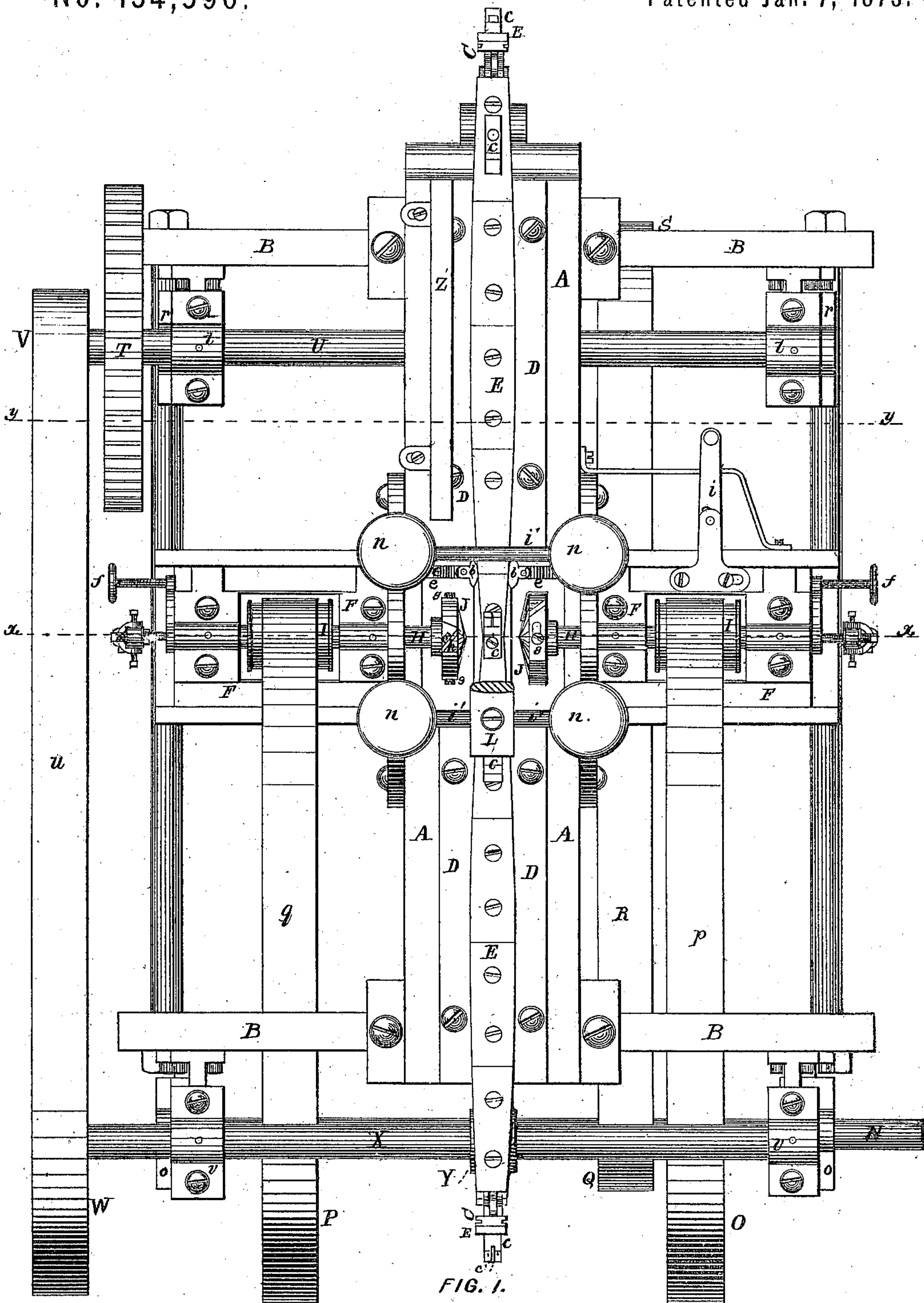


**S. S. GRAY.**  
**Machines for Jointing Staves.**  
 No. 134,596.

Patented Jan. 7, 1873.



WITNESSES.

*J. A. Wood.*  
*W. E. Lombard*

INVENTOR.

