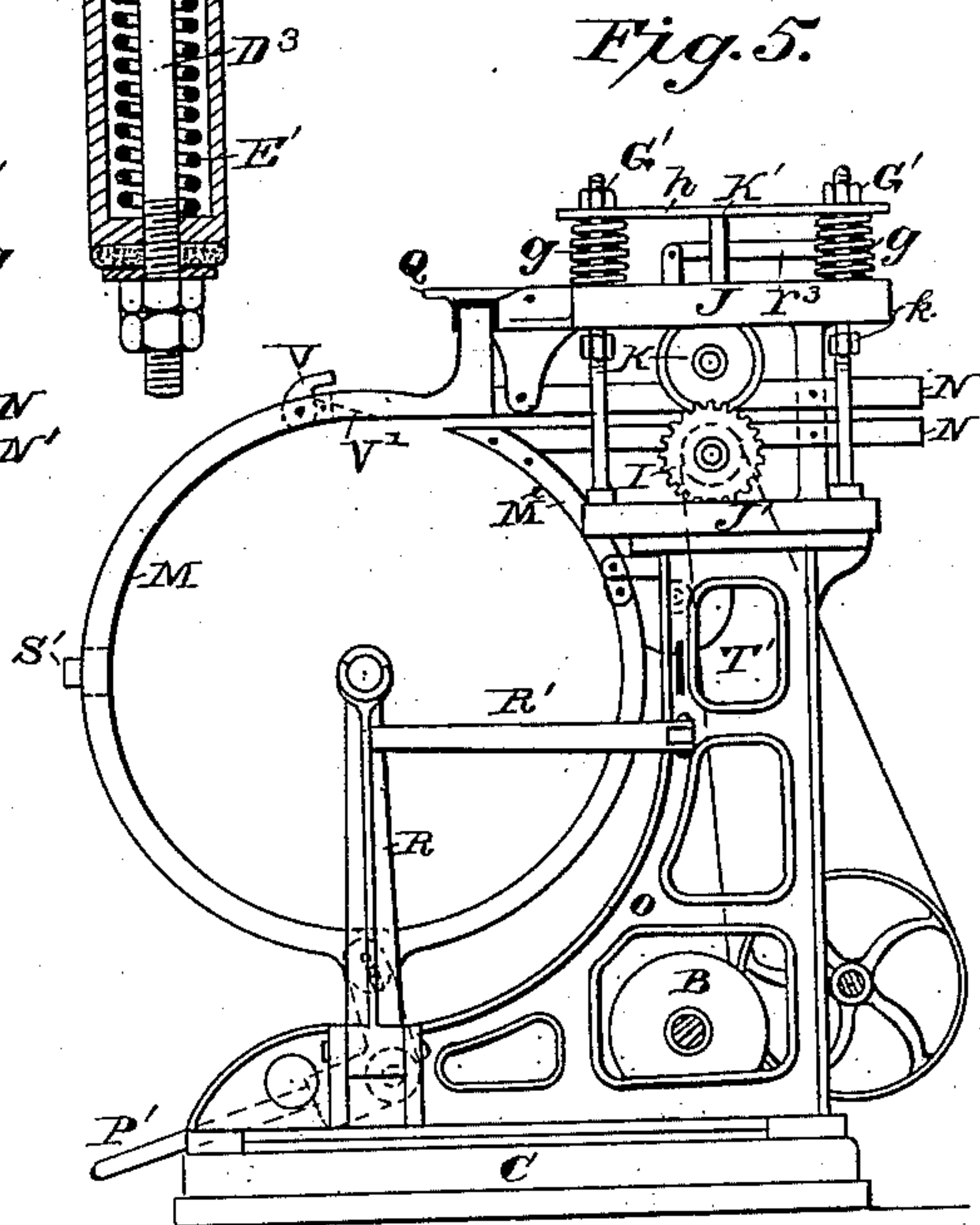
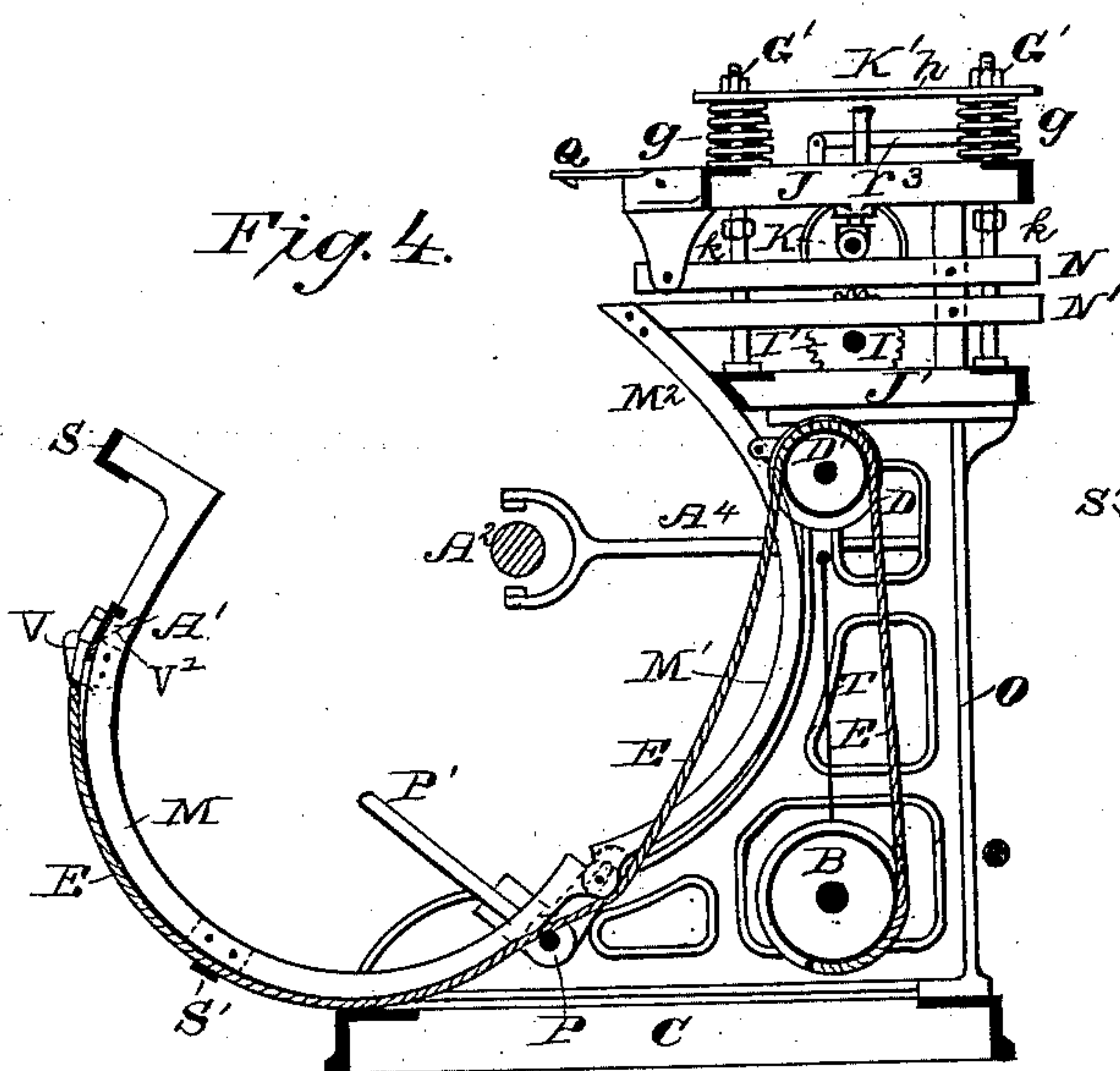
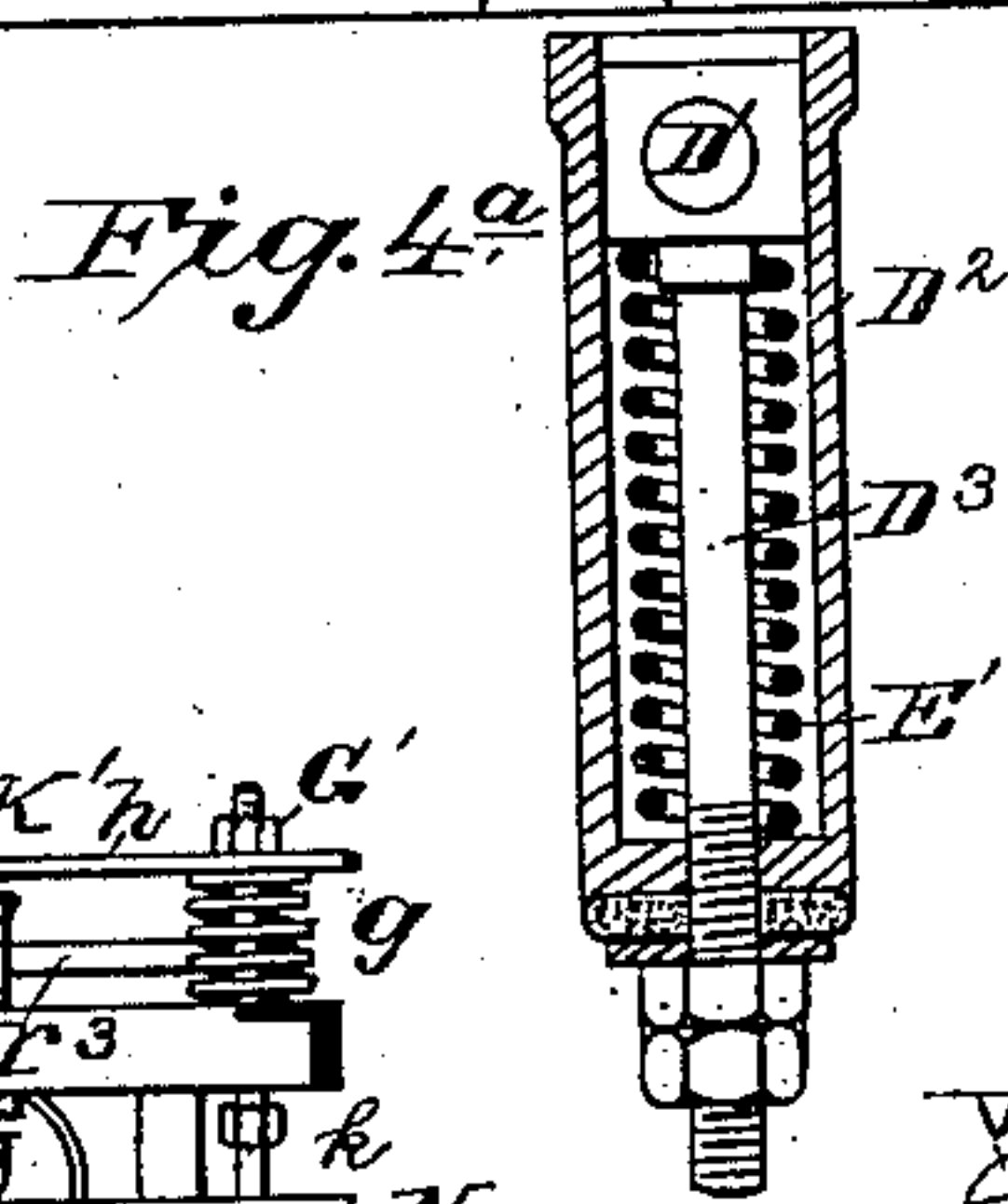
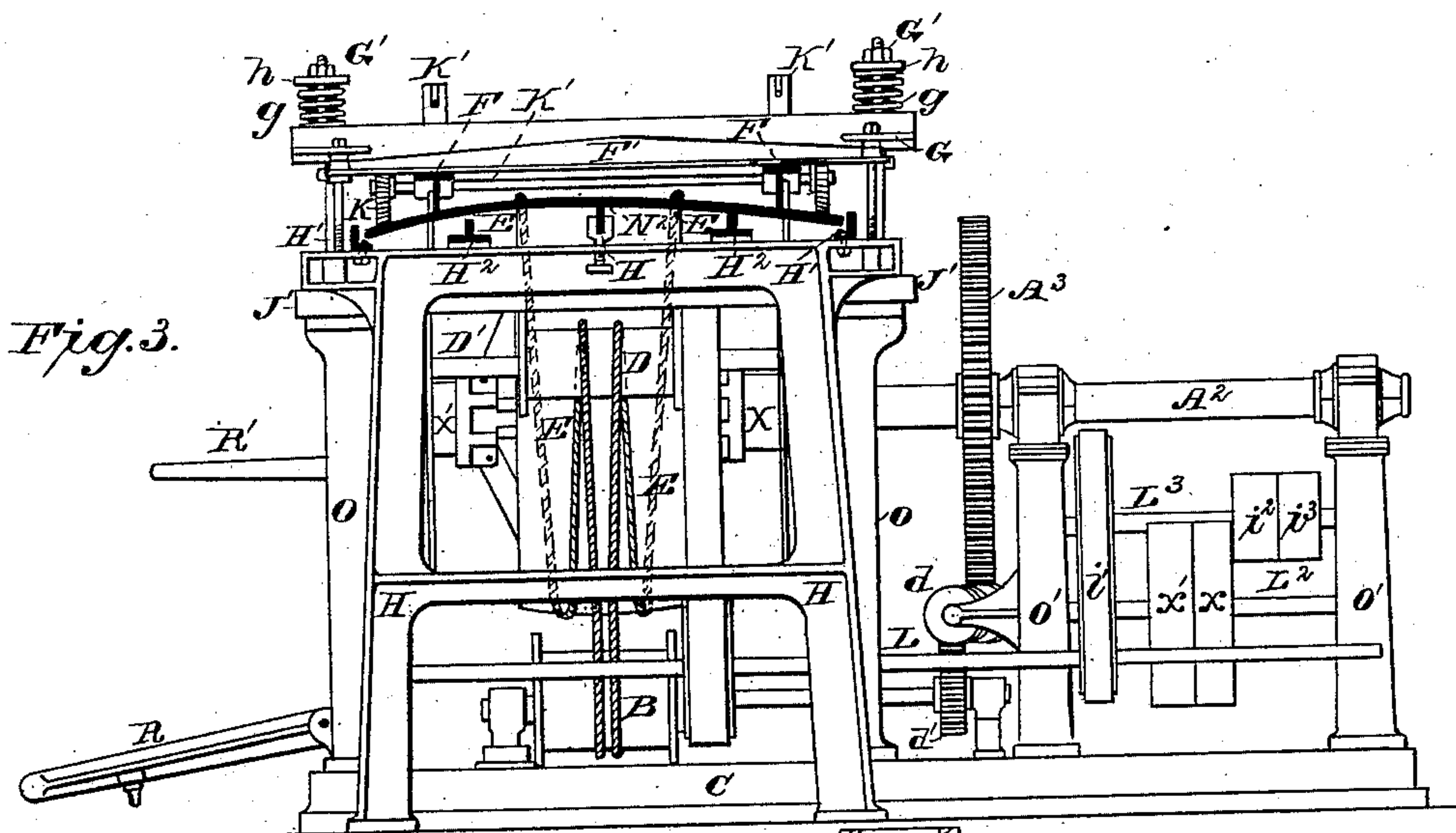




