

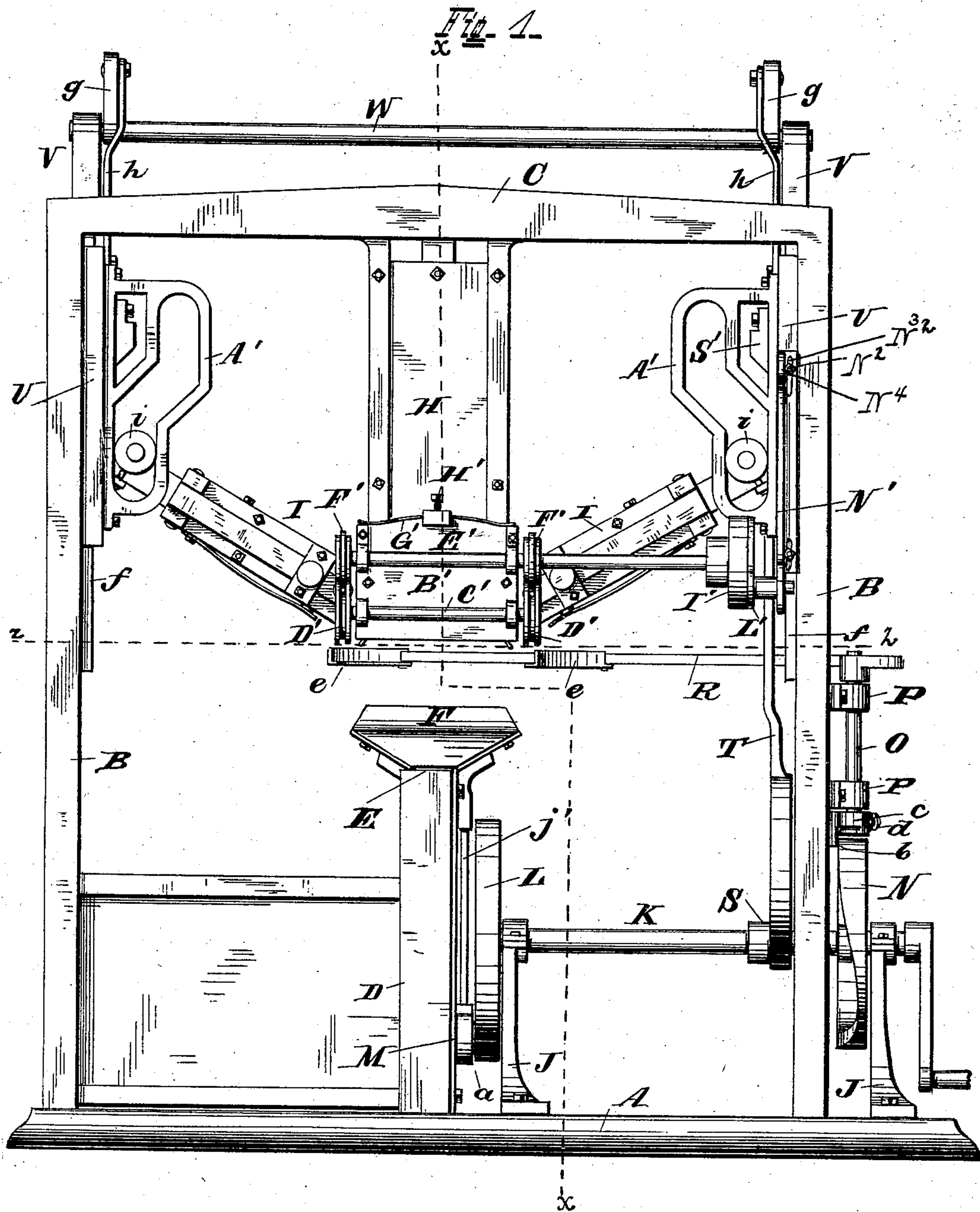
(No Model.)

