

A. B. EDMANDS.
Eyelet-Setting Machinery.

No. 141,211.

Patented July 29, 1873.

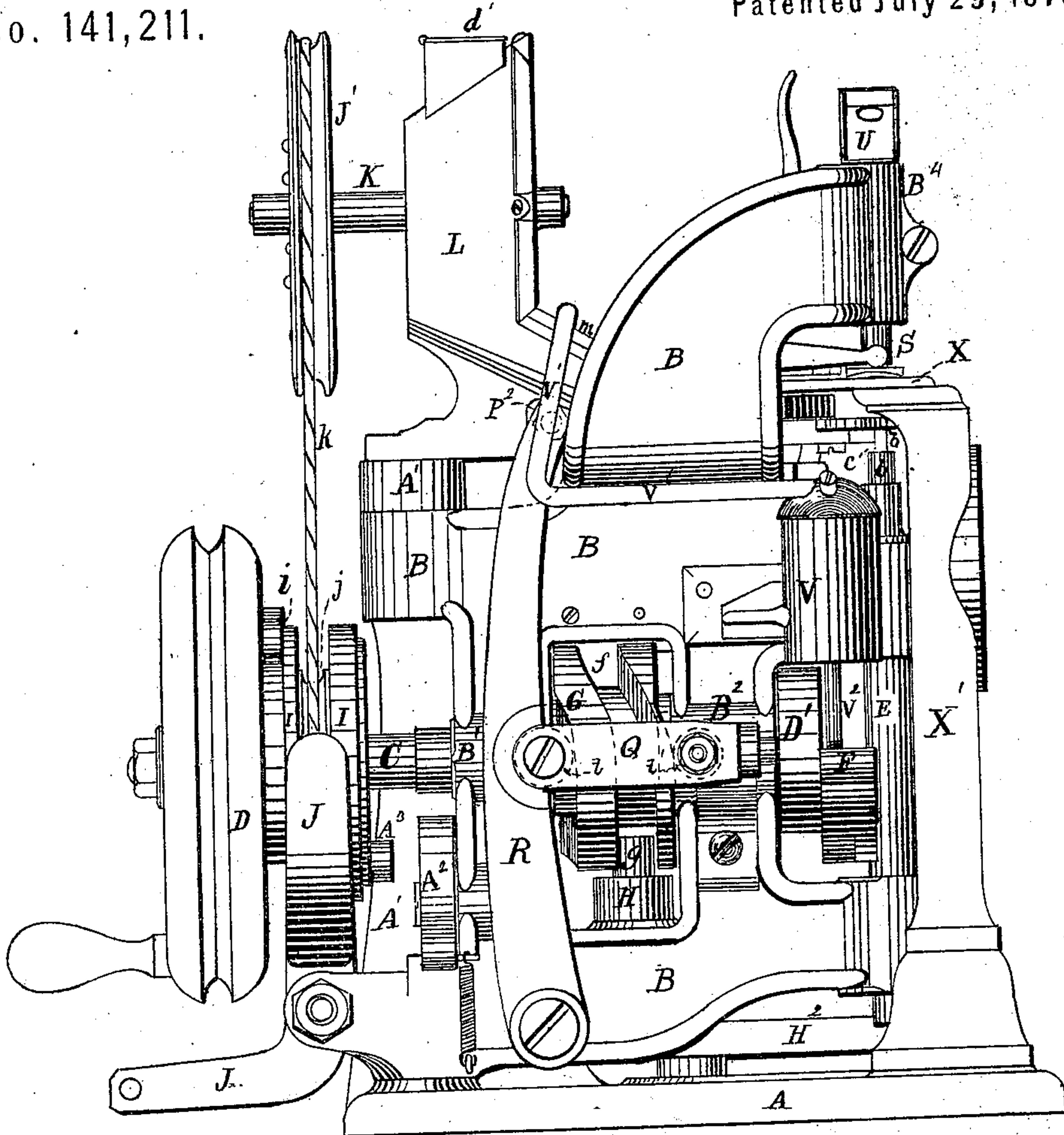


FIG. 2.

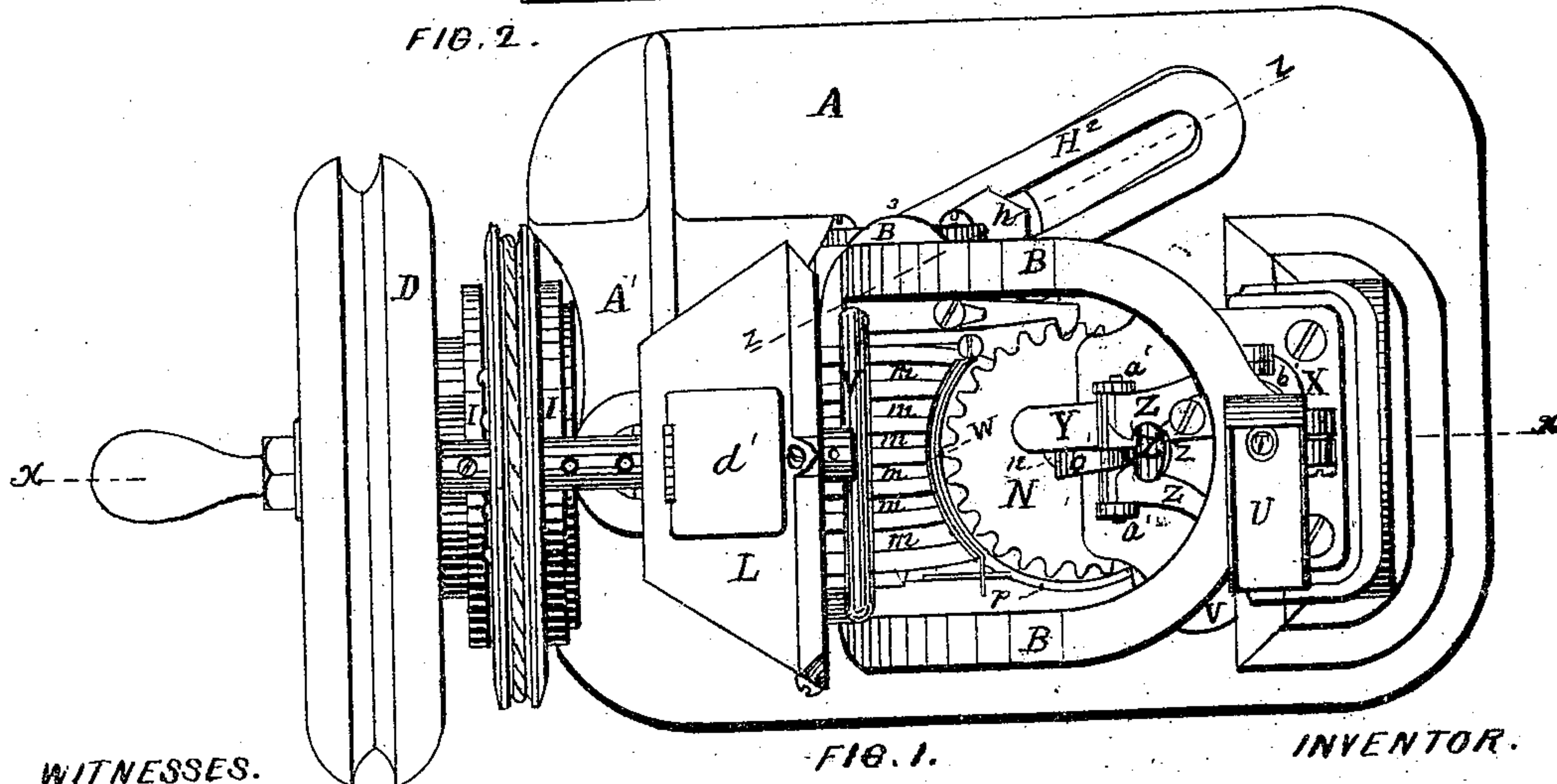


FIG. 1.