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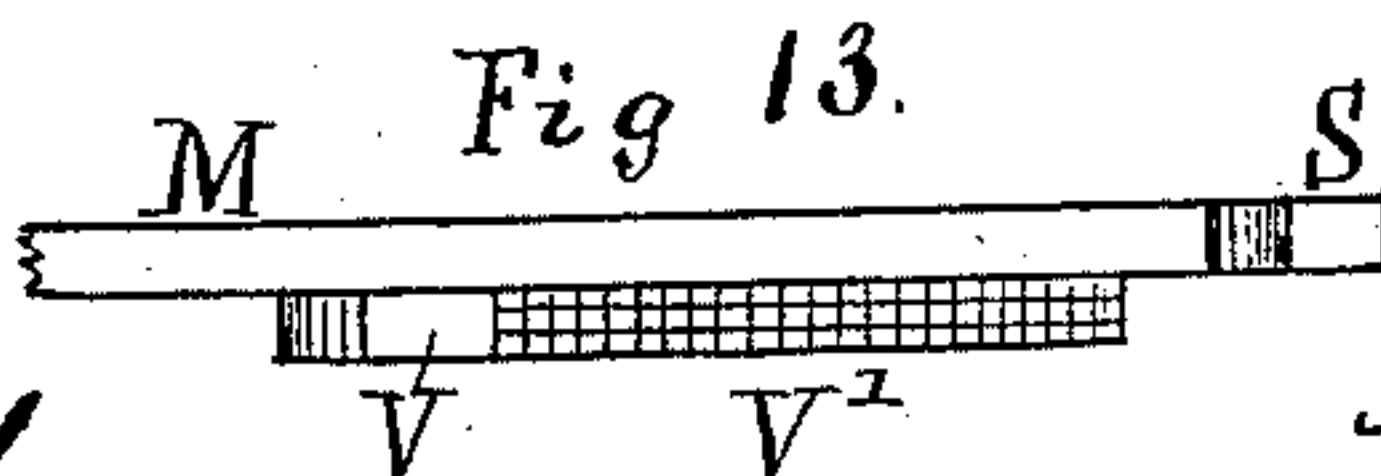
No. 299,896.