5 Sheets—Sheet 1.

W. ROBERTS.  
TRAY MACHINE.

No. 369,078.

Patented Aug. 30, 1887.



Attest  
Carl Spengel

C. W. Pector

Inventor  
Webster Roberts  
By Steiner Beckhuysen Att'y's

(No Model.)

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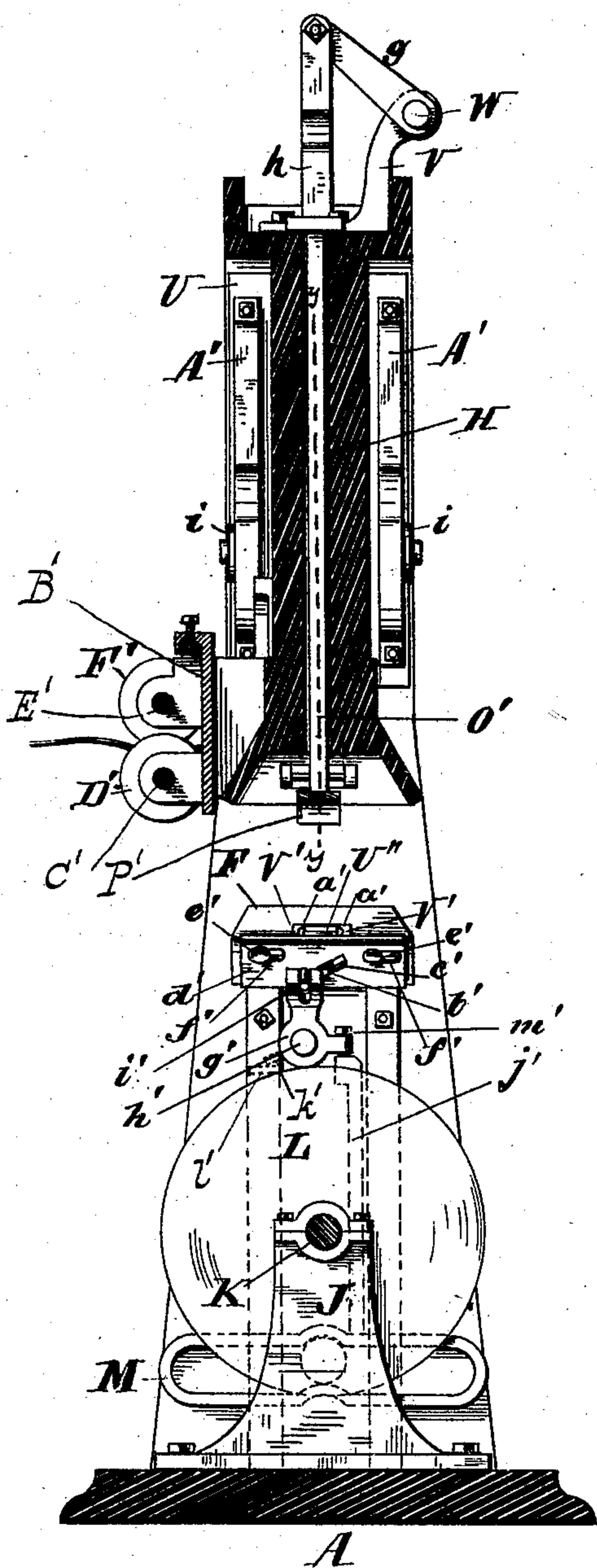
W. ROBERTS.

