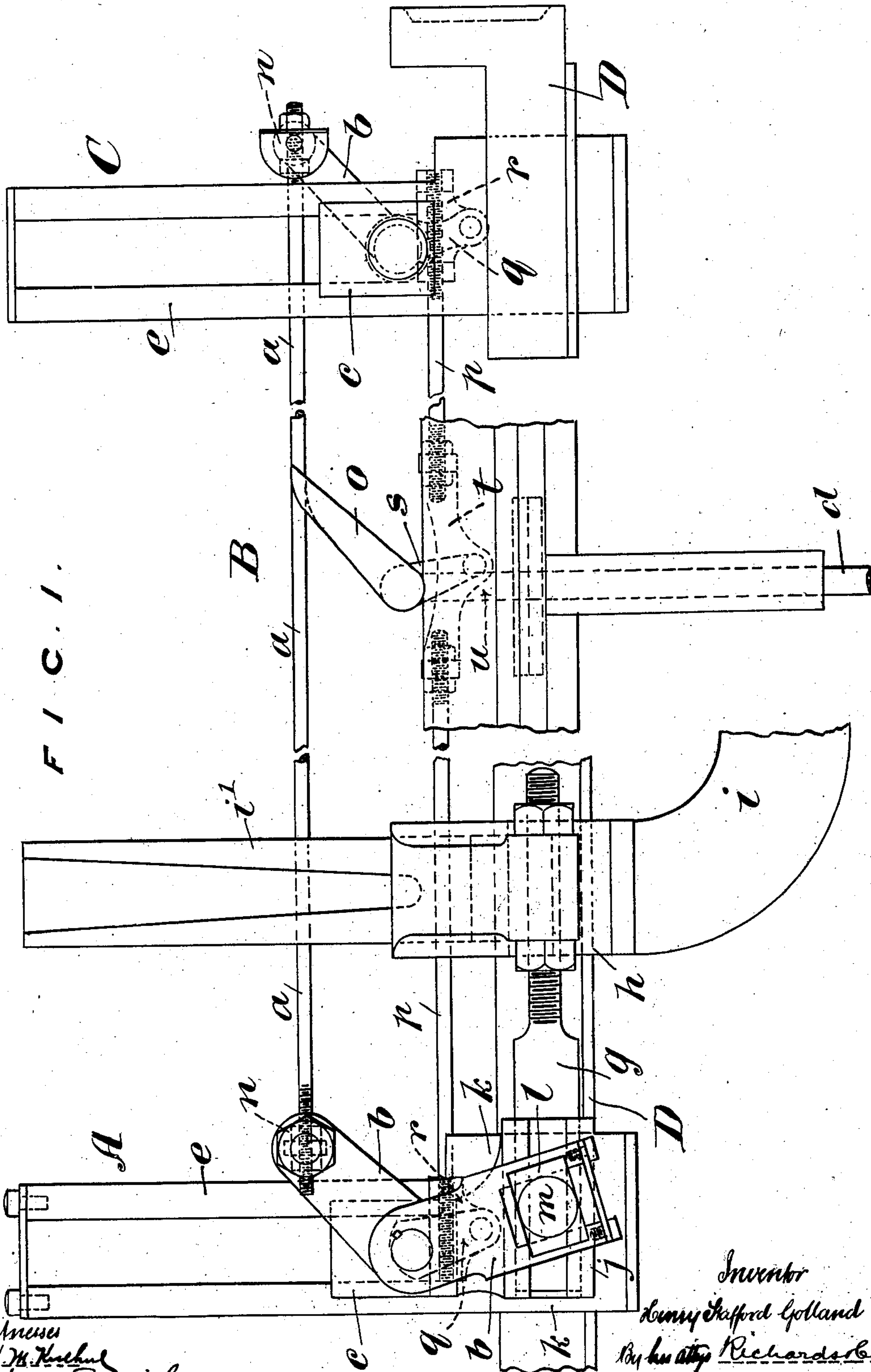
PATENTED JAN. 19, 1904.

H. S. GOLLAND.  
SPINNING MULE.

APPLICATION FILED APR. 4, 1903.

NO MODEL.

5 SHEETS—SHEET 1.



Witness  
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5 SHEETS—SHEET 2.

FIG. 3.