Patented June 3, 1884.



**WITNESSES**

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*INVENTOR*

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 Attorney.

*Attorney*



(No Model.)

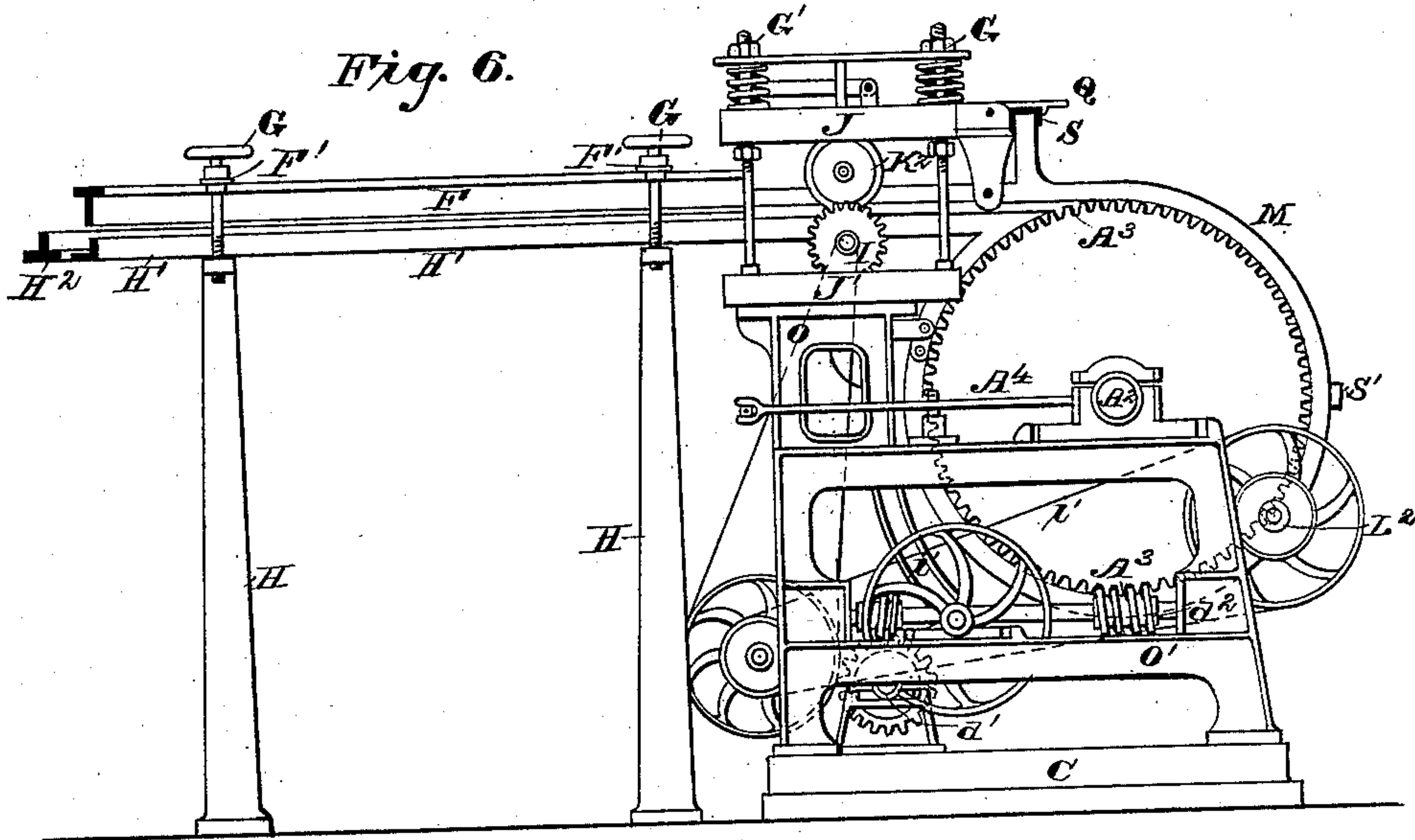
3 Sheets—Sheet 3.