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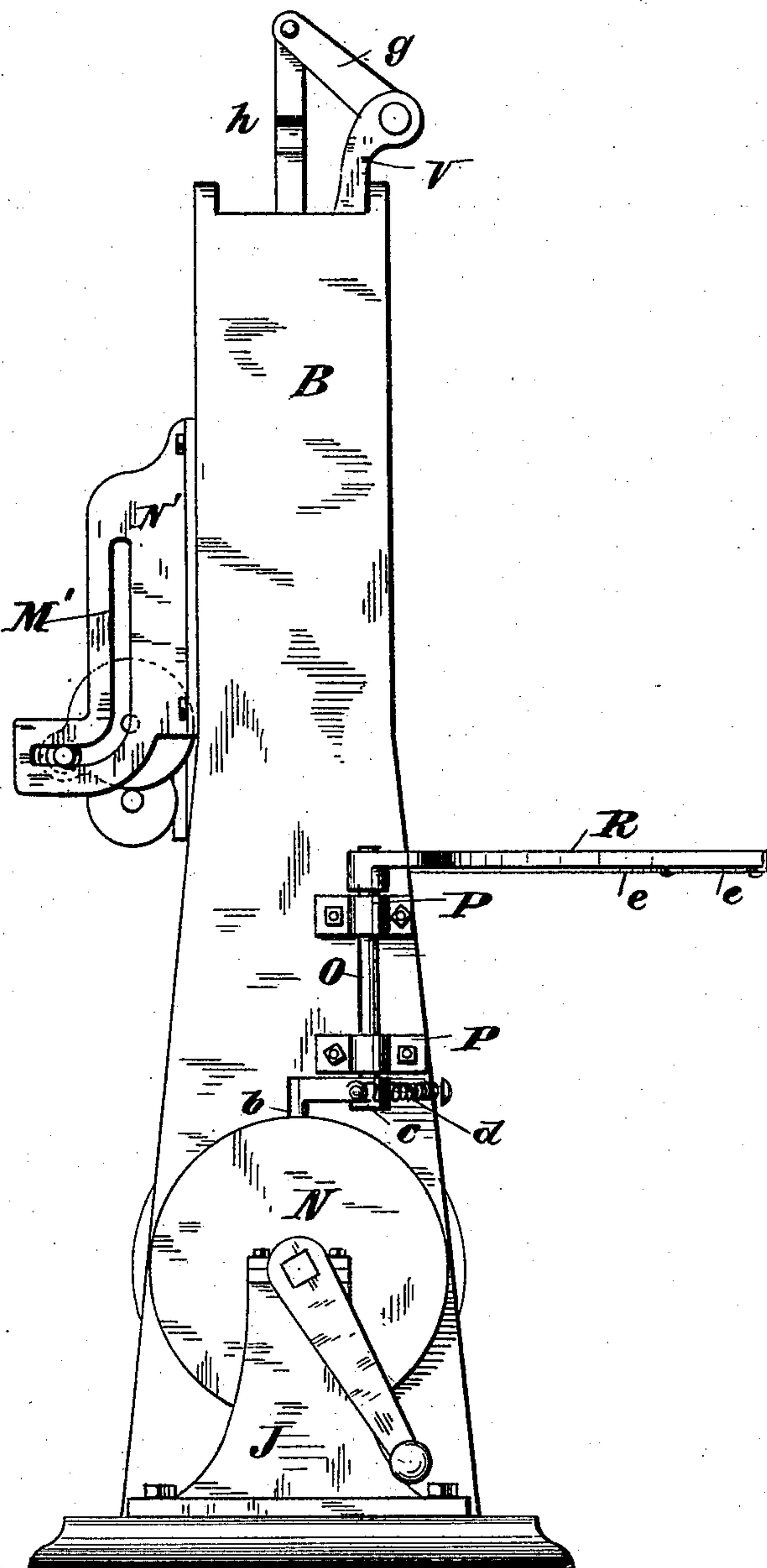
No. 369,078.

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Fig 2.