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WITNESSES.

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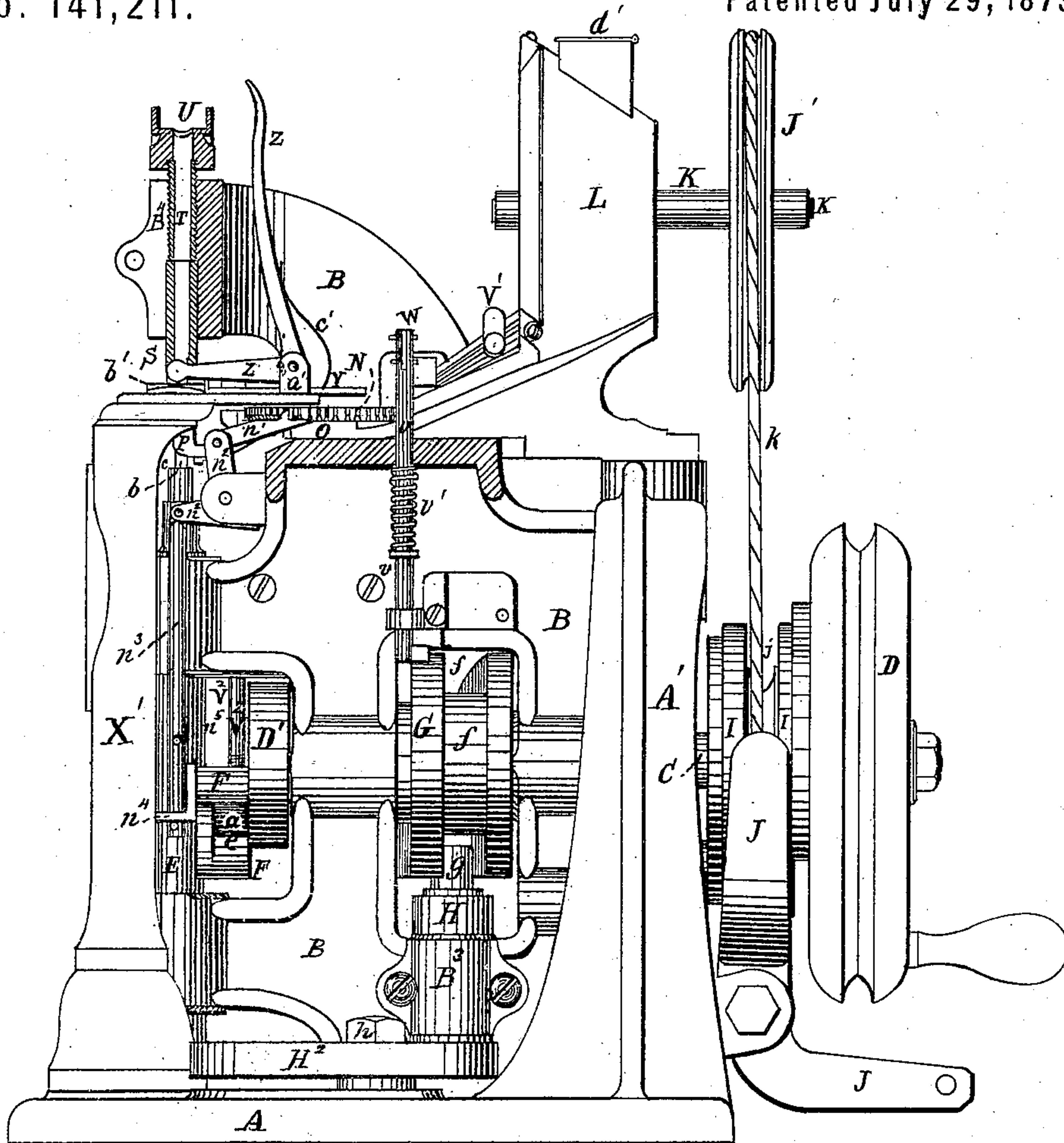


FIG. 3.