S. WRIGHT.

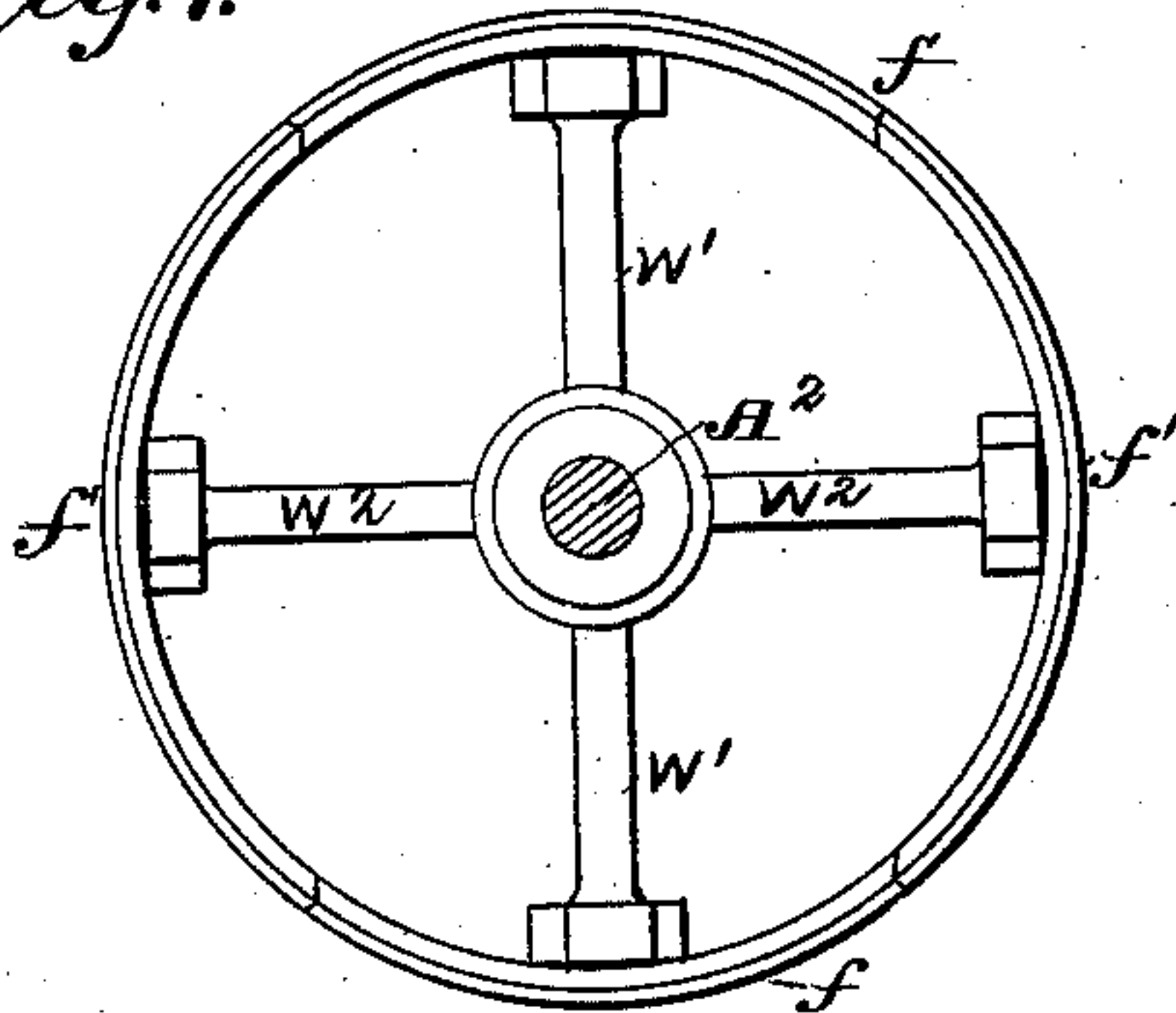
BARREL MAKING MACHINE.

No. 299,896.