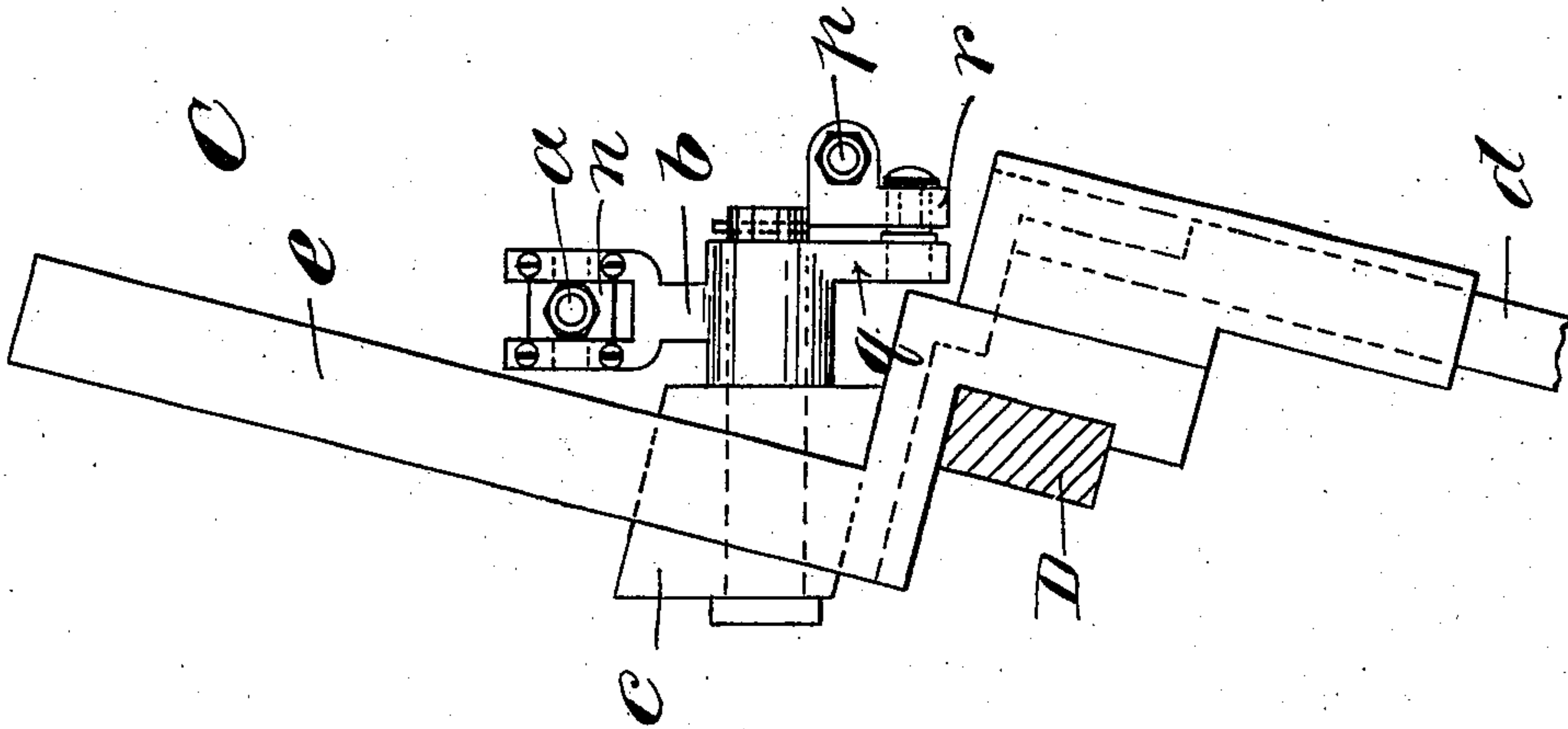


FIG. 4.