*Solomon S. Gray*

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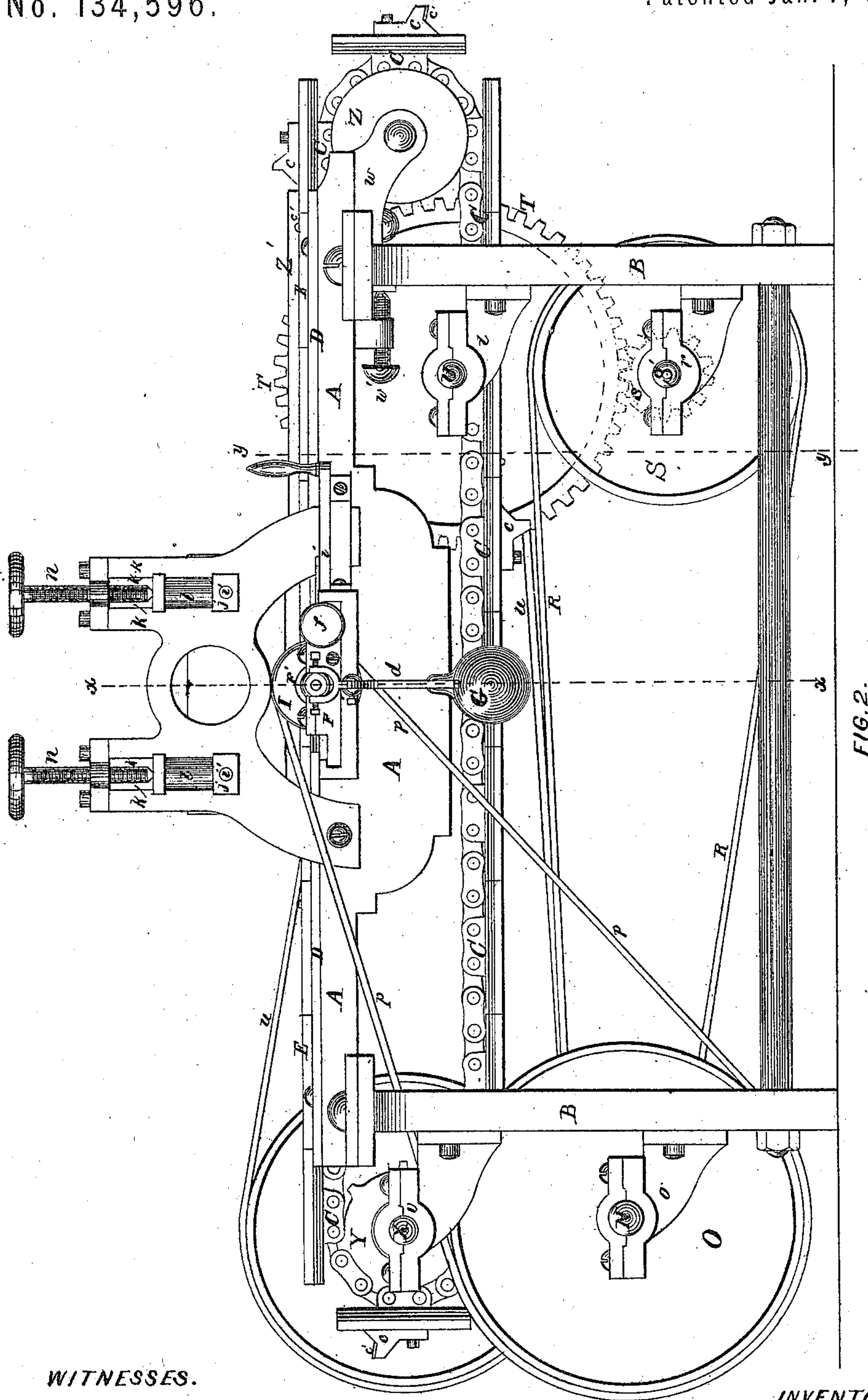


FIG. 2.