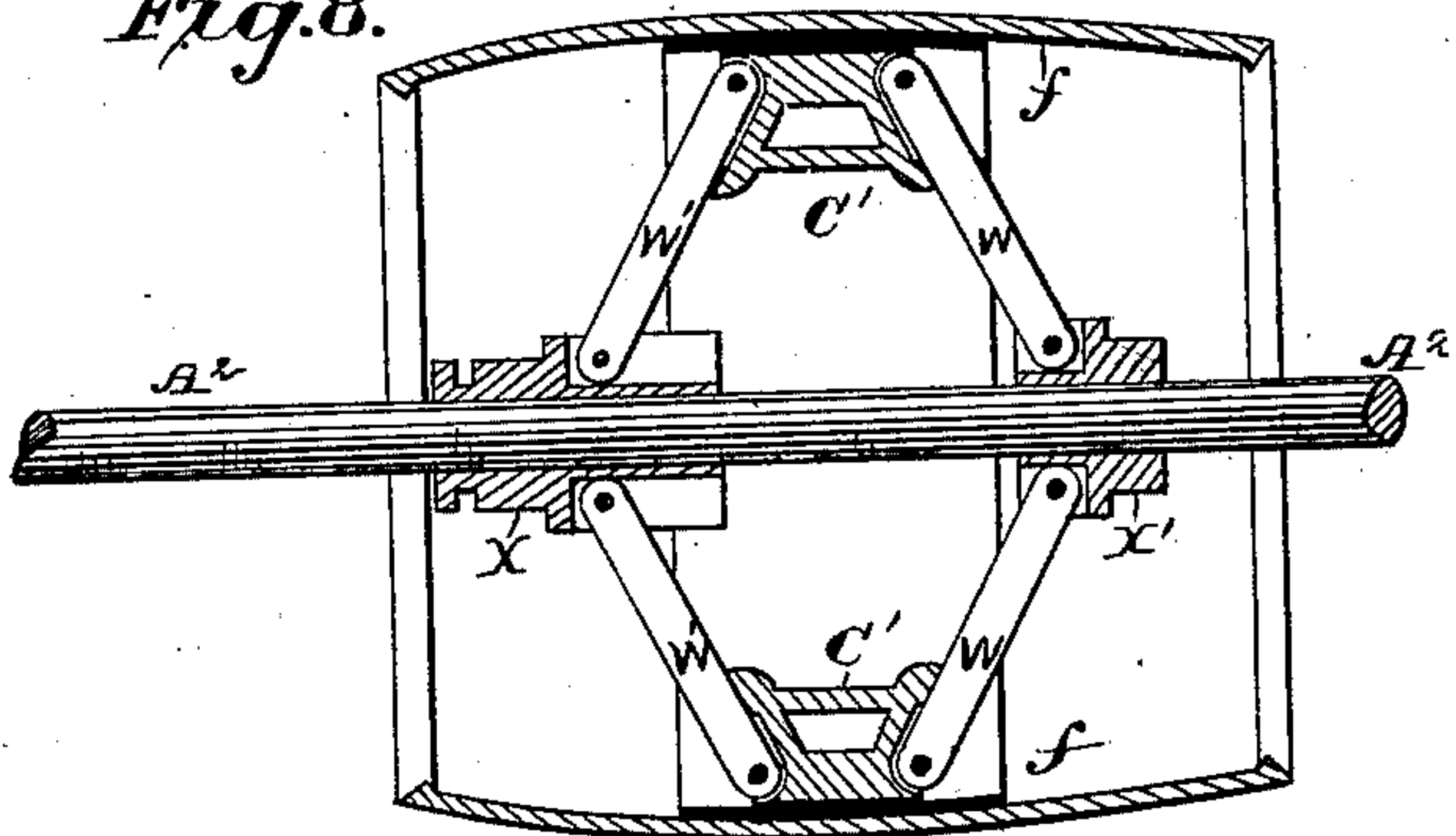
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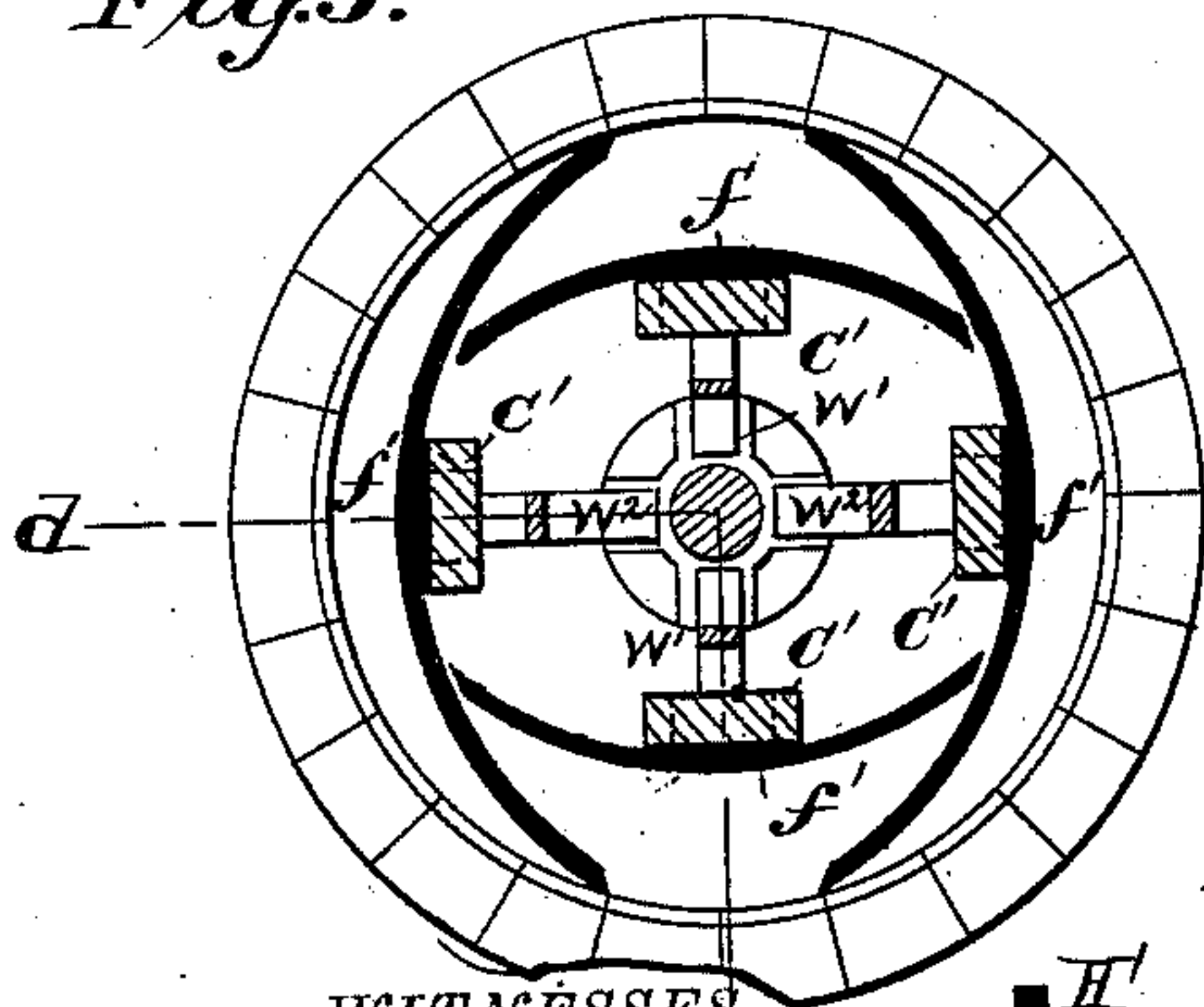
*Fig. 7.*