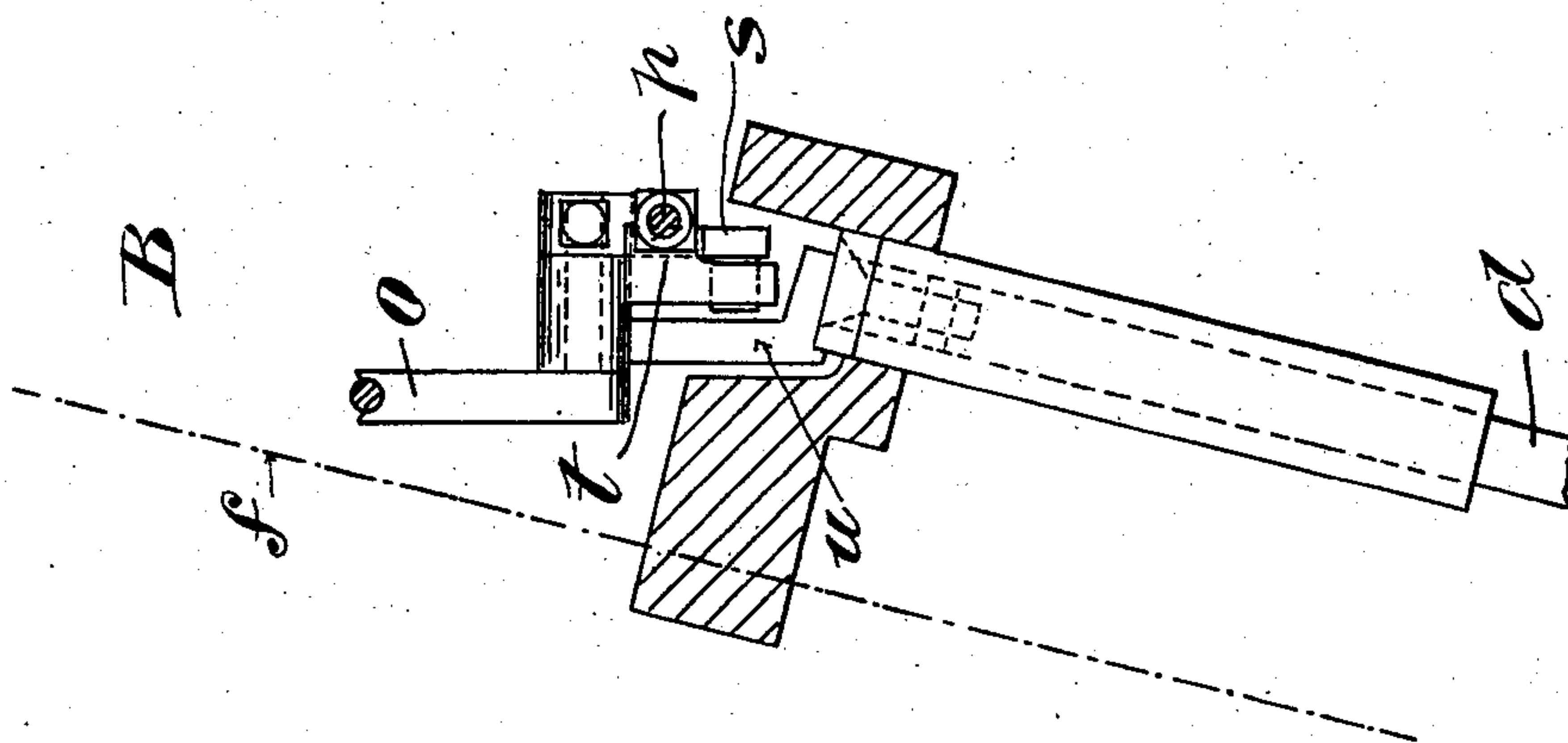
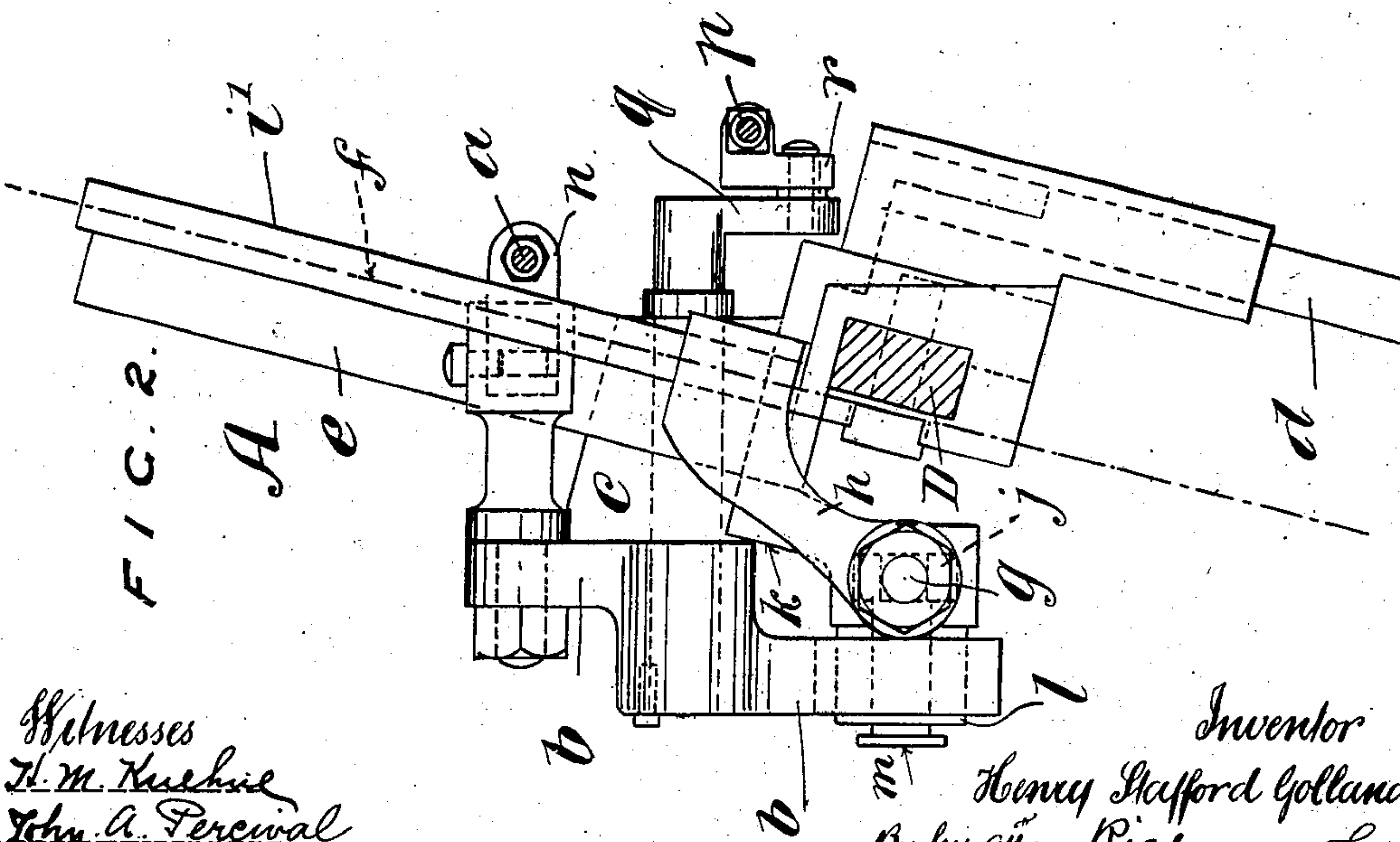


FIG. 2.