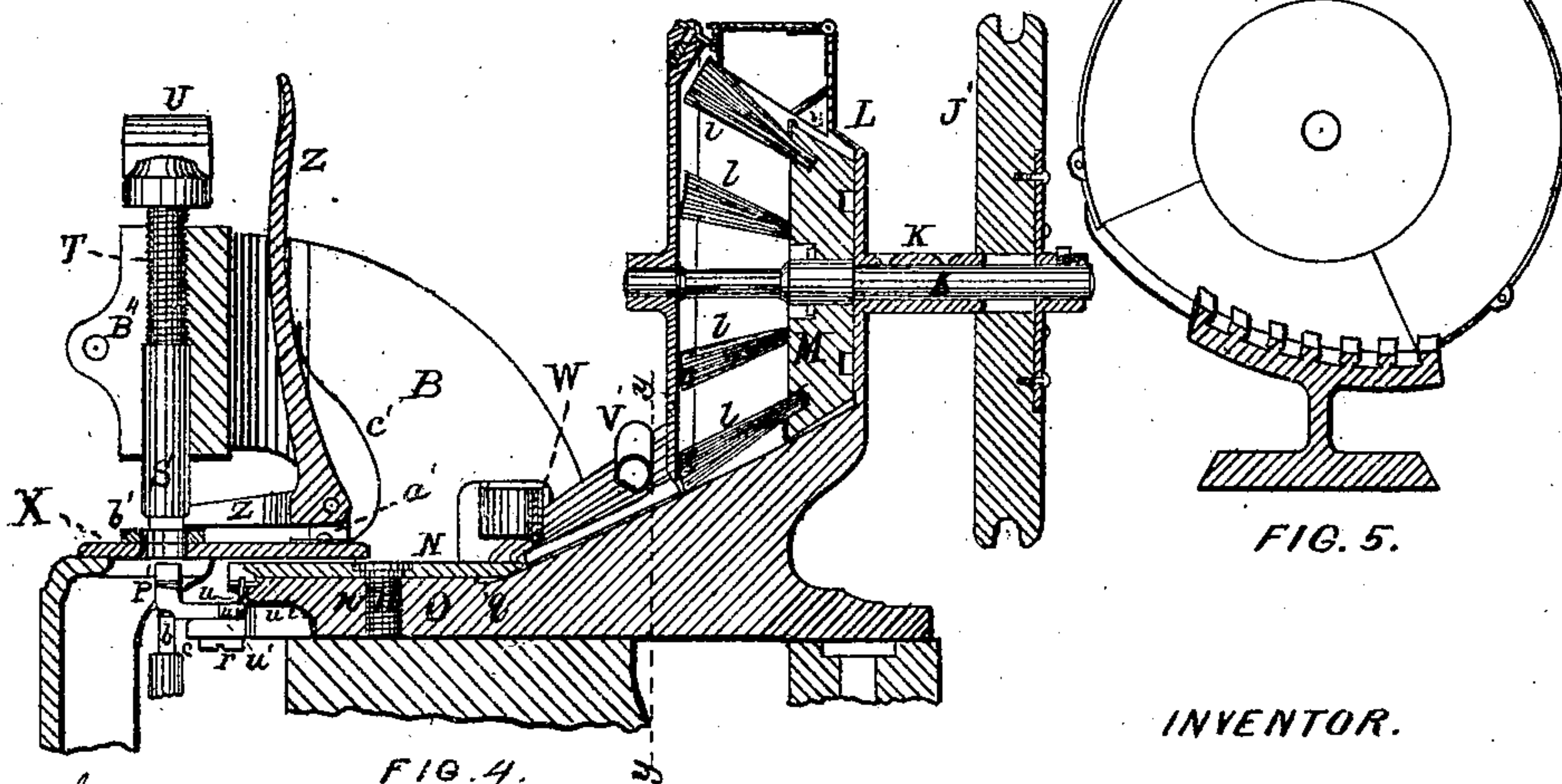


FIG. 5.

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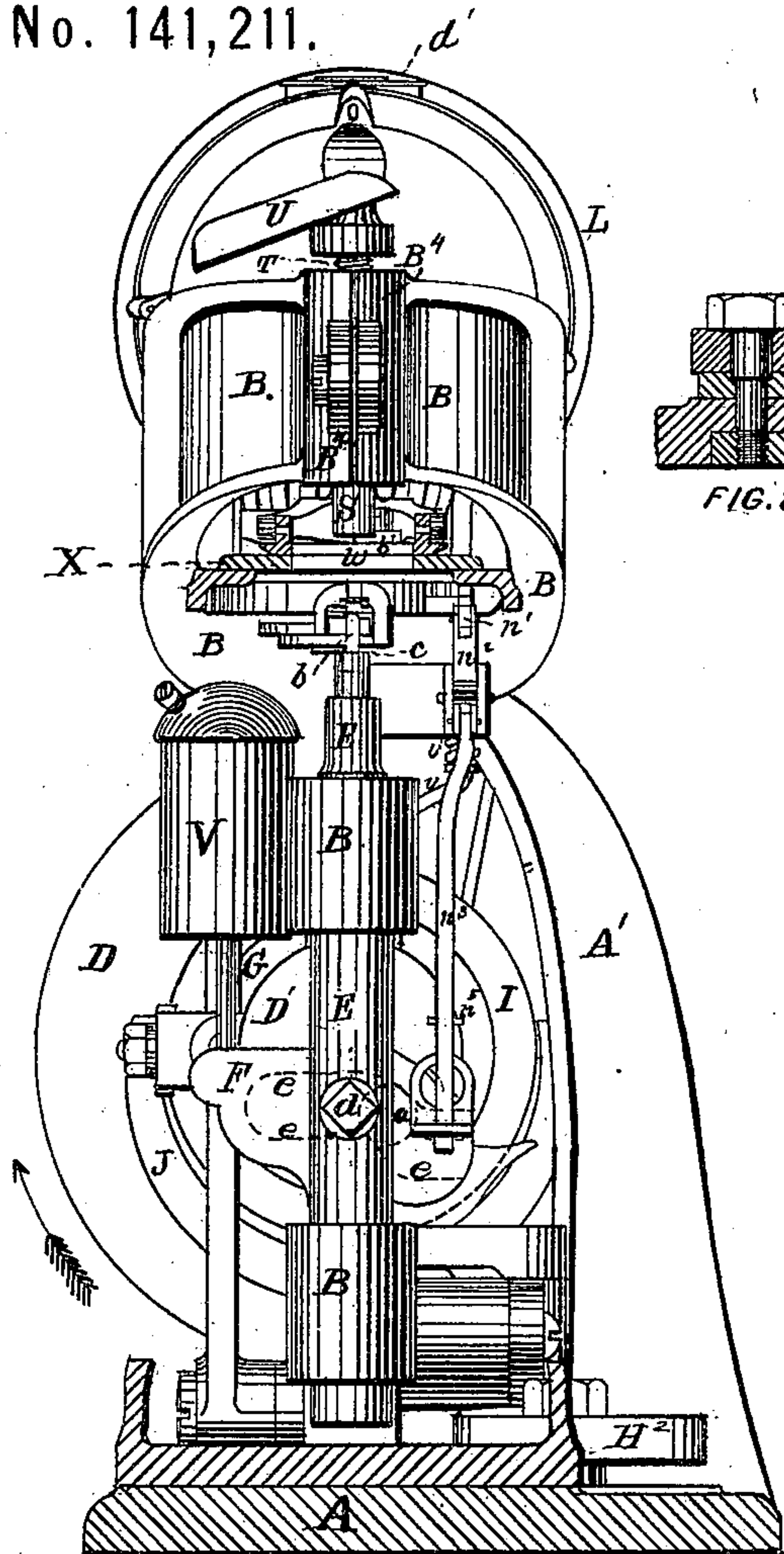


FIG. 6.