File 3



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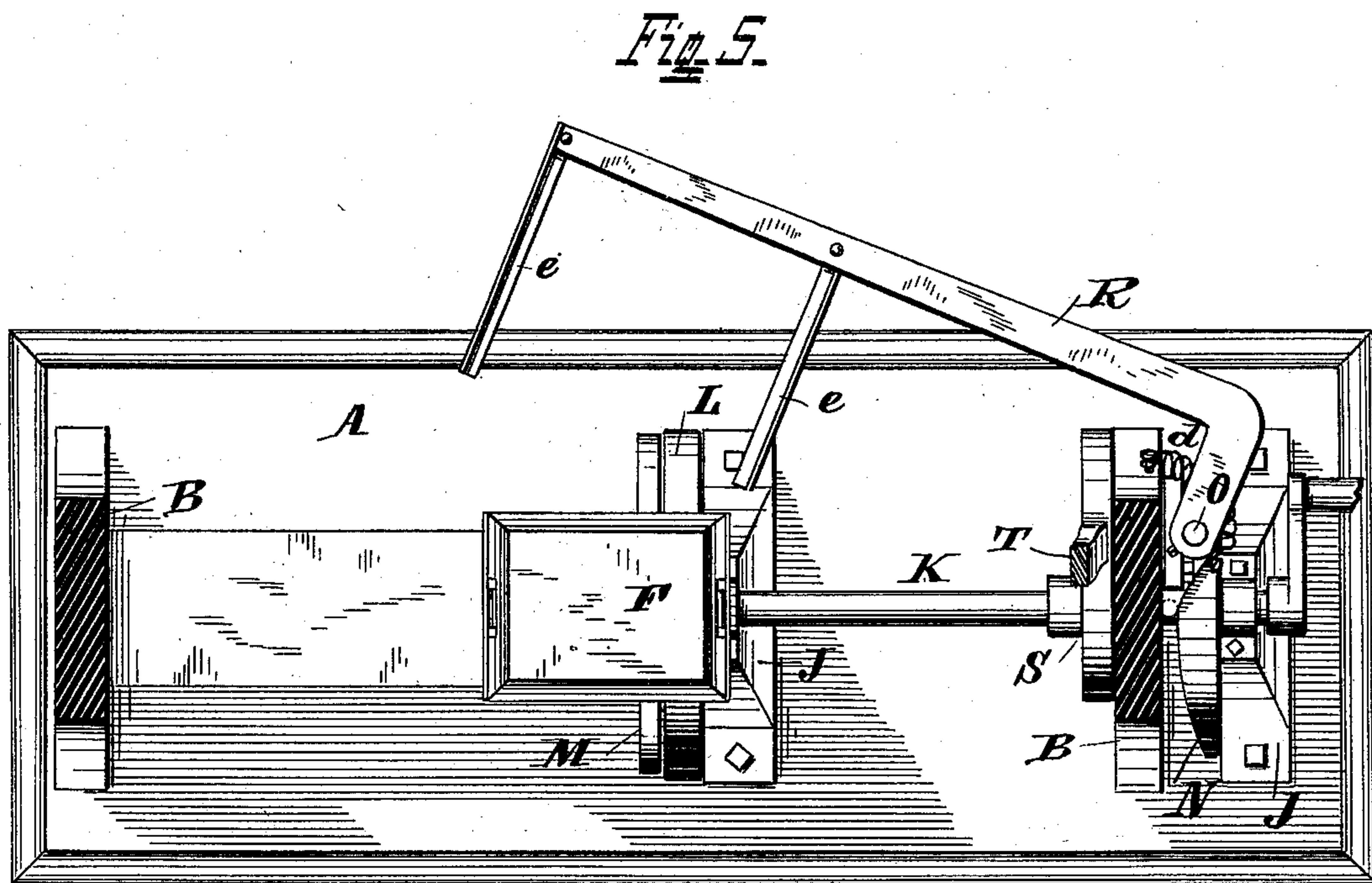
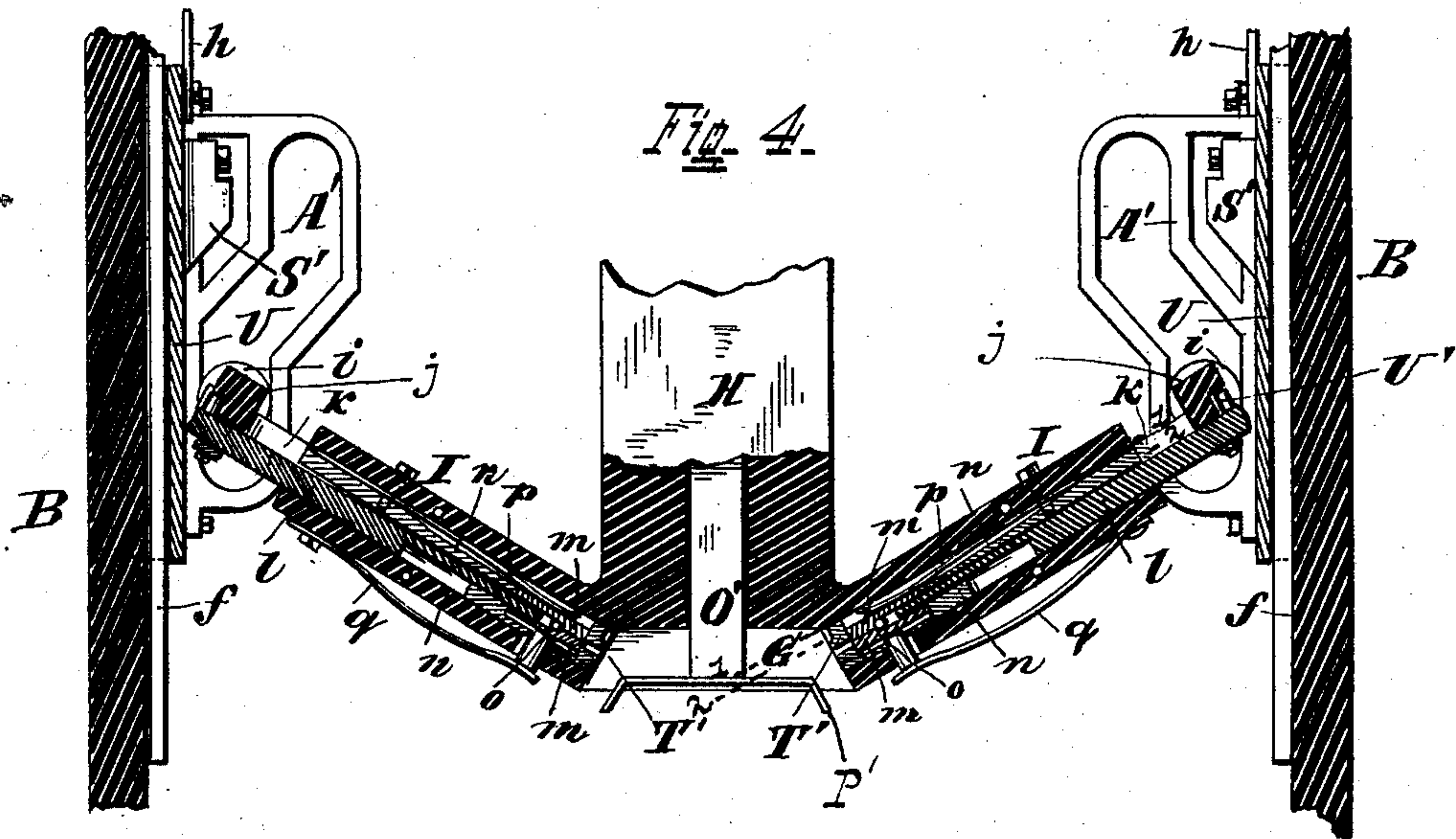