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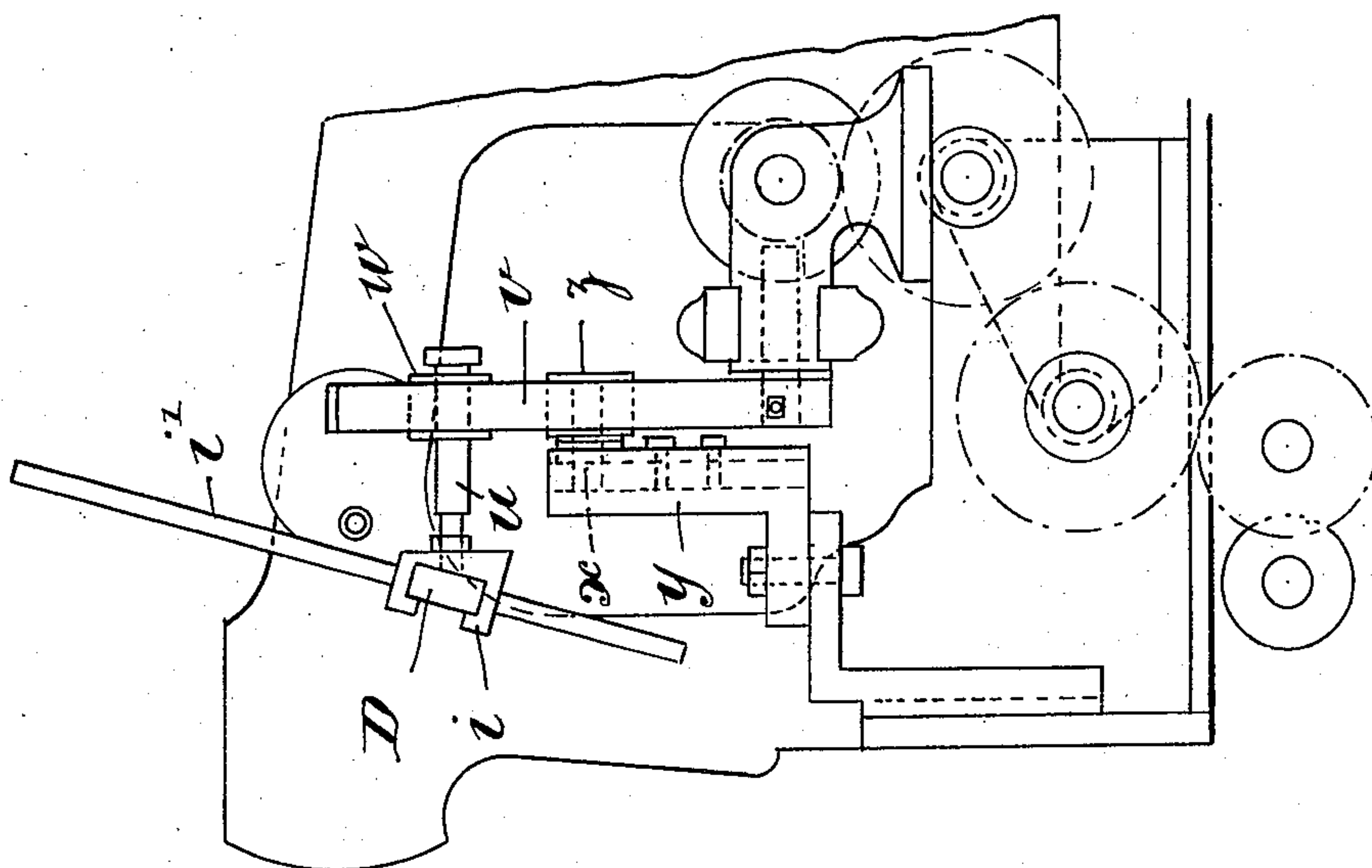
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5 SHEETS—SHEET 3.

FIG. 5.



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5 SHEETS—SHEET 4.

FIG. 8.