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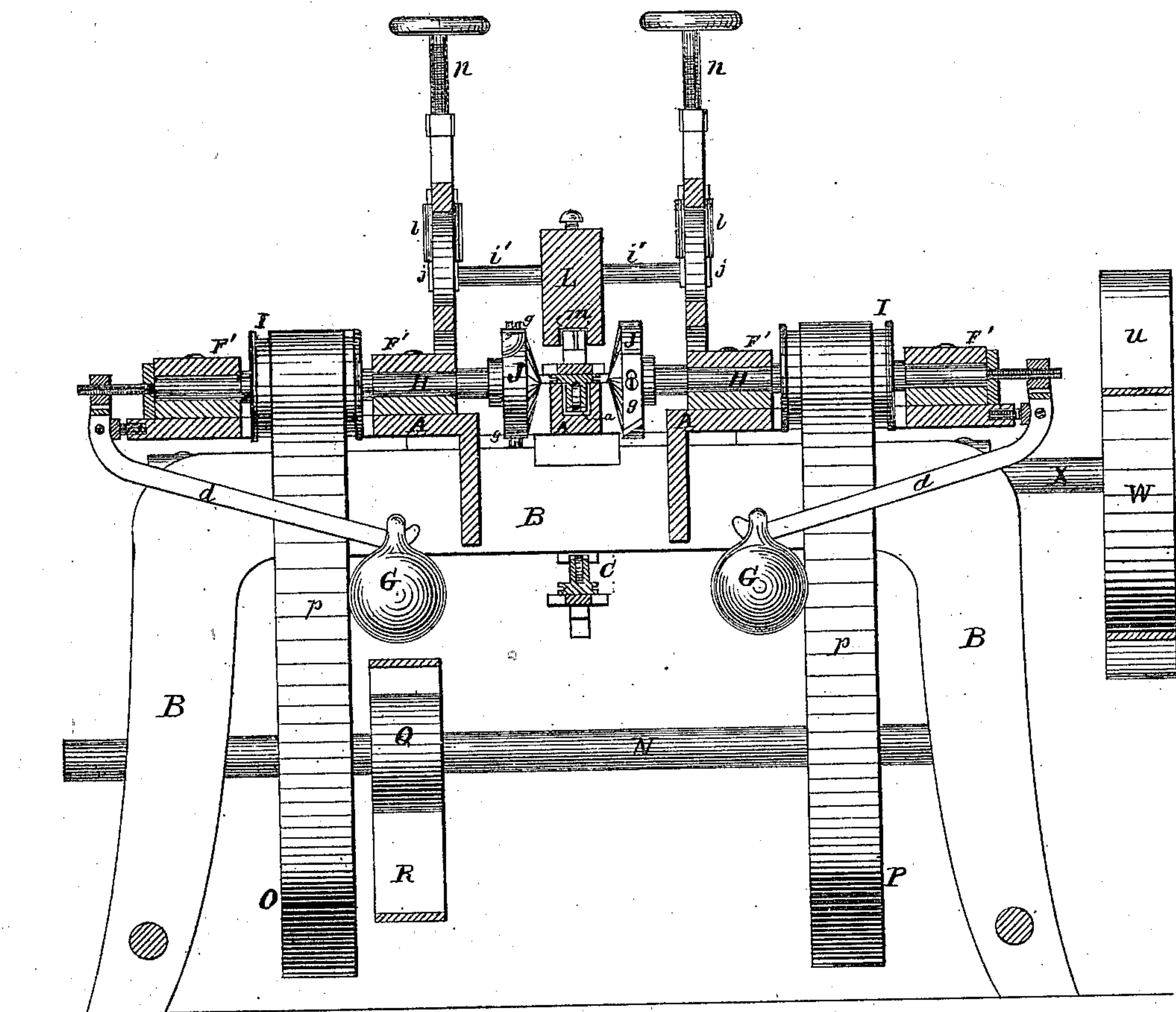


FIG. 3.