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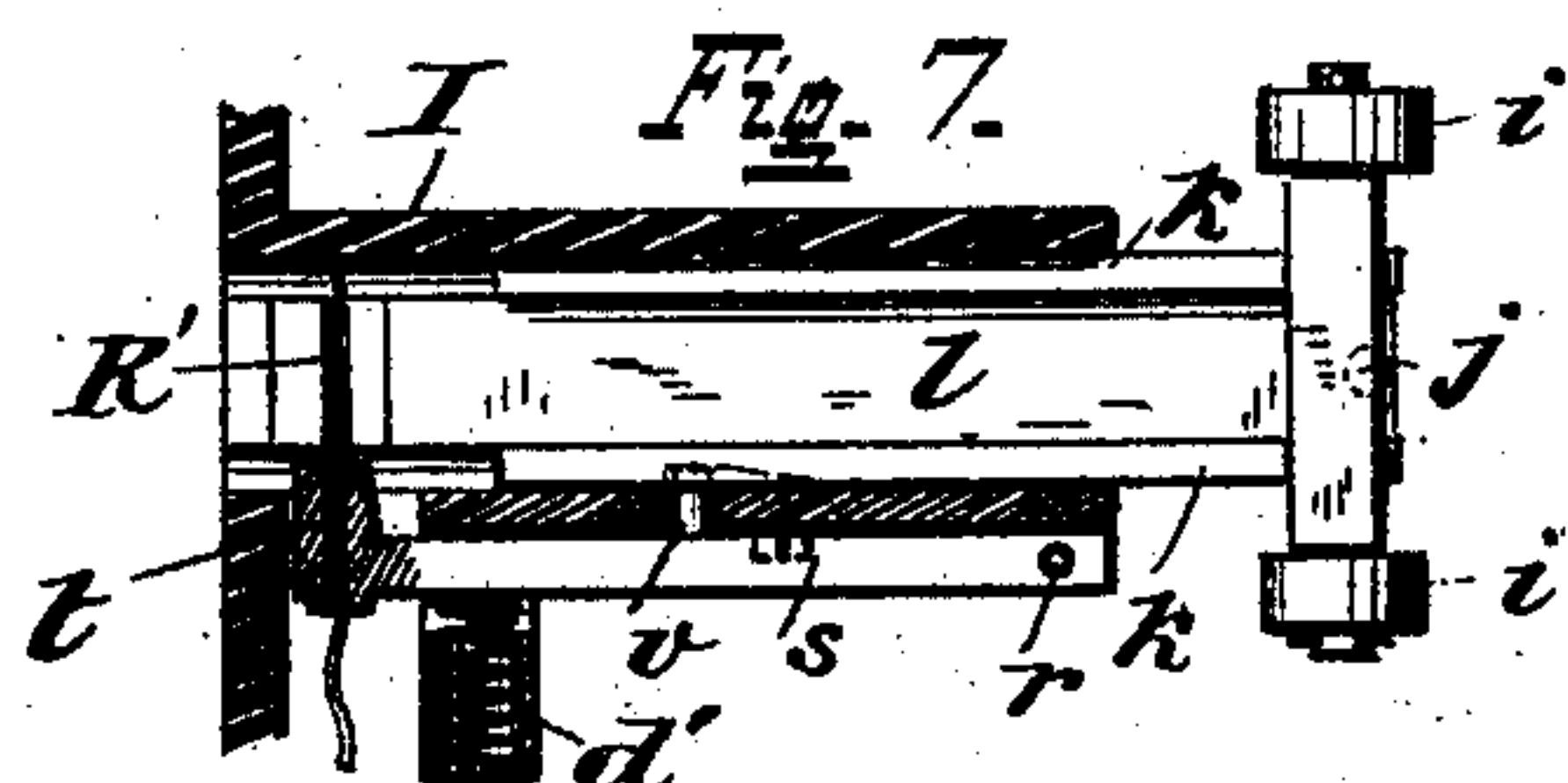