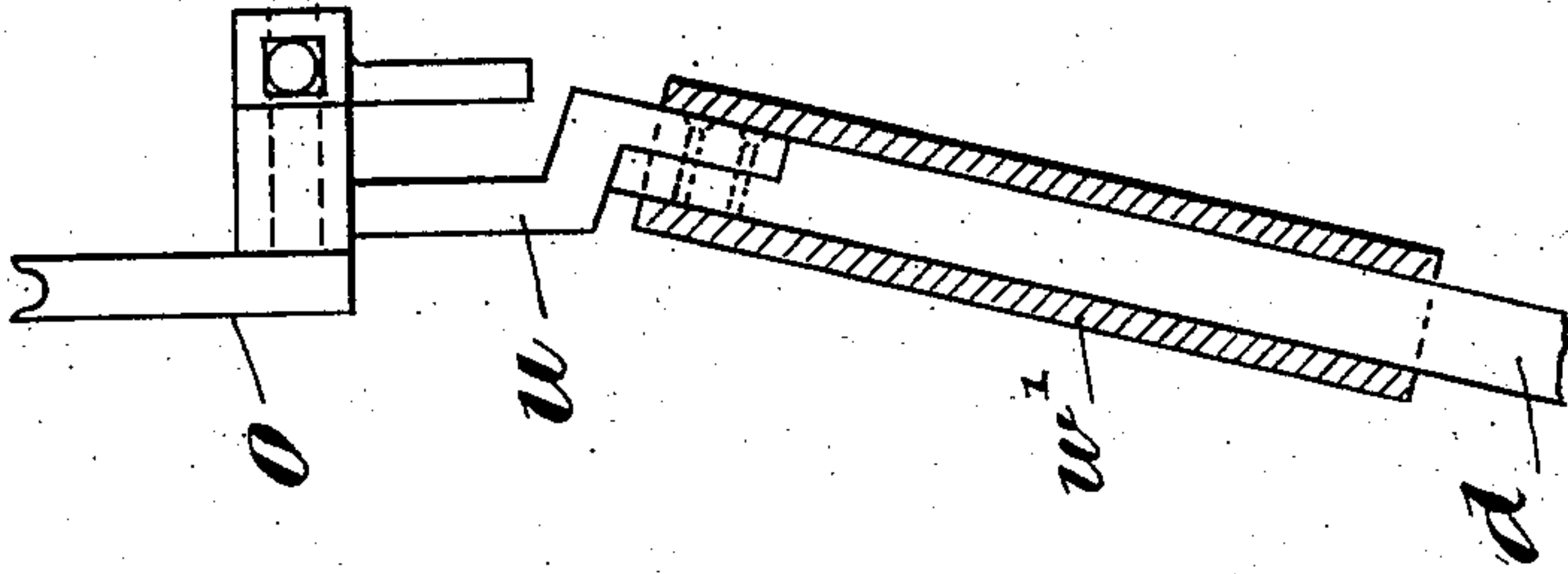


FIG. 7.