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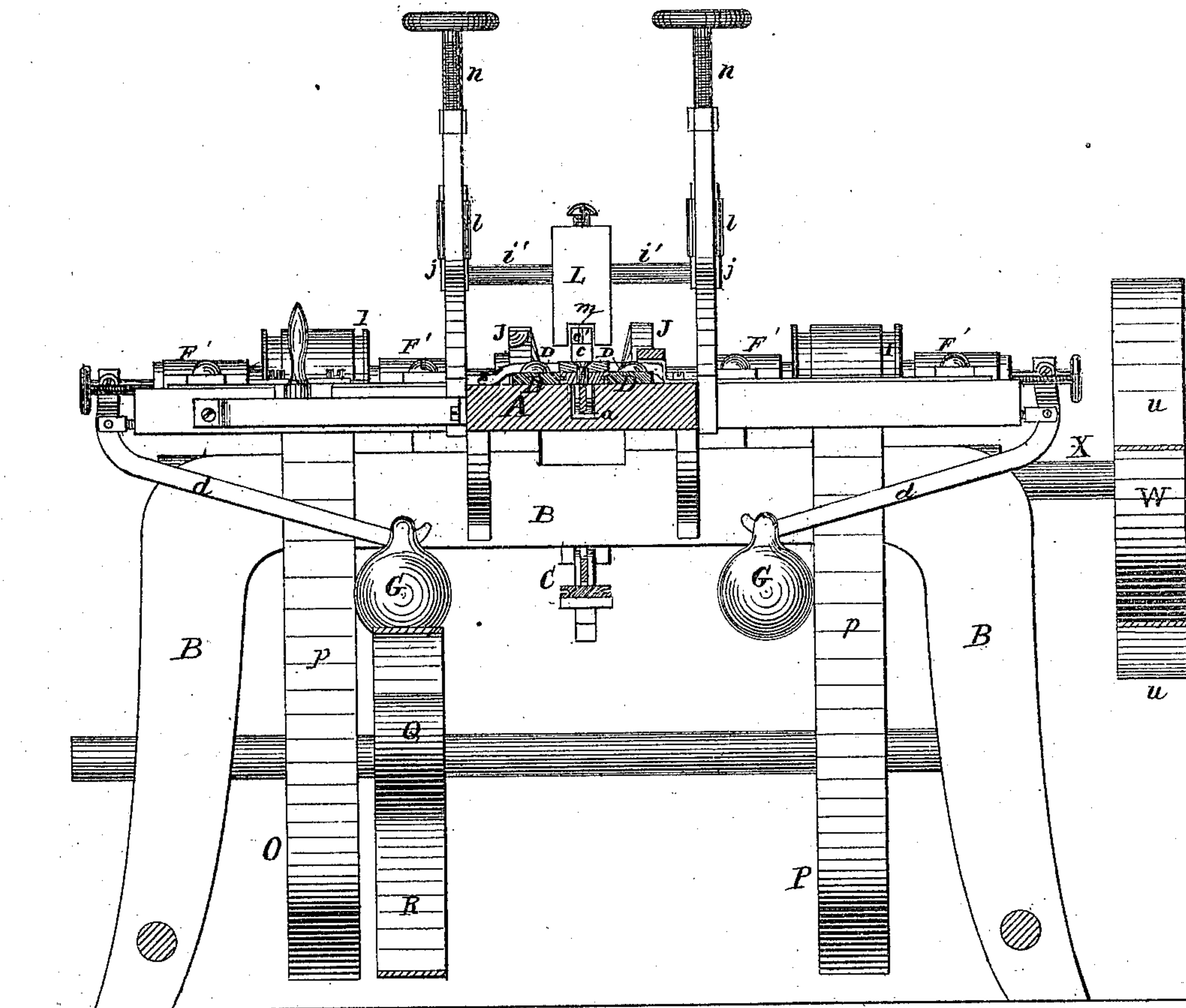


FIG. 4.