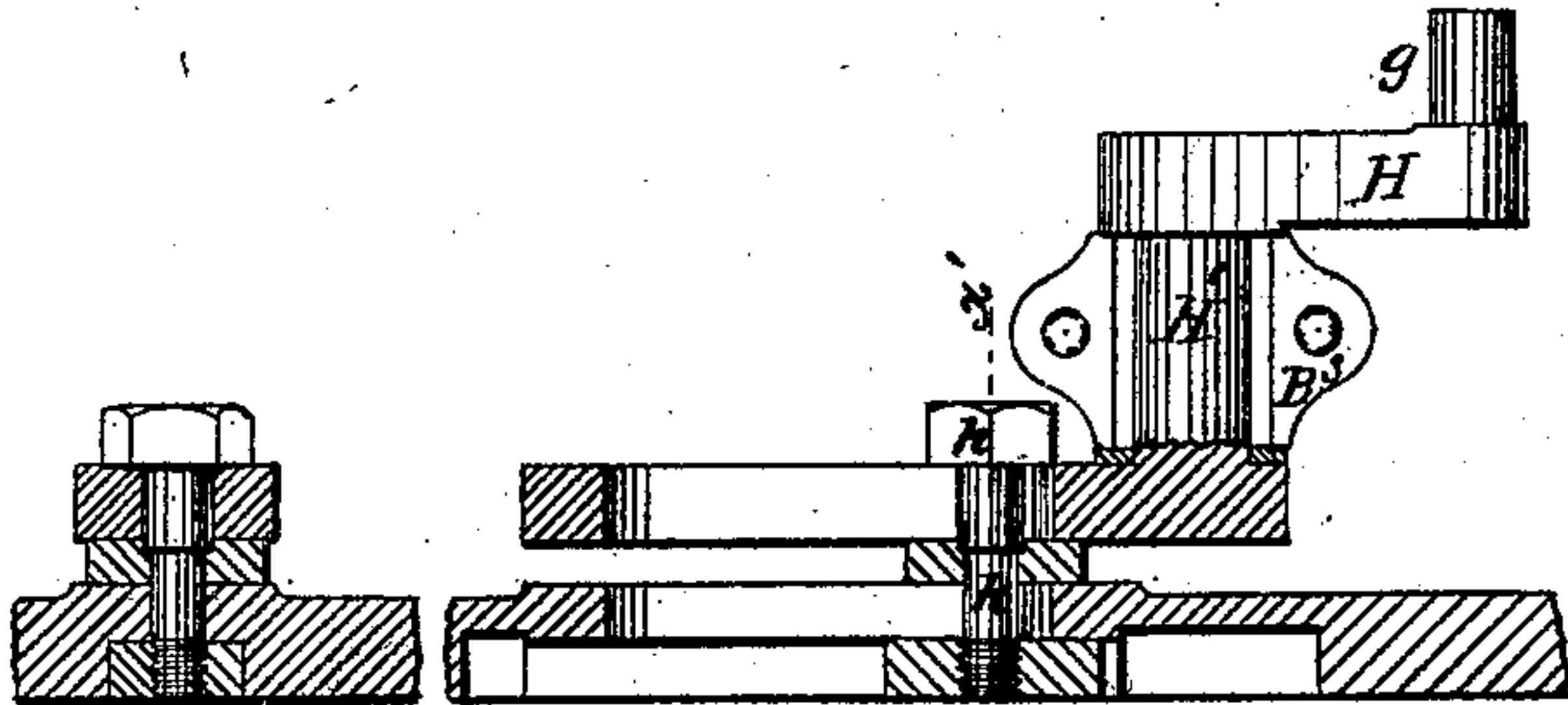


FIG. 7.

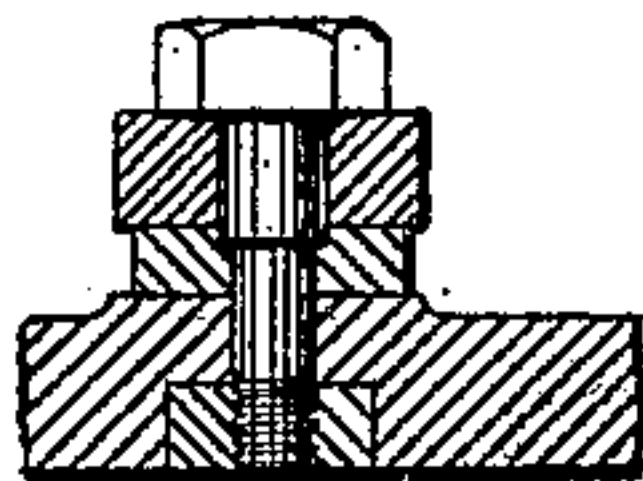


FIG. 8.

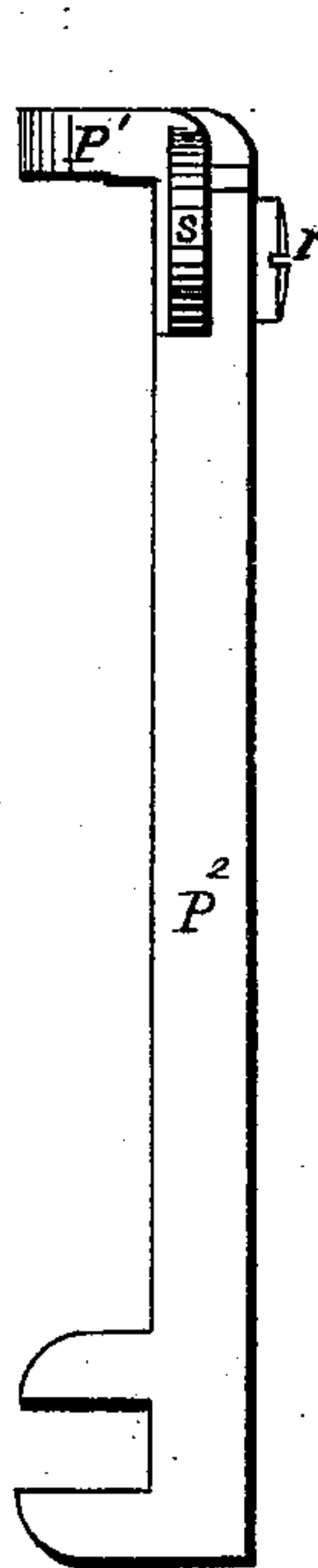


FIG. 10.

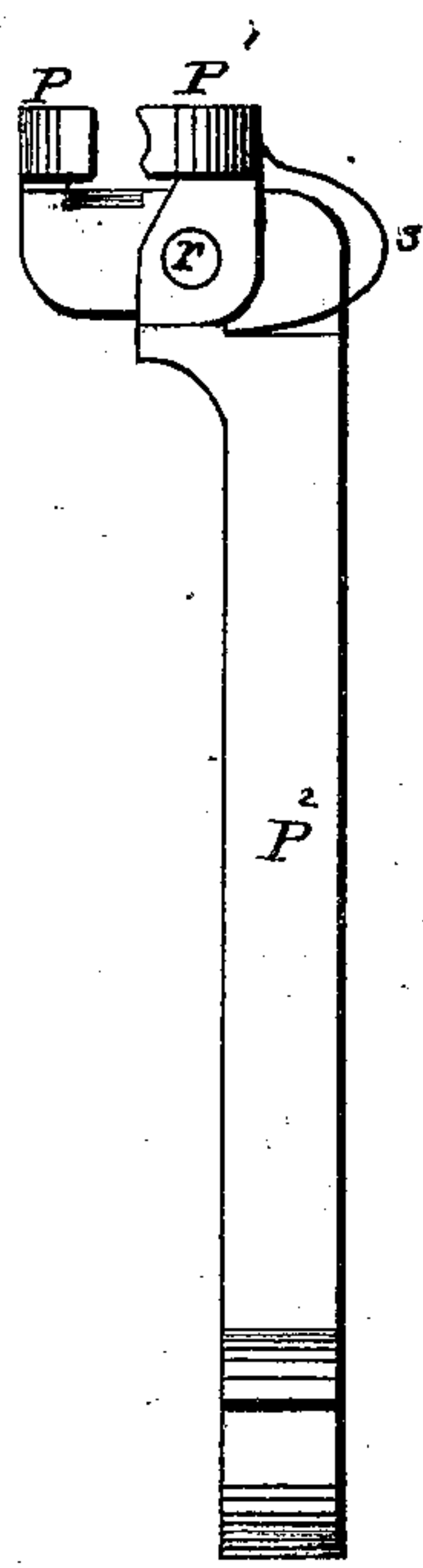


FIG. 9.