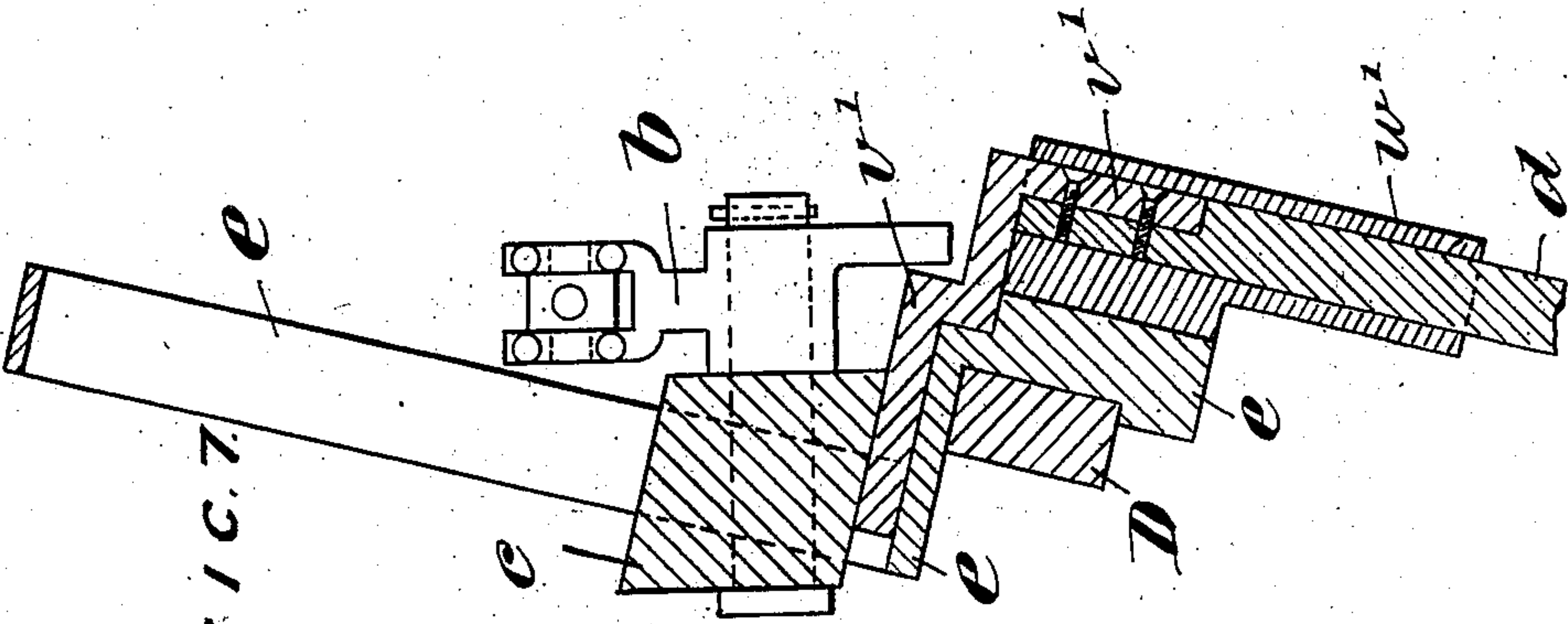
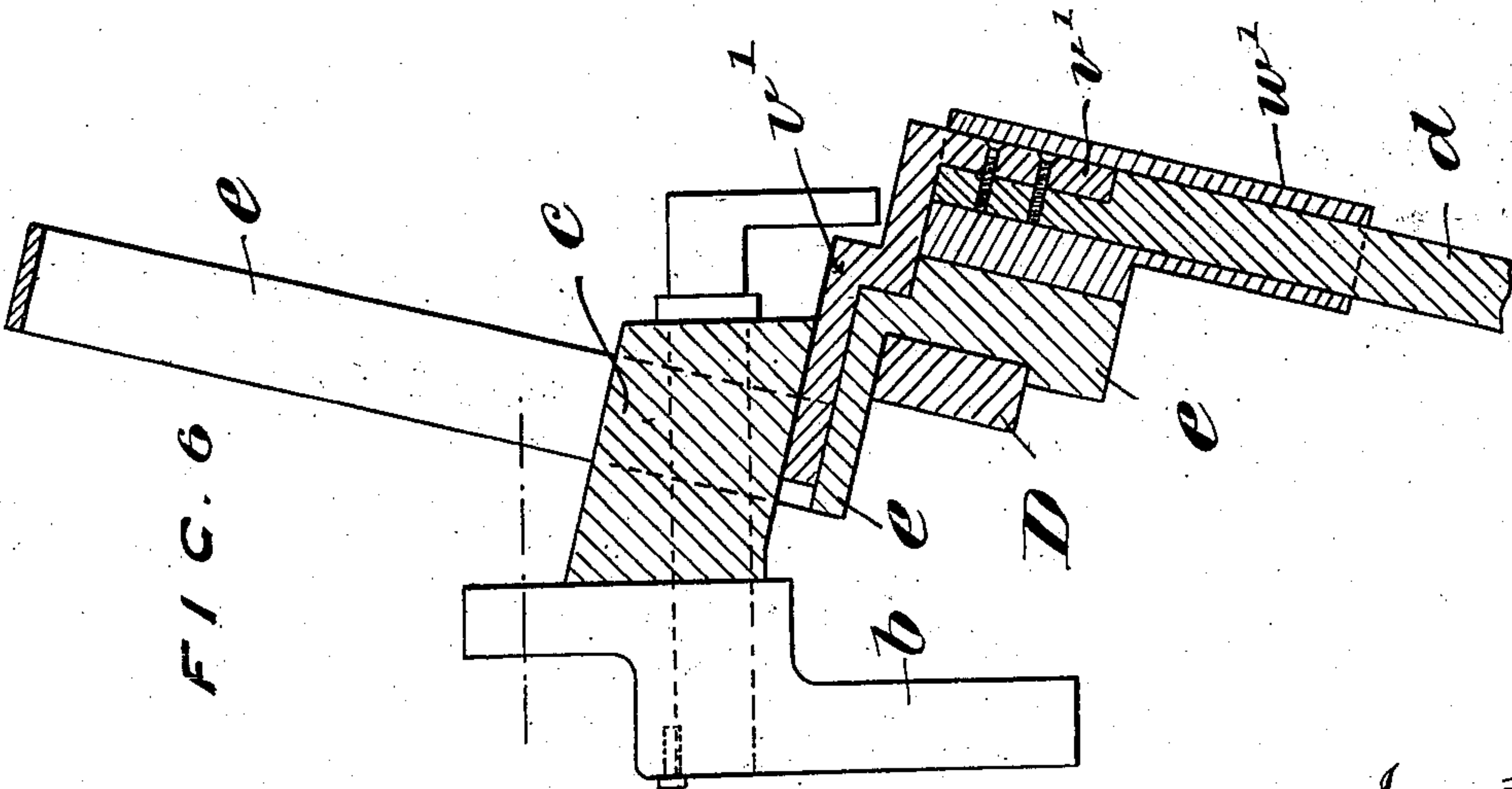