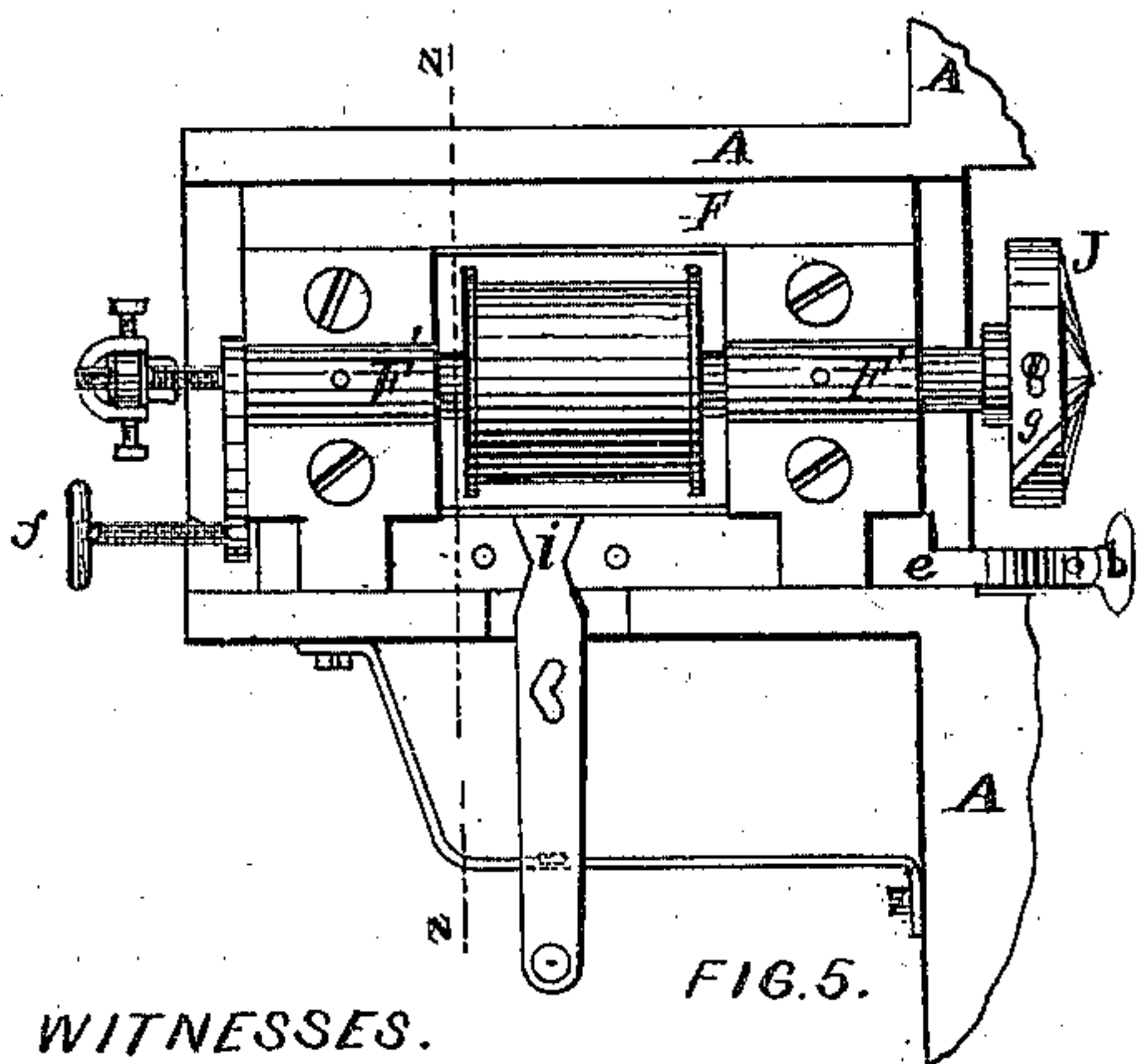


FIG. 5.

WITNESSES.