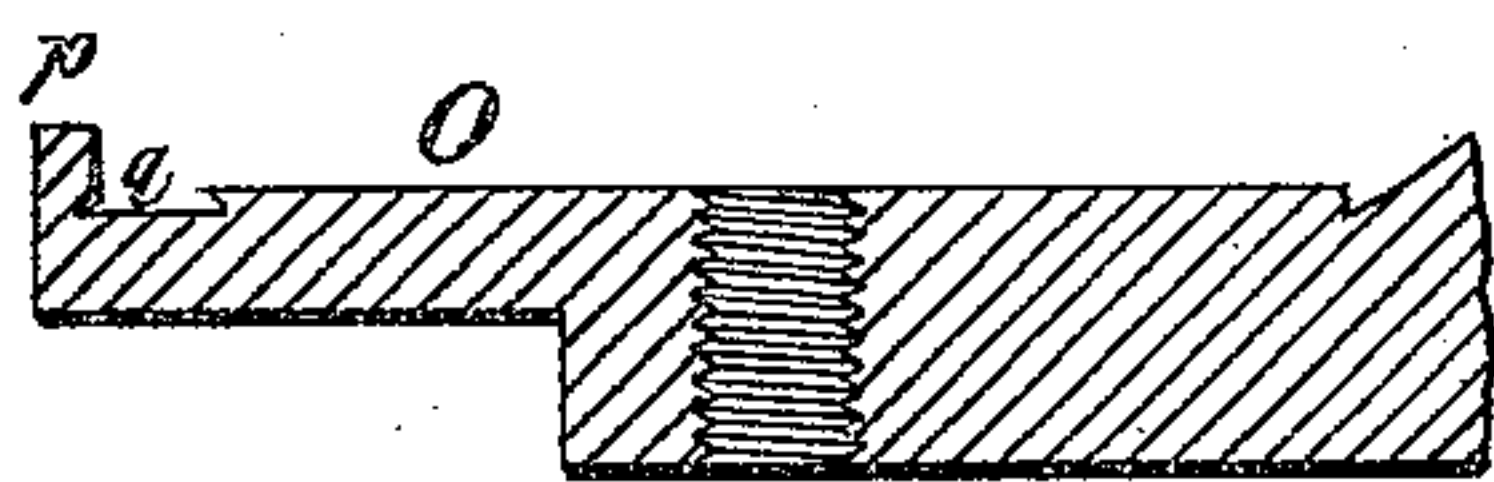


FIG. 13.

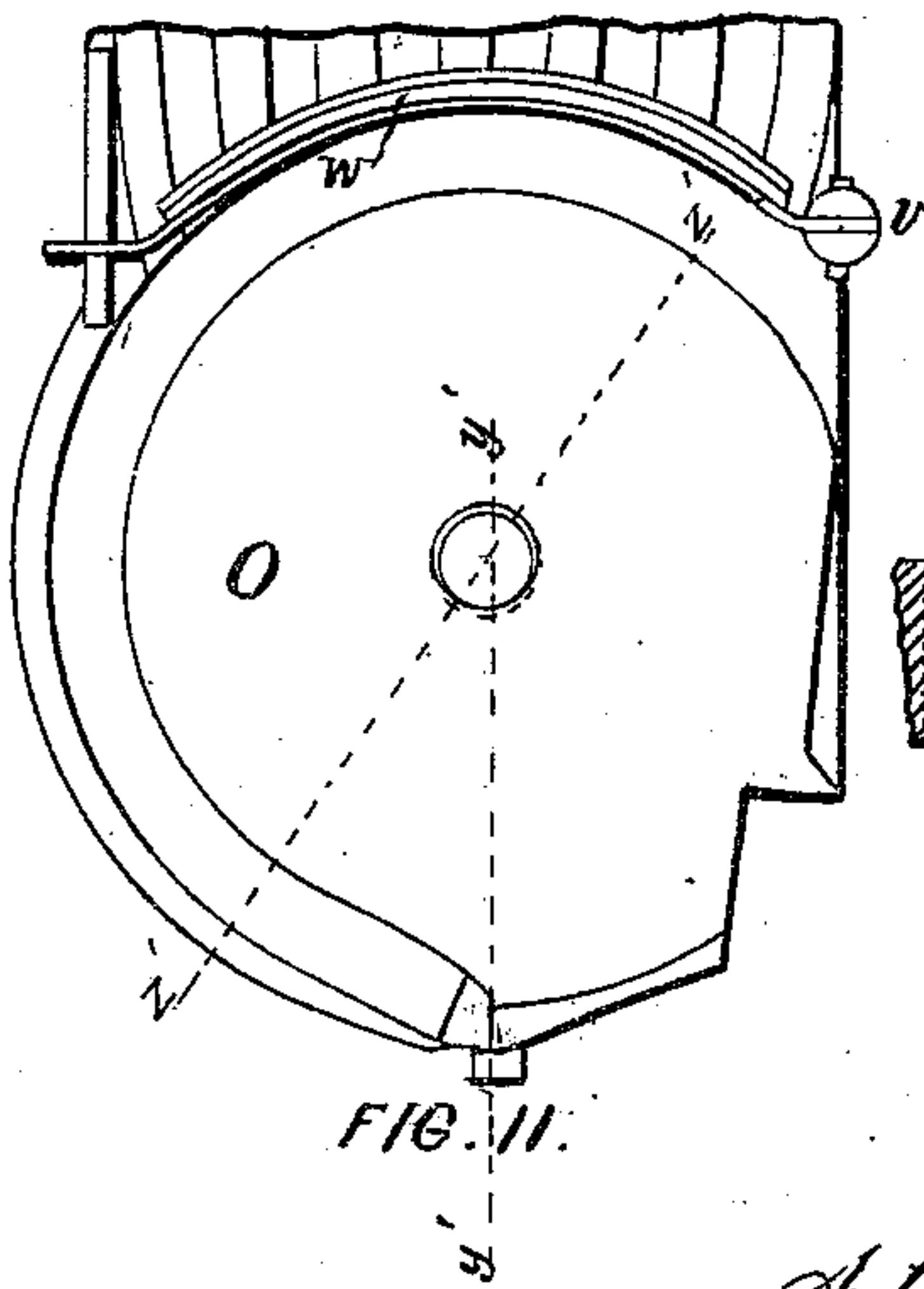


FIG. 11.