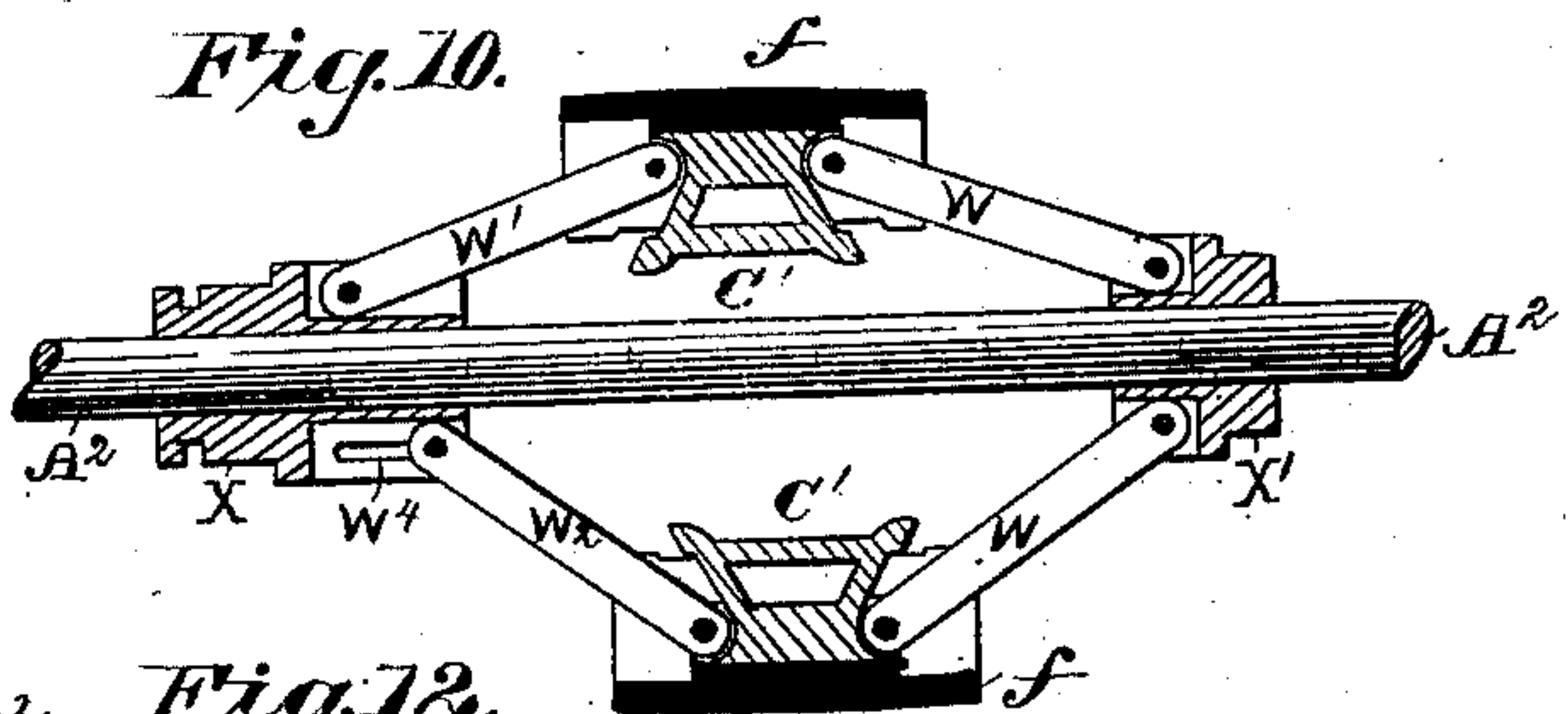
*Fig. 8.*



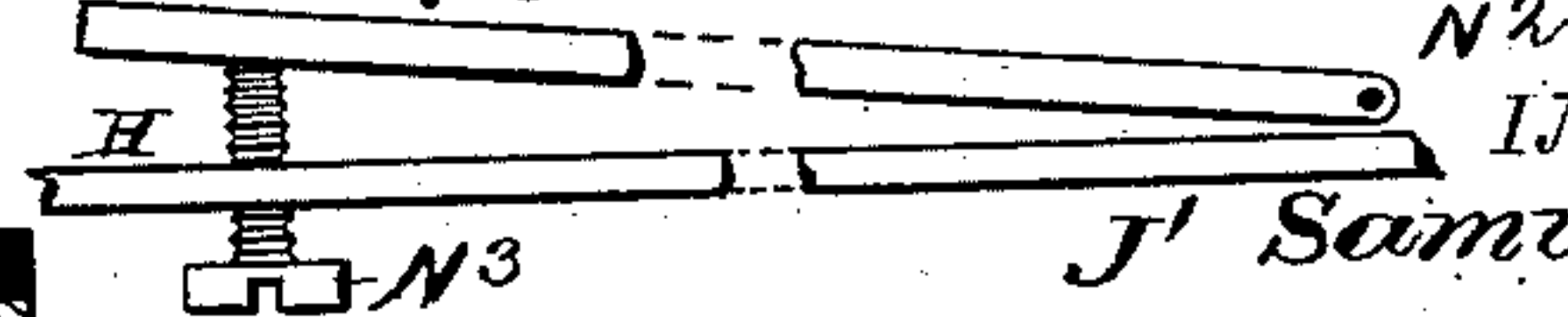
*Fig. 9.*



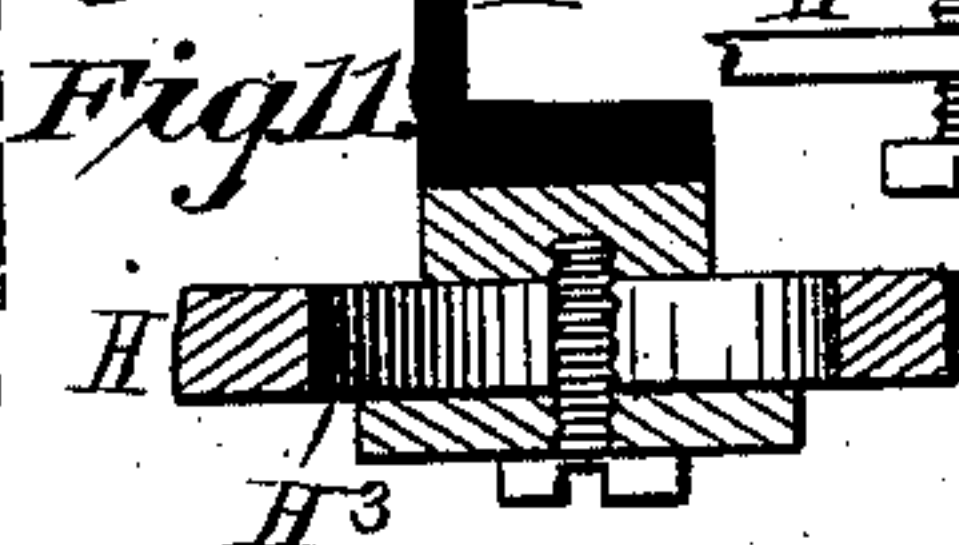
*Fig. 10.*



*Fig. 11.*



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# UNITED STATES PATENT OFFICE.

SAMUEL WRIGHT, OF EGREMONT, COUNTY OF CHESTER, ENGLAND.

## BARREL-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 299,896, dated June 3, 1884.

Application filed February 26, 1883. (No model.) Patented in England May 12, 1883, No. 2,250, and July 28, 1883, No. 3,589; in France November 10, 1882, No. 152,028, and in Canada March 1, 1883, No. 16,424.

*To all whom it may concern:*

Be it known that I, SAMUEL WRIGHT, a subject of the Queen of Great Britain and Ireland, residing at Egremont, in the county of Chester, Kingdom of Great Britain and Ireland, have invented an Improved Barrel-Making Machine, (for which I have obtained a patent in Great Britain No. 3,589, bearing date 28th July, 1882,) of which the following is a specification.

My invention has reference to that kind of barrel-making machine in which staves to form a barrel rim or shell are fed between guides, past suitable revolving saws and cutters (whereby said staves are cut to the required length, and also beveled and grooved,) onto a barrel form or drum surrounded by guide-hoops, the barrel rim or shell thus formed being trussed, and afterward withdrawn from the barrel form or drum, which for that purpose, is made in segments, and is provided with means whereby it can be collapsed, as explained hereinafter. In a machine according to the present invention a suitable table or platform of sufficient length to hold a complete set of staves for one barrel-rim is provided. It is formed of guide-bars, on which the staves can slide, other bars being arranged above. The staves are laid between these upper and lower guide-bars, with their edges touching each other, and are drawn onto the barrel form or drum by a rope or ropes (or the equivalent thereof, such as a chain or chains) passing partly around the collapsible barrel form or drum, and thence to a winding-drum or other suitable hauling apparatus underneath the barrel form or drum. To feed the machine, the rope (or each of them when employing more than one) is hauled sufficiently tight to draw the staves along the table and force them between the guide-hoops and the collapsible barrel form or drum, which may be rotated directly by the frictional contact with it of the staves. The collapsible barrel form or drum is made considerably shorter than the length of the staves to be placed thereon, and the segments whereof it is formed are held and guided by means of links or rods pivoted at or near their respective ends as

follows—that is to say, each rod or link is at one of its ends pivoted to a bracket or fixing carrying one of the segments, while the other ends of the said links are pivoted to collars on the central or barrel shaft. One of these collars is fast, whereas the other can slide along the shaft, and is coupled to a lever, by which it is operated when the barrel form or drum is to be expanded or collapsed. The centers or points at which the links are pivoted to the fixings of the segments are somewhat closer together (measured in a line parallel to the axis of the shaft) than the corresponding centers or points of attachment to the collars on the shaft. When the loose collar is drawn along the shaft by the lever, the segments are brought sufficiently close together to allow of the bulge barrel-rim being drawn off. Suitable slot-holes or their equivalents are provided to permit two opposite segments (if the drum is made with four segments) to close toward the shaft in advance of the other two.

The accompanying three sheets of drawings illustrate my invention.