J. A. Wood.  
W. E. Lombard

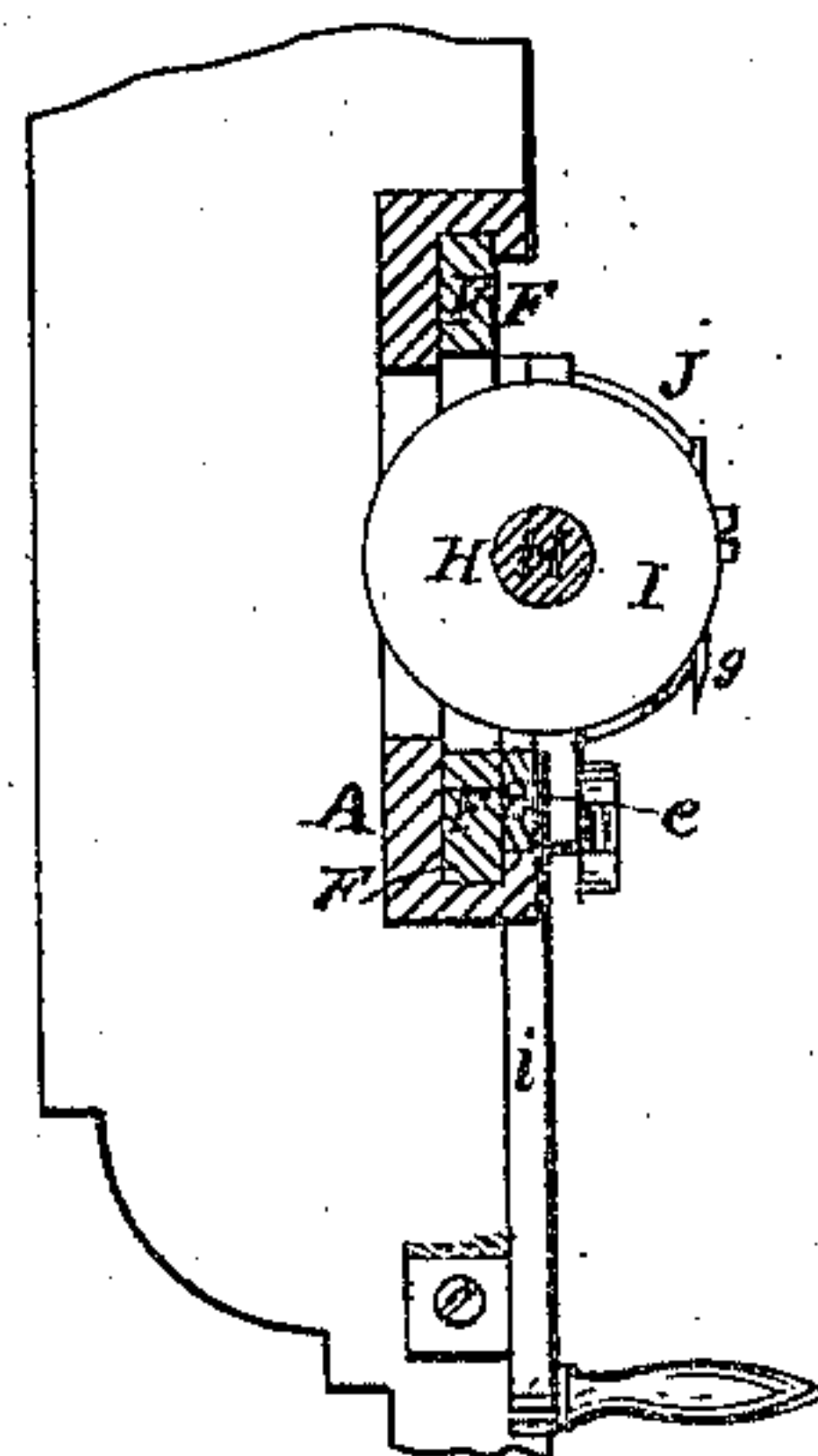


FIG. 6.

INVENTOR.

Solomon S. Gray



# UNITED STATES PATENT OFFICE.

SOLOMON S. GRAY, OF BOSTON, MASSACHUSETTS.

## IMPROVEMENT IN MACHINES FOR JOINTING STAVES.

Specification forming part of Letters Patent No. 134,596, dated January 7, 1873.

*To all whom it may concern:*

Be it known that I, SOLOMON S. GRAY, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Machines for Jointing Barrel-Staves, of which the following is a specification:

My invention relates to a machine for jointing staves, arranged to joint both edges at the same time, giving thereto the proper bilge and bevel; and it consists, first, in the employment of a chain-feed bed having secured thereon one or more pattern-forms, upon which the stave to be jointed is placed and secured by suitable dogs and spurs. It further consists in the use, in combination with a chain-feed bed having one or more pattern-forms secured thereon, of a pair of revolving cutters, one upon either side of said chain-bed and opposite to each other, mounted upon horizontal shafts arranged to revolve in suitable bearings upon sliding frames so arranged in relation to and controlled by the pattern-forms carried by said feed-chain that the position of said cutters shall be controlled by said pattern-forms, to give the proper form or bilge to the stave, said frame being made to bear against the forms on the feed-chain by means of a lever and weight, or its equivalent. It also consists in the use, in combination with a chain-feed bed having one or more pattern-forms made in sections secured thereon, of a yielding pressure-bar, under which the stave passes while the cutters are acting thereon, for the purpose of holding the stave firmly on the pattern-form, whatever may be its thickness. It further consists in the use, in combination with a chain-feed bed having one or more pattern-forms made in sections and secured thereon, and one or more rotary cutters controlled thereby, of a pivoted shoe attached to the frame of said cutters in such a manner that said shoe may be adjusted with relation to said cutter so as to vary the distance of said cutter from the center line of the stave, and so that said shoe may accommodate itself to the varying angle of the curved edge of the pattern-forms. It further consists in the application to one of said shoes of a lever, wedge, or other suitable device by means of which the cutter-head may be read-