FIG. 6.



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PATENTED JAN. 19, 1904.

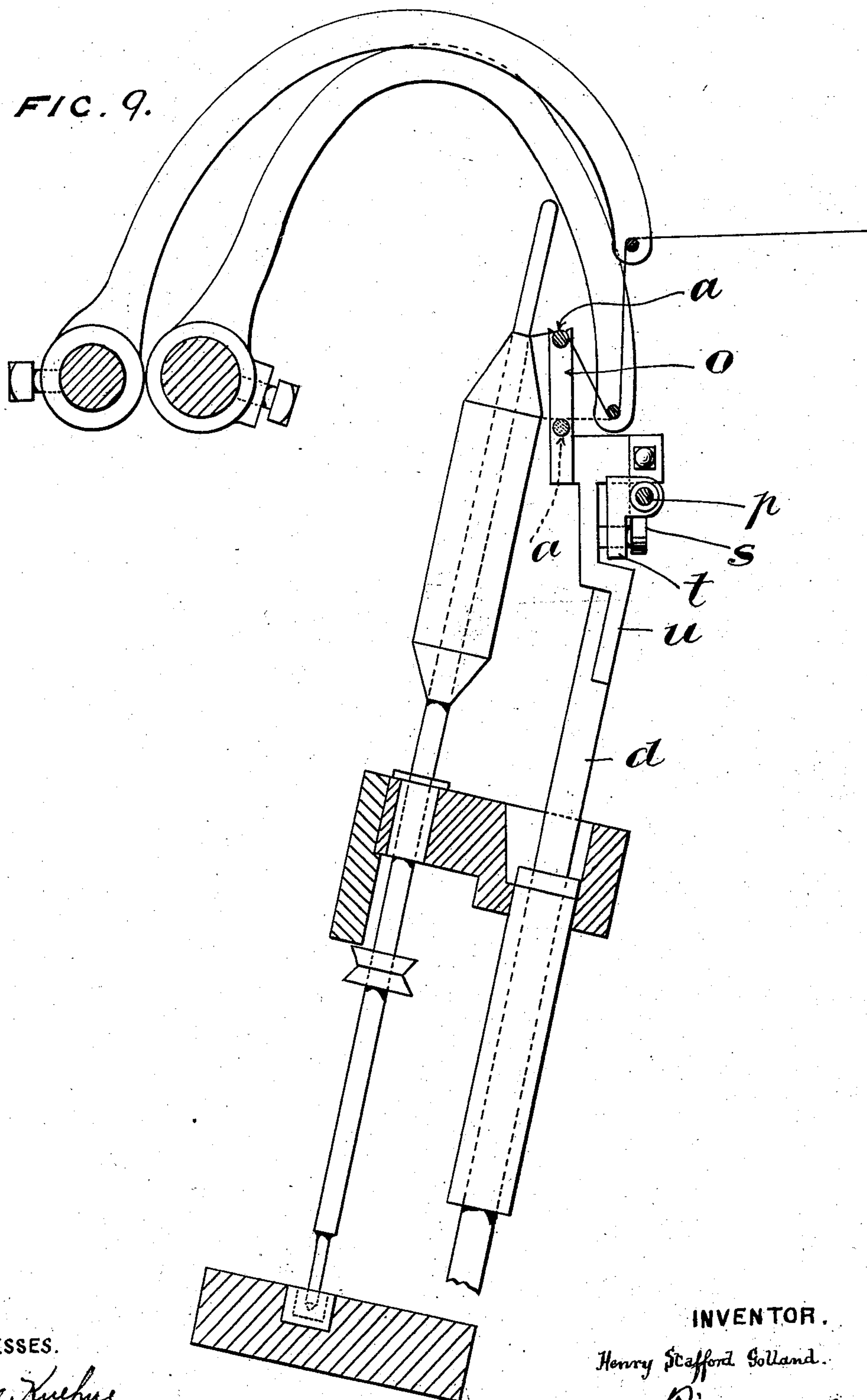
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5 SHEETS—SHEET 5.

FIG. 9.



WITNESSES.

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By his Attorneys Richardson



# UNITED STATES PATENT OFFICE.

HENRY STAFFORD GOLLAND, OF WORSLEY, ENGLAND.

## SPINNING-MULE.

**SPECIFICATION** forming part of Letters Patent No. 750,026, dated January 19, 1904.

Application filed April 4, 1903. Serial No. 151,109. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY STAFFORD GOLLAND, merchant, a subject of the King of Great Britain and Ireland, residing at The Gables, Broad Oak Park, Worsley, in the county of Lancaster, England, have invented certain new and useful Improvements in Spinning-Mules, (for which I have made application in Great Britain, No. 22,988, and dated October 22, 1902, an application has also been filed in Germany on the 17th day of February, 1903,) of which the following is a specification.

My invention relates to spinning-mules, and has reference to improvements upon prior United States Patents Nos. 604,593, 652,203, and 722,973 for winding cross-wound cops in such spinning-mules, and relates particularly to the means for guiding the yarn, so that it will be cross-wound upon the spindles. Under the above patents the cross-winding of the yarn is effected by a series of inclined surfaces arranged between the spindles and the winding faller-wire. The inclined surfaces are reciprocated at a right angle to the threads, causing the threads to run up and down the inclined surfaces and so guide them upon the spindles in widely-pitched spirals. The gradual upward movement of the faller-wire during the winding operation is eliminated, the faller-wire ceasing to be the thread-guide, but serving to hold down the threads in contact with the inclined yarn-guides. These inclined yarn-guides are out of effective action when the yarn is being spun and come into operation only during the run in of the mule-carriage when the yarn is being wound upon the spindles.

My present invention consists in the provision of a wire, rod, or bar running the length of the mule-carriage, or thereabout, at each side of the head-stock and arranged in juxtaposition with the spindles in the space between the winding faller-wire and the spindles. This guide-rod is used in lieu of the inclines mentioned in the above former patents. The rod or its equivalent is arranged below the threads, and as they are being wound upon the spindles the faller-wire brings down the threads in contact with the rod, which is vi-

brated in a vertical, or it might be slightly inclined, path. The rod thus serves to guide or raise and lower the yarn in its passage from the winding faller-wire to the spindles a number of times, so that it is wound upon the spindle in widely-pitched spirals. The spindles are driven at a constant speed, or nearly so, as mentioned in the former patents, and to effect the building of the cops I arrange that the rod or equivalent yarn-guide shall be very slightly raised at the same time as it is vibrated during the run in of the mule-carriage, and this movement is also imparted to the winding faller-wire, which may be conveniently effected by means similar to those described in the specification of the former patent, No. 727,349, applied for by myself and John Dempster Whyte.

In the accompanying drawings, on Sheet 1 Figure 1 represents a front view of the apparatus. The part marked A is the arrangement at the head-stock side of the mule-carriage, C is the outer end of the carriage, while B represents one of a number of intermediate supports for the wire or bar. On Sheet 2 Fig. 2 is an end view of A. Fig. 3 is an end view of the part marked C, and Fig. 4 an end view of B. On Sheet 3 Fig. 5 represents the means for vibrating the guide-rod. Figs. 6 to 8 show in sectional end view the means for raising bell-crank levers used for vibrating the yarn-guide rod. Fig. 9 is a view showing the relation of the faller-wires to the vibrating rod.