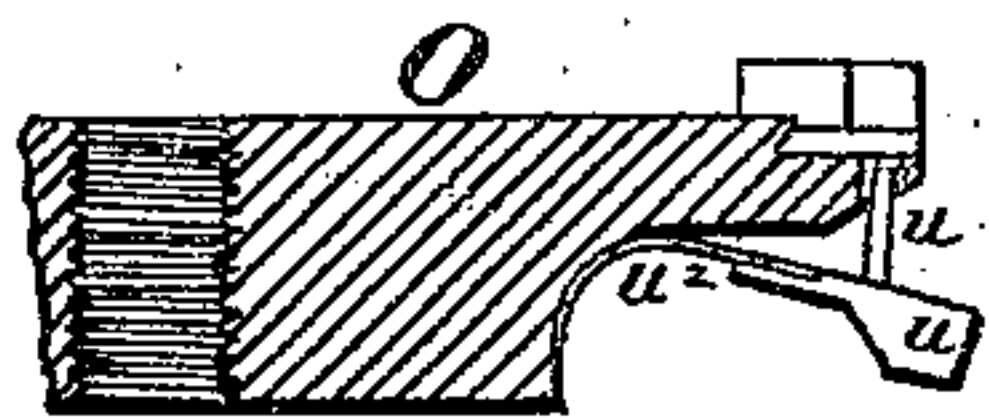


FIG. 12.

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UNITED STATES PATENT OFFICE.

ARTEMAS B. EDMANDS, OF SAUGUS, MASSACHUSETTS.

IMPROVEMENT IN EYELET-SETTING MACHINERY.

Specification forming part of Letters Patent No. **141,211**, dated July 29, 1873; application filed June 21, 1873.

To all whom it may concern:

Be it known that I, ARTEMAS B. EDMANDS, of Saugus, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Machines for Setting Eyelets, of which the following, taken in connection with the accompanying drawings, is a specification:

My invention relates, in the first place, to the general arrangement of mechanism by which the material is fed, the hole punched, and the eyelet set; and it consists, first, in the employment in eyelet-setting machines of a frame pivoted upon a vertical axis at or near its rear end, and so arranged that its front end, in which are set the punching and setting tools, may be vibrated from left to right and from right to left for the purpose of feeding the material, said frame having mounted thereon and moving with it, when it vibrates, all the mechanism for operating the punching and setting tools and the eyelet selecting and inserting devices, as will be more fully described. It further consists in a novel method of imparting a vibratory motion to the front of the pivoted frame by means of a cylindrical cam mounted on the operating-shaft revolving in bearings in said frame and acting upon one end of a lever, the fulcrum of which is also upon said frame, the opposite arm of said lever being slotted and embracing a stud or pin set in the bed or other stationary part of the frame or stand which supports the vibrating frame, said pin being so set in the bed or stationary frame that it may be adjusted therein to regulate the stroke or movement of the vibrating frame, and thereby adjust the length of the feed. It further consists in the combination, with the punch-rod or plunger and a crank-pin set in the end of the driving-shaft, or otherwise securely affixed thereto, of a block of metal formed upon or secured to the punch-rod or plunger, and having formed therein a cam-shaped groove, in which said crank-pin travels as it revolves and by virtue of the peculiar shape thereof imparts to the punch-rod or plunger the necessary intermittent vertical reciprocating motion.

The punching and setting tools are con-

structed the same as described in the Letters Patent No. 124,346, granted to me March 5, 1872, and are, therefore, no part of my present invention.

The second part of my invention relates to devices employed to separate the eyelets and convey them singly and in rapid succession to the setting-tools; and it consists, first, in the employment of a conical hopper or receptacle for the eyelets placed upon its side or with the base of the cone in a vertical plane, with a series of openings cut through the lower side of the vertical plate which forms the base of the cone, of a shape corresponding to the outline of the eyelet in a well-known manner, and provided with a brush mounted upon a horizontal shaft passing through the center of said hopper. It further consists in the combination, with a hopper for the reception of the eyelets in bulk, of a series of inclined channels or grooves, an intermittently-rotating wheel provided with a series of recesses formed in its outer edge and arranged to rotate within an inclosing curb or rib, which serves to retain the eyelets in the recesses in said wheel as they are transmitted from the mouths of the inclined chutes to the opposite side of the wheel, and a pair of intermittently-reciprocating nippers arranged to take the eyelets from the point where they are left by the wheel to the setting-tools. It further consists in the formation of a guide-channel beneath the eyelet-wheel leading from the mouths of the inclined chutes around to the opposite side of the wheel in the arc of a circle, and then curved toward the setting-punch, said groove being intended to receive the flange of the eyelet and, by its peculiar shape cause the eyelet to be pushed out of the wheel when it arrives at the proper point by the movement of the wheel itself, so as to place the eyelet in a position where it can be taken by the nippers to be carried thereby to the setting-tools. It further consists in the use of a stop-pin, arranged upon a spring-arm beneath the carrying-wheel, and operated by the nippers in such a manner that when the nippers move toward the setting-tools the said pin will be raised and enter the next

eyelet, delivered from the wheel, and retain it in position until the nippers return, when the pin will be depressed and withdrawn from the eyelet, leaving it free to be pushed into the nippers by the next movement of the wheel. It further consists in the employment, in combination with inclined chutes, of an intermittently-reciprocating stop, made of flexible material, placed near the lower end of said chutes for the purpose of holding back the eyelet until the proper time for its delivery. It also consists in the employment, in combination with two or more inclined chutes for conveying the eyelets to the work, of a pipe placed above said chutes and at right angles or nearly so thereto, and provided with a small perforation upon its under side to each chute, through which jets of air are injected into said chutes in a downward direction by means of an air-pump, or equivalent device connected therewith, for the purpose of insuring the descent of the eyelet at the proper time and freeing said chutes from all dust or dirt which may accumulate therein, as will be more fully described. My invention further consists in flattening the lower side of the circular conical hopper at the point where the series of inclined chutes are joined thereto, or in making that portion of the hopper of a curve of considerably greater radius than the other portions, the center from which said curve is struck being in a vertical line above the outside inclined chute on that side from which the brush approaches in its revolution, so that the eyelets in moving past the openings leading to the several inclined chutes will be ascending, for the purpose of insuring the delivery of eyelets from all of said openings. It further consists in making that portion of the semicircular groove which guides the flange of the eyelet while being carried by the feed-wheel, at which the eyelet leaves the wheel, and from which it is taken by the nippers, about the thickness of the flange of the eyelet lower than the other parts thereof, for purposes which will be described.