ily and easily adjusted to the proper position for jointing a wide or a narrow stave, while at the same time said cutter-head may be slightly adjusted by means of a screw for the more accurate setting of the cutter-head. It also consists in the formation of a groove in either edge of the various sections of the chain-feed bed, in combination with guide-plates secured to the fixed bed, and having formed thereon tongues to fit said grooves, thereby preventing any inequalities in the upper surface of said bed.

Figure 1 is a plan of a machine embodying my invention, with a portion of the pressure-bar broken away in order to show more clearly the other parts. Fig. 2 is a side elevation. Fig. 3 is a transverse section on line *x x* on Figs. 1 and 2. Fig. 4 is a transverse section on line *y y* on Figs. 1 and 2. Fig. 5 is a plan of one of the cutter-heads, its shaft and frame showing more clearly the adjusting mechanism; and Fig. 6 is a section on line *z z* on Fig. 5.

In the drawing, A is the table or fixed bed of the machine, made in the form of a cross, and mounted on the legs B B, which, together with said table, constitute the frame of the machine. The table A has a longitudinal groove, *a*, formed in its upper side to receive and guide the links of the traversing chain-feed bed C. This traversing bed is an endless-chain belt, a portion of the links of which have formed on or secured to their outer sides short sections of a flat plate of such a length and so fitted as to form a continuous flat bed from end to end of the table, said chain-bed being mounted at either end of the machine upon suitable chain-wheels so arranged and operated as to give motion to the bed in the desired direction. The upper surface of the bed is kept in a level position and made to travel in a straight line by means of the guide-plates D D secured to the upper side of the table A, and provided with a tongue upon their inner edges to fit a corresponding groove upon either edge of the chain-bed, as shown in Figs. 3 and 4. To the upper side of this chain-bed are secured, by screws or other suitable means, a series of pattern-forms, E E, made in sections corresponding to the sections of the chain-bed, the sides or edges of said forms being curved ac-



according to the bilge it is desired to give the stave, which serve the purpose of guides to control the position of the cutters while the stave is passing them. Upon each pattern-form are secured two dogs, *c*, and the spurs *c'*, by means of which the stave is registered in proper position and held while the cutters are operating thereon. The wings of the bed *A* have fitted thereto frames *F F* in such a manner that they may move toward or from the stave at right angles to the line of motion of the chain-bed. The frames *F F* each have attached thereto a pivoted shoe, *b*, which bears against the edge of the form *E*, against which it is held by the weight *G* and the lever *d*, acting upon the frame *F*, to which said shoe is connected, by means of the bar *e*, in such a manner that the relation of the shoe to said frame may be varied by means of the screw *f*. The frames *F F* are provided with the bearings *F' F'*, in which are mounted the cutter-shafts *H H*, carrying the pulleys *I I* and the cutter-heads *J J*. The cutter-heads *J J* are provided with two periphery-cutters, *g g*, for cutting away the bulk of the surplus stock, and a face or side cutter, *h*, for smoothing or finishing the work, the inner face of said cutter-heads being made in the form of a flat cone and the face or finishing cutter *h* corresponding to said cone for the purpose of giving the proper bevel to the edge of the stave. The cutter-shafts *H H* are placed directly opposite each other on either side of the chain-bed, with the working faces of their cutting-heads toward each other, so that as the pattern-form, carrying a stave secured thereto, is carried forward by the chain-feed bed, the cutters, revolving at a high rate of speed, will joint both edges of the stave at the same time, the cutters following the line of curvature of the pattern-form and giving to the stave the same bilge or curvature as the pattern, but a greater or less width, according to the adjustment of the shoe *b* with relation to the cutter-head. Upon the front side of the machine an extra adjustment of the shoe *b* is provided for by cutting the bar *e* into two parts and interposing a wedge, *i*, or other equivalent device, by which the two parts may be readily separated, so as to move the cutter-head further from the center line of the feed-bed, so that the adjustment from a narrow stave to a wide one, or vice versa, may be made without stopping the machine. *L* is a pressure-bar, preferably of wood, mounted on the rods *i' i'*, said rods being supported in the sliding boxes *J J*, fitted to work in the slots *k* in the stands *M*, and forced downward by the springs *l* in an obvious manner. The under side of the pressure-bar *L* has formed therein, running longitudinally through the center thereof, a groove, *m*, to allow the dogs *c* to pass, while the portion of the under surface of said bar on either side of the groove *m* is made to press hard upon the upper side of the stave, by the springs *l*, to prevent the stave from being thrown off from