The wire rod or yarn-guide *a* is secured at each end to bell-crank levers *b*, pivoted upon blocks *c*, carried by the "pokers" *d*, (shown in Figs. 2 and 3,) the blocks *c* being adapted to slide in suitable bearings *e*, arranged at the same angle as the mule-spindles, the center line of which only is shown in Figs. 2 and 4 and marked *f*. The bearings *e* are secured upon the fixed bars D. In Figs. 6 and 7 I show more clearly in sectional end elevation the connection between the pokers *d* and the bell-crank levers C. The blocks *c*, on which are pivoted the bell-crank levers C, rest upon brackets *v'*, which are screwed to the top of the pokers *d*, the poker-tops sliding a guiding-tube *w'*. As the pokers *d* are gradually raised the brack-



ets  $v'$  thrust the blocks  $c$  up the inclined bearings  $e$ . The bell-crank lever (shown at A) is also connected by a rod  $g$  or the like to the sliding part  $h$ , mounted on the inclined extension  $i'$  of a slide  $i$ , slidable on the bar D, which is secured to the mule-carriage, the slide  $i$  being actuated by a lever with an adjustable fulcrum, as described particularly with reference to Figs. 1 and 2 of the said prior specification, No. 722,973. The arrangement of actuating-lever is shown in Fig. 5. The slide  $i$  is connected by a stud  $u$  with the lever  $v$ . The stud  $u$  is carried by a block  $w$ , slidable on the lever  $v$  to compensate for the curved path of the lever  $v$ , as particularly described in the Patent No. 722,973.

The fulcrum  $x$  of the lever  $v$  is made adjustable in the bracket  $y$ , so as to alter the throw of the lever, as required, the lever being carried by a block  $z$ , slidable in the lever and the bracket  $y$  to adjust the throw of the lever. A train of gearing is employed to vibrate the lever  $v$ , which gearing is fully described in the said prior patent, No. 722,973. It will be seen that as the slide  $i$  is vibrated to and fro by the lever  $v$  the bell-crank levers  $b$  are oscillated, thus raising and lowering the guide-rod  $a$ .

The rod or bar  $g$  slides in bearings  $j$ , formed in a bracket  $k$ , carried by the sliding block  $c$ . To compensate for the curved path of the end of the bell-crank lever  $b$ , it is provided with a block  $l$ , slidable in the jawed end of the bell-crank lever, the block  $l$  being connected to the sliding bar  $g$  by a set-screw  $m$ .

The rod or guide  $a$  is connected at each end to parts  $n$ , which are capable of oscillation to compensate for the curved path of the end of the bell-crank lever. The rod  $a$  is also supported at intervals by any suitable number of fingers  $o$ , which are vibrated, as required, by means of a second wire or rod  $p$ , attached to the bell-crank levers  $b$ .

To oscillate the second or lower rod  $p$ , I secure a crank  $q$  upon the axis of the bell-crank lever  $b$ . (Shown at A in Fig. 1 and in end view in Fig. 2.) A corresponding crank  $q$  is also carried by the bell-crank  $b$ . (Shown at C, Fig. 1, and in end view, Fig. 3.) To these cranks  $q$  is secured a bracket  $r$ , to which the rod  $p$  is connected.

Upon the axis of the intermediate supporting-fingers  $o$  is secured also a crank  $s$ , connected at its other end to a bracket  $t$ , to each end of which is secured the ends of the lower rod  $p$ . The oscillation of the bell-crank levers thus provides for the vertical vibration of the guide-rod  $a$  and the lower rod  $p$  to effect the synchronous oscillation of the intermediate supporting-fingers  $o$ .

The supporting-fingers  $o$  are connected to the pokers  $d$  by brackets  $u$ , which are also raised, as required, as well as the winding faller-wire, by the means described in the said prior specification, No. 727,349.

Fig. 8 shows more clearly how the bracket  $u$ , supporting the intermediate fingers  $o$ , is connected to the poker  $d$ , which slides within the tube  $w$ .

The gist of my invention being the provision of a wire, rod, or bar, or equivalent support for the yarn, which wire or rod is vibrated in a vertical path, or thereabout, to guide the yarn in widely-pitched spirals upon the spindles, I do not confine myself to any particular method of vibrating the rod, as various means will readily recommend themselves to the skilled mechanic.

I declare that what I claim is—

1. In spinning-mules, a guide rod or bar arranged in juxtaposition with the spindles and below the threads, means for bringing the threads in contact with the said guide-rod and means for vibrating the rod in a substantially vertical path to guide the yarn upon the spindles in widely-pitched spirals substantially as described.

2. In combination in a spinning-mule, the spindles, a guide-rod associated therewith, means for bringing the threads in contact with said guide-rod, means for vibrating the guide-rod consisting of bell-crank levers connected to the guide-rod and supporting-fingers, and means for actuating the bell-crank levers and supporting-fingers whereby the guide-rod will be vibrated in a substantially vertical path,

In witness whereof I have hereunto set my hand in presence of two witnesses.

HENRY STAFFORD GOLLAND.

Witnesses:

JOSHUA ENTWISLE,  
ALFRED YATES.