In the drawings, Figure 1 is a plan of a machine embodying my improvements. Fig. 2 is a side elevation. Fig. 3 is an elevation of the opposite side with a portion of the frame cut in section. Fig. 4 is a vertical section of a portion of the upper part of the machine on line xx on Fig. 1. Fig. 5 is a section on line yy on Fig. 4, showing the hopper in elevation with the front plate or cover removed. Fig. 6 is a front elevation of the machine with the table column removed. Fig. 7 is a section on line zz on Fig. 1, showing the manner of connecting the lever that operates the vibrating frame to the base-plate or fixed portion of the machine. Fig. 8 is a section on line $x'x'$ on Fig. 7. Figs. 9 and 10 are, respectively, a plan and side elevation of the nippers for conveying the eyelets from the feed-wheel to the setting-tools. Fig. 11

is a plan of the bed-plate upon which the eyelet feed-wheel is mounted, showing the semicircular groove for the flange of the eyelet, the reciprocating-stop, and a portion of the inclined chutes. Fig. 12 is a section of said bed-plate on line $y'y'$ on Fig. 11, and Fig. 13 is a section on line $z'z'$ on Fig. 11.

Figs. 1 to 8 inclusive are made to a scale of one-half the actual size of the working-machine, and Figs. 9 to 13 inclusive are full size of the working machine.

A is a base-plate, upon which is cast or otherwise secured the stand A' , between which and the base-plate A is pivoted the frame B, so as to vibrate to the right and left upon a vertical axis near its rear end. C is the driving-shaft, mounted in the bearings B^1 and B^2 in the frame B, and carrying upon one end the driving-pulley D, and upon the other end the crank-disk D' , having set therein the crank-pin a . E is the punching and setting mandrel or plunger, fitted to slide vertically in suitable bearings in the frame B, and carrying at its upper end the punch b , provided with the setting-shoulder c . F is a block of metal, secured by the bolt d to the back side of the plunger E, having formed in its rear side the cam-shaped slot e , seen in Fig. 3, and in dotted lines in Fig. 6, in which works the crank-pin a , said slot being so shaped that the revolution of the crank-pin a in the direction indicated by the arrow will cause the plunger E to move upward during the upward movement of said crank-pin, to remain in a state of rest during the first half of the downward movement of said crank-pin a , and complete the whole of its downward movement during the last half of the downward movement of the crank-pin a , the feed of the material taking place during the first half of the downward movement of the crank-pin a , and while the plunger E is at the extreme of its upward movement, and while the punch is inserted in the eyelet. Upon the shaft C is also mounted the cam-cylinder G, having formed thereon the cam-path f , in which is placed the truck g , on the end of the lever H, secured to the upper end of a short rocker-shaft, H^1 , mounted in the box B^3 on the frame B. Upon the lower end of the rocker-shaft H^1 is formed or secured the slotted lever H^2 , placed at an angle of about one hundred and twenty degrees to the lever H, and pivoted to the base-plate A by means of the adjustable bolt h . The driving-pulley D is fitted to revolve loosely upon the shaft C when the machine is at rest, and is coupled thereto, so as to revolve therewith by shipping the clutch-pulley I into contact with the pin i , set in the driving-pulley D, by means of the shipper-lever J, connected by a link to a treadle upon the floor, not shown in the drawings. The clutch-pulley I is provided with the groove j , which serves the double purpose of receiving the shipper-pins and the round belt k , by which the mo-

tion of said pulley is transmitted to the pulley J' on the brush-shaft K. L is a hopper or receptacle, to receive the eyelets in bulk, made in the form of a frustum of a cone, arranged with the axis of the cone in a horizontal position, and the base of the cone toward the front of the machine. M is a brush-head, mounted upon the shaft K, and fitted with several small brushes, *l l*, and inclosed in the hopper L, and having imparted thereto a constant rotary motion in one direction, when the machine is in operation, by means of the belt *k*.

Motion may be imparted to the brush-head M by running the belt *k* direct from the driving-pulley D to the pulley J, so that the brush may revolve in the hopper at all times when the driving-pulley is in motion, if it is found that for any reason the previously-described arrangement fails to supply the eyelets to the wheel fast enough to fill all the recesses as fast as they are presented to the ends of the chutes, or before passing all of them.

The bottom of the hopper L, by virtue of its conical shape, is inclined toward the front of the machine, and, as a consequence thereof, the eyelets naturally gravitate toward the lower front portion of the hopper, at which point commence the series of inclined chutes *m m m*, into which the eyelets are discharged as fast as they are presented thereto, right side up, by the action of the brushes revolving in the hopper, the cross-section of each of said chutes being of the same shape as the outline of an eyelet when standing upon its flanged end.

N is a toothed wheel, mounted upon the plate O by the stud or pin *n*, about which it is moved at regular intervals a distance equal to the distance between two contiguous teeth by the action thereon of the pawl *n*¹, to which motion is imparted by the elbow-lever *n*², the rod *n*³, and the lug or stand *n*⁴, attached to the cam-block F or the plunger E, the rod *n*³ passing freely through said lug and provided with the pin *n*⁵ or a shoulder, against which the lug *n*⁴ strikes to move said rod in a vertical direction at the last part of the upward movement of the plunger E. When the wheel N has been moved by the action of the pawl *n*¹ it is held stationary until another action of said pawl by the detent-pawl *o*. The plate O is provided with the raised ledge or rib *p* upon one side thereof, and also the groove *q*, just inside of said rib and directly under the teeth of the eyelet feed-wheel N, said groove being of a width and depth corresponding respectively to the diameter and thickness of the flange of the eyelet, said groove being so curved as to force the eyelets out of the recesses formed in the edge of the wheel N when they arrive at the front of the machine or in a line between the setting-punch and the center of the wheel, so that the eyelet may be grasped by the nippers

P P¹ and transferred to the setting-tools. The extreme front end of the groove *q* is sunk below the remainder of said groove a depth equal to the thickness of the flange of the eyelet, so that the flange of the next succeeding eyelet may pass over the flange of the first one and bear against its body to prevent the eyelet from being tipped over at an angle and clogging. The feed-nippers, consisting of the fixed jaw P and the pivoted jaw P¹, secured to P by the pin *r* and held in place by the spring *s*, have an intermittent reciprocating motion imparted thereto by cams formed on either end of the cam-cylinder G, acting upon the trucks *t* and *t'* upon the back side of the sliding bar Q, the rear end of which is connected to the lever R, which is pivoted by its lower end to the frame B, and connected at its top end to the rear end of the bar P² of the nippers by means of a pin set in said lever and fitting into the fork formed thereon. A pin, *u*, set in the block *u*¹, is connected to the plate O by a spring connection, *u*², so arranged that the spring *u*² will throw the pin down so that its top shall not project above the level of the bottom of the groove *q* at that point when the nippers P P¹ are in position to receive the eyelet resting on the front end of the guide-groove *q* when pushed forward by the next movement of the feed-wheel, and when the nippers are moved forward to convey the eyelet to the setting-tools the pin *u* will be raised up by the forward part of the nipper-arm P coming in contact with the incline at the rear end of the block *u*¹, in an obvious manner, and, entering the next eyelet, prevent it from being pushed off from the plate O and retain it in position till the nippers are again moved back to take another eyelet, when the nipper-arm being withdrawn from under the block *u*¹ the spring *u*² will withdraw the pin from the eyelet and allow it to be moved forward into the nipper by the next movement of the feed-wheel. S is the female punching-die and the setting-anvil, set firmly in the hub B⁴ of the frame B. T is a hollow set-screw for controlling the position of the anvil S, having secured to its upper end the chute U for conveying away the pieces of material punched out. V is the cylinder of an air-pump, the lower end of which is open and the upper end closed and provided with the pipe V¹, leading to and across the inclined chutes *m m m* and having its end closed. The pipe V¹ is perforated upon its lower side by a series of small holes, one above each of the inclined chutes, from which jets of air may be forced at an angle of about forty-five degrees toward the lower end of said chutes for the purpose of insuring the descent of the eyelets to the feed-wheel N, the cylinder V being provided with a piston, operated by the piston-rod V², set in and operated by the cam-block F, or in any other suitable manner. W is a stop-bar, having projecting tongues upon its lower edge,