the former by the cutters. The front lower corner of the pressure-bar *L* is curved upward so that the end of the stave will pass under and lift it. The pressure of said bar is regulated by the set-screws *n n n n*. *N* is the driving-shaft, having its bearings in the stands *o o*, and carrying thereon the pulleys *O* and *P*, from which the belts *p* and *q* lead to the pulleys *I I* on the cutter-shafts *H*, to operate the cutter-heads *J J*. The shaft *N* also carries the pulley *Q*, from which motion is transmitted by the belt *R* to the pulley *S* on the shaft *S'*, which is mounted in bearings *r r*, and carries upon one end the pinion *s*, which works in the spur-gear wheel *T* on the shaft *U*, having its bearings in the stands *t t*. The shaft *U* also carries upon its outer end the pulley *V*, from which motion is imparted by the belt *u* to the pulley *W* on the shaft *X*, which has its bearings in the stands *v v*, and has mounted thereon the chain-wheel *Y*, which gives motion to the chain-feed bed *C*. At the opposite end of the machine the chain-feed bed passes around the pulley or grooved wheel *Z*, which is mounted in the stand *w*, secured to the under side of the table *A* in such a manner that it may be adjusted to take up the slack in the chain by means of the screw *w'*. *z'* is a gage against which the edge of the stave is placed to adjust it on the feed-bed.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. In an organized machine for jointing staves, an endless-chain feed-bed, having secured thereon one or more pattern-forms by which the position of the cutters is controlled to give the proper curvature to the edge of the stave, substantially as described.

2. In combination with an endless-chain feed-bed having one or more pattern-forms secured thereon, the cutter-heads *J J*, arranged and operating as herein described, for the purpose specified.

3. In combination with an endless-chain feed-bed having one or more pattern-forms secured thereon, the pivoted adjustable shoe *b*, attached to the cutter-frame, substantially as described, for the purpose specified.

4. In combination with an endless-chain feed-bed having one or more pattern-forms secured thereon, the yielding pressure-bar *L*, arranged and operating substantially as described, for the purpose specified.

5. The combination of the chain-feed bed *C* having one or more pattern-forms, *E E*, secured thereon, the revolving cutter-heads *J J* placed opposite each other, on either side of said bed and mounted upon sliding frames *F F*, the adjustable pivoted shoes *b* attached to said frames and working in conjunction with the curved edge of the former *E* to control the position of the cutter-heads, and the levers *d* and the weight *G* for holding said cutters to their work, substantially as herein set forth and described.

6. In combination with an endless-chain



feed-bed having one or more pattern-forms secured thereon, the guide-plates D. D, provided with a tongue on their inner edges to fit a corresponding groove formed in either edge of said feed-bed, for the purposes and in the manner herein set forth and described.

7. The combination of the frame F, the bar *e* made in two parts, and the wedge *i* interposed between said parts for the purpose of

expanding said bar to vary the position of the shoe *b* with relation to the cutter-head, substantially as described.

Executed at Boston this 23d day of August, 1872.

SOLOMON S. GRAY.

Witnesses:

S. A. WOOD,

H. E. LOMBARD.