Figure 1 is an elevation of my machine as it appears when the hauling-ropes are about to begin feeding a set of staves to the collapsible barrel form or drum A, one stave being shown between the top rollers, K, and saw and grooving cutters I. Fig. 2 is a plan of the same as it would appear with a set of staves on the barrel form or drum, and the ropes and hauling-bar drawn back in position to allow of a fresh set of staves being put on the feeding-table or platform. The hauling-ropes are thus shown drawn back a short distance on the feeding-table for clearness. They would not in practice be so placed while a complete barrel-rim remained on the collapsing barrel form or drum. Fig. 3 is an elevation the reverse of Fig. 1. In this view the saw-spindle is removed; but the guides and feeding-table bars are shown in section with a stave (previously bent to shape) in position between the guides and holding-down rollers. The shaft-supports R R' are shown withdrawn from the central shaft, A<sup>2</sup>, as they would be to allow a barrel rim or shell to be withdrawn. Fig. 4 shows



an end view, in section, of portions of the machine, the guide-hoops, their operating-gear, the ropes and hauling-bar being represented as they would appear when in position to allow a barrel rim or shell to be drawn off the barrel form or drum. Fig. 4<sup>a</sup> is an enlarged detail view showing the spring compensating arrangement for guide-roller shaft D'. Fig. 5 is a similar view in elevation showing the hoops closed and held by the latches Q, the supports R R' for the central shaft in position for supporting said shaft. S and S' are distance bars or stays. Fig. 6 is a view showing the reverse end of the machine. In it are represented, *inter alia*, the driving-gear for the hauling-barrel, the collapsible barrel form or drum, and the saw-spindle. Fig. 7 is an end elevation of the collapsible barrel form or drum, shown in the expanded or working position. Fig. 8 is a central longitudinal section of the same. Fig. 9 is a cross-section showing the collapsible barrel form or drum collapsed and a barrel rim or shell ready for withdrawal; and Fig. 10 is a section of the same in line *a b* of Fig. 9. Fig. 11 is a detail sectional view showing the means for adjusting the end guide-bars. Fig. 12 is a detail view showing the means for adjusting the central lower guide-bar. Fig. 13 is a top view of the upper inner end of one of the guide-hoops.

The feeding-table is composed of bars forming lower and end guides, connected and supported by cross-fixings H. Upper guide-bars, F, serve to prevent staves from riding over each other, and are attached to cross-bars F', which are held in position by means of screws operated by hand-wheels G, and screwed into the lower guide-supports, H. The upper guides, F, can be raised or lowered by the screws (when operated by the hand-wheels) to suit different thicknesses of staves.

H' are the end guide-bars, for the staves to slide between them as they are pulled toward the saws, grooving and beveling cutters I by the hauling or feeding ropes E. The fixings H have slot-holes formed in them, so that the end guides, H', may be adjusted for rather longer or shorter staves, as required. The end guide-bars and the intermediate guide-bars, H<sup>2</sup>, forming the table, are bolted onto a suitable frame or to the supports H. The bars H' H<sup>2</sup> are of sufficient length to be secured to the saw-spindle frame J'. The frame J' is secured to the fixings O, and has brackets or pedestals bolted to it for holding the short guide-bars N', which extend forward toward the barrel form or drum, as shown, a sufficient space being left between N and N' for the staves to pass.

The machine represented in the three sheets of drawings is suitably formed for operating on sawed or split staves that are supposed to be previously bent to the required bulge before entering the feeding-table. When staves are used which are not previously bent to the required bulge, a central lower guide-bar, N<sup>2</sup>,

is provided, one end of which is pivoted to a joint fixed on the outer side of lower feeding-frame, J'. At or near the other end a screw is applied for raising the central guide-bar sufficiently to bend the staves as they are fed to the barrel-drum to the bulge the barrel-rim is required to take. The staves are bent while passing between the upper and lower frames, J and J', and over the saw-spindle I'. The frame J is made somewhat similar to the lower one, but is not prepared to receive saw-spindle pedestals. It is held and guided by four vertical guide-rods, G', provided with springs *g*, distance-pieces *h*, and nuts. The lower nuts, *h*, serve to keep the upper frame, J, and guide-bars N from coming in contact with the lower guides, N'. The springs *g* exert sufficient force to keep the staves from riding over each other; also, to allow of a slight inequality in the thickness of staves.

Directly over the saw-spindle I' on the lower framing is a shaft, K<sup>2</sup>, with beveled rollers K, or their equivalent—such as sliding guide-bars—which have their bearings in the sliding pedestals K', which are weighted by levers *r*<sup>3</sup> *r*<sup>3</sup> in such a way that the rollers press against the curved staves, so as to keep them in contact with the circular cutters and down on the lower guide-bars, N', that the grooves may be cut a uniform depth across their widths. After the staves have been grooved, &c., they are by the continued action of the feeding-ropes E forced between the encircling guide-hoops M M' M<sup>2</sup> and the collapsible barrel A, hereinafter more fully described. The ropes E pass around a portion of the barrel form or drum, (so as to be at the outer sides of any staves thereon,) and each is attached at one end to a bar, A', provided with catches to press against the edge of the last stave, so as to force all the staves forward as the ropes are wound on the winding-drum. This bar A' is drawn by the ropes between the same guide-bars that the staves are drawn.

It will be seen the ropes are led from the hauling-bar A' around the collapsible barrel form or drum, over the guide-roller D, thence to the winding-drum B. The guide-roller shaft D' rotates in the sliding pedestal D<sup>3</sup>, (shown in the enlarged section, Fig. 4<sup>a</sup>,) and is retained in position by the fixing D<sup>2</sup>, which is secured to the frame O. The pedestals rest on springs E', placed inside the fixings, to allow the shaft D' and guide-roller D to rise or fall, as a greater or less amount of tension is applied to the ropes E, which slightly vary in speed as the staves are fed onto the barrel-form, thus accommodating the amount of rope to be wound onto the hauling-barrel during the formation of a barrel-rim.

By the application of the sliding pedestals and springs the ridged ropes or chains become elastic in their action to accommodate the slightly varying speed and thickness of staves. The pedestal ends D<sup>3</sup> are of sufficient length to pass through the end of fixing D<sup>2</sup>



and allow of lock-nuts and washers being placed thereon; also, of an india-rubber buffer-stop being inserted between the washer and fixing end, as shown, thus forming an elastic cushion for the compressed spring to rebound against when the hauling-bar is released. The winding-drum B is driven by a worm and worm-wheel,  $d d'$ . A clutch-coupling,  $B^2$ , is provided to throw it in or out of gear. The drum B is loose on its shaft, so that when the coupling  $B^2$  is withdrawn by the lever and handle T T' (shown in dotted line, Fig. 1, the lower end of the lever T being pivoted at  $t^4$ ) the ropes E are run back ready to take the next set of staves.