made of rubber or other suitable flexible and elastic material, which fit into the inclined chutes near their lower ends to hold back the eyelets until the proper time, when said bar is raised by the action of a face-cam formed on the cylinder G, upon the rod *v*, which is kept bearing upon the cam by the spring *v'*. The projecting tongues on the bar W are made of a flexible and elastic material to prevent injury to the eyelets, when the bar is moved downward in case an eyelet should have stopped directly under said bar. In such case that particular tongue would yield or bend up, thus allowing the bar W to continue its downward motion, all of the other tongues not thus obstructed projecting into the inclined chutes, and serve to prevent the eyelets in said chutes from descending below a given point until the bar W is raised. The movements of this stop-bar, the feed-wheel N, and the piston of the air-pump should be so timed that the jets of air shall be discharged from the pipe into the inclined chutes when the stop-bar W is raised, and the wheel N is in a position to receive eyelets from all the chutes, and in a state of rest. X is the table, upon which the material is placed to be operated upon, firmly secured to the fixed stand or column X', and provided with the opening *w*, through which the punch *b* passes to enter the eyelet, punch the material, and clinch the eyelet by pressure against the anvil S. To the upper side of the table X is secured, so as to be adjusted thereon, the gage Y. Z is an elbow lever, having two horizontal arms and one vertical arm, and pivoted to ears *a'* on the rear end of the table X, and having pivoted to said horizontal arms the oblong ring-shaped presser-foot *b'*, so arranged that the punch *b* may pass through the opening formed therein. The presser-foot *b'* is pivoted to the lever Z in order to allow it to adapt itself to the surface of the material, so that its whole surface may bear whatever may be the thickness of the material, and is held firmly onto the material by the spring *c'*. The hopper L is provided with an opening at the top for the insertion of the eyelets closed by the hinged cover *d'*. A² is a double hooked stop, pivoted to the rear side of the frame B, and between it and the clutch-pulley I, upon which it acts to stop the machine at the proper point through the medium of the pin A³, when the clutch-pulley I is thrown out of gear with the driving-pulley D.

It will be seen that the upper portion of the frame B is divided into two parts, between which is located the eyelet-delivering mechanism, said divided portions being again united in the hub B⁴ at the front of the machine, the object of said division of the frame B being to provide a suitable place for locating the eyelet separating and delivering mechanism, and at the same time to make a symmetrical frame and equalize the strain of setting the

eyelet, and prevent injurious springing of the frame at that point with the least weight of metal.

It is obvious that the pump for furnishing the blast of air to the inclined chutes may be of a different kind, arranged in a different place, and operated from some other moving part of the machine without affecting the principle of operation; but the arrangement shown works very well when the machine is run at the proper speed of, say, from one hundred and fifty to three hundred revolutions per minute.

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

1. In an eyelet-setting machine, the frame B, hung upon a vertical axis at or near its rear end, and parallel, or nearly so, to the center line of the setting-plunger mounted in the front end of said frame, when said frame has mounted thereon all the mechanism for separating, delivering, and setting the eyelets, as well as punching the holes in the material, and arranged to vibrate upon said axis to feed the material, substantially as described.

2. The cam-path *f* in the cam-cylinder G, the lever H, acted upon by said cam-path, the rocker-shaft H¹, the lever H², and the fulcrum-bolt *h*, or their mechanical equivalents, when the cam is mounted or has its bearings on, and levers are pivoted to, the frame B, all arranged and operating to vibrate said frame upon its axis, acting upon the pin *h* as a fulcrum, set in the base or other stationary portion of the machine, substantially as described.

3. The combination of the setting-plunger E, the crank-pin *a*, and cam-shaped slot *e*, formed in, or secured to, the plunger E, arranged and operating as described, for the purpose specified.

4. In an eyelet-setting machine, a hopper or receptacle for the eyelets, in the form of the frustum of a cone, placed upon its side, with the base of the cone in a vertical position and toward the setting-tools, substantially as described.

5. The combination, in an eyelet-setting machine, of a hopper for the reception of the eyelets in bulk, and provided with one or more openings from which the eyelets can escape when right side up, one or more inclined chutes, an intermittently-rotating wheel, provided with a series of recesses in its outer edge, and mounted upon a vertical axis, and a pair of intermittently-reciprocating nippers, arranged and operating as set forth, to feed the eyelets to the setting mechanism, substantially as described.

6. In combination with the wheel N, provided with a series of recesses in its outer edge, and arranged, as set forth, to convey the eyelets from the inclined chutes to the position to be received by the nippers, the groove *g*, to receive the flange of the eyelet, and guide

or force it out of the wheel at the proper point, substantially as described.

7. The groove *q*, having its front end made the thickness of the flange of the eyelet lower than the other portion, substantially as described, for the purpose specified.

8. The pin *u*, arranged and operating substantially as described, for the purpose specified.

9. In combination with a series of inclined chutes for delivering the eyelets from a hopper, a conical or cylindrical hopper, placed upon its sides, and having its lower inside shaped to give that portion opposite the mouths of the several chutes an inclination upward from the outer chute on the side from which the brush approaches, substantially as described.

10. The intermittently-reciprocating stop-bar *W*, provided with projecting tongues of rubber or other suitable flexible and elastic material, arranged and operating, as set forth, in combination with inclined chutes, substantially as described, for the purpose specified.

11. In combination with two or more inclined chutes for conveying the eyelets to the work, the pipe *V*, having one end closed, and the other communicating with an air-pump or other suitable air-forcing device, and provided with a perforation upon its under side to each of said chutes, all arranged and operating substantially as described, for the purpose specified.

12. In an eyelet-setting machine, a frame, upon which is mounted the eyelet separating, delivering, and setting mechanism, having its rear portion divided into two parts, and said two parts again united at the front, and having the eyelet separating and delivering mechanism placed between said parts, substantially as described, for the purpose specified.

Executed at Boston, Massachusetts, this 18th day of June, 1873.

ARTEMAS B. EDMANDS.

Witnesses:

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