By the action of the ropes, arranged, as described, the staves are kept tightly together on the barrel-form. Thus tight work can be done on this machine. The ropes also in a measure truss the barrel-rim, thereby reducing the friction between the encircling hoops and staves. When the last stave is fed onto the barrel form or drum and the bar A' has reached the drum, the hand-lever T is pushed in by hand, thereby releasing the clutch-coupling  $B^2$ , and thus stopping the ropes E. The bar A' is slightly shorter than the distance between the hoops M M, and is prevented from being displaced by being drawn up the inclines V' V' on the inner sides of the encircling hoops and by engaging with the catch-stops V V. When the bar A' has reached these stops and the motion of the ropes E has been stopped by the release of the clutch-coupling  $B^2$ , the action of the compressed springs E' E', which are now relieved from the pressure of the shaft B', over which the ropes E pass, exerts a strain upon the ropes E, and thus draws the bar A' up against the catches of the stops V V, where the bar A' is out of the way, while the barrel-rim is trussed and the hoops M M opened out, as shown in Fig. 4, for the withdrawal of the completed barrel. The encircling hoops are each formed in three segments. The first or shorter segment,  $M^2$ , is securely fixed to the lower guide-bar, N', and frame O. The second segment, M', is pivoted to the segment  $M^2$ , and the third segment, M, hinged to the segment M', also onto the bell-crank levers P, in such a manner that the two last-named segments can be thrown clear of the staves by means of the levers P and lengthening-bars P'. These levers P have slot-holes formed in them where the segments M M' are jointed, to allow for the travel of the segment M'. The levers P are secured to a rocking shaft, that the hoops may be operated on simultaneously. The collapsible barrel form or drum comprises four segments,  $f f f' f'$ , of which the two opposite ones,  $f f$ , extend through a shorter circular arc than the other two, to allow of their being drawn closer to the main shaft. A suitable bracket or fixing, C', is attached to each of the segments, and is provided with stops and joints, to which the retaining-links W W' W<sup>2</sup> are pivoted at one end.

The other ends of the links W are pivoted to a fixed collar, X', while the other ends of the links W' are pivoted to a sliding collar or sleeve, X, which is provided with a recess, into which the forked lever A<sup>4</sup>, for effecting the collapsing, takes. (Shown in Figs. 2, 4, and 6.) It is pivoted near the center to a fixed pin. The other end is attached to a screw or lever. (Not shown.) The links W<sup>2</sup> have pins or studs that pass into slot-holes W<sup>4</sup>, formed in X, and of such a length as to allow the shorter segments to be drawn toward the shaft in advance of the others. The collapsible barrel form or drum A and shaft A<sup>2</sup> are supported in a fixing O', bolted to the base-plate C, and may be driven by the worm or spur wheel A<sup>3</sup> and worm  $d^2$ , as shown in Figs. 1 and 6, or may be rotated by the frictional contact of the staves as they are drawn or forced by the feeding-ropes between the barrel form or drum and its encircling-hoops M M' M<sup>2</sup>. When this plan is adopted, the larger spur-wheel, A<sup>3</sup>, on the main shaft A<sup>2</sup> may be disconnected and allowed to run loose without altering the other gearing. The machine is driven by the fast and loose pulleys  $x$  and  $x'$  on the shaft L<sup>2</sup>. This shaft is geared by a pair of angle bevel-wheels, U, Fig. 2, to the diagonal worm-shaft  $d^3$ . The shaft L<sup>3</sup>, carrying the fast and loose pulleys  $i^2$   $i^3$ , drives the saw counter-shaft L by the strap  $i'$ . The strap-guides and levers are omitted, to prevent confusion.

The encircling guide-hooks and their means of adjustment I have made a part of the subject-matter of another application for Letters Patent filed by me February 24, 1883, No. 86,120.

What I claim is—

1. In a barrel-making machine, the combination, with a collapsible barrel form or drum and guide-hoops encircling said barrel form or drum, of a feeding-table composed of end, upper, and lower guide-bars, as described, and a rope or ropes, or their equivalent, attached to a feeding-board behind the staves, to be fed to the barrel form or drum, and passing around said barrel form or drum, whereby the staves are fed onto the barrel form or drum between said form or drum and the encircling guide-hoops and retained in position thereon, substantially as set forth.

2. In a barrel-making machine, a collapsible barrel form or drum, guide-hoops encircling said barrel form or drum, and tightening-pulleys, in combination with a feeding-table composed of end, upper, and lower guide-bars, as described, and a rope or ropes, or their equivalent, which pass around the barrel form or drum, and are adapted to draw or force the staves along the feeding-table and onto the barrel form or drum between said form or drum and the encircling guide-hoops, and also to partially truss the staves when on said barrel form or drum, substantially as set forth.

3. In a barrel-making machine, a feeding-



table comprising end guide-bars,  $H^1 H^1$ , and lower intermediate guide-bars,  $H^2 H^2$ , in combination with an adjustable lower central guide-bar,  $N^2$ , and upper adjustable guide-bars,  $F F$ , substantially as set forth.

4. In a barrel-making machine, the combination, with a collapsible barrel form or drum, of top, bottom, and end guide-bars, means for adjusting the top guide-bars, cutters for shaping the ends of staves, top guide rollers or their equivalent, and a rope or ropes, or the equivalent thereof, the arrangement being such that the staves, while being drawn toward the collapsible barrel form or drum by a rope or ropes, or the equivalent thereof, are subject to the action of the cutters which shape their ends, as above set forth.

5. In a barrel-making machine, in combination with a collapsible form or drum and encircling guide-hoops, the top roller-shaft,  $K^2$ , beveled rollers  $K$ , or their equivalent, the central lower guide-bar,  $N^2$ , fixed on the lower frame,  $J^1$ , and means for adjusting said guide-bar to suit the curvature the staves are required to take before entering between the collapsible barrel form or drum and its encircling hoops, substantially as set forth.

6. In a barrel-making machine, a collapsible barrel form or drum, and guide-hoops encircling said barrel form or drum, in combination with a feeding-table, a rope or ropes, or their equivalent, passing around the barrel form or drum, and adapted to draw or force the staves along said feeding-table onto said form or drum between it and the encircling guide-hoops, and means, substantially as described, for automatically regulating the tension of said ropes, whereby they are adapted

to truss the staves upon said drum, substantially as set forth.

7. A collapsible barrel form or drum composed of four segments,  $f f f' f'$ , of which two opposite segments,  $f f$ , extend through a shorter circular arc than the two adjacent or connecting segments,  $f' f'$ , in combination with the shaft  $A^2$  of the drum, a collar,  $X'$ , fixed to said shaft, a movable collar,  $X$ , adapted to slide on said shaft, links  $W W W W$ , connected at opposite ends to the fixed collar  $X'$  and the segments  $f f f' f'$  by pivotal connections, links  $W' W'$ , connected at opposite ends to the sliding collar  $X$  and the short segments  $f f$  by pivotal connections, and links  $W^2 W^2$ , connecting the long segments  $f' f'$  to the sliding collar  $X$ , which links are pivoted to the segments  $f' f'$ , and are connected to the sliding collar  $X$  by pins working in slots  $W^4 W^4$ , formed in said collar, whereby the short segments are adapted to travel in advance of the long segments when the drum is being collapsed, substantially as set forth.

8. In a barrel-making machine, the combination, with a collapsible barrel form or drum and a feeding-table, of feeding-ropes  $E$ , winding-drum  $B$ , guide-roller  $D$ , shaft  $D'$ , sliding pedestal  $D^2$ , fixing  $D^2$ , frame  $O$ , and springs  $E'$ , all substantially as and for the purpose specified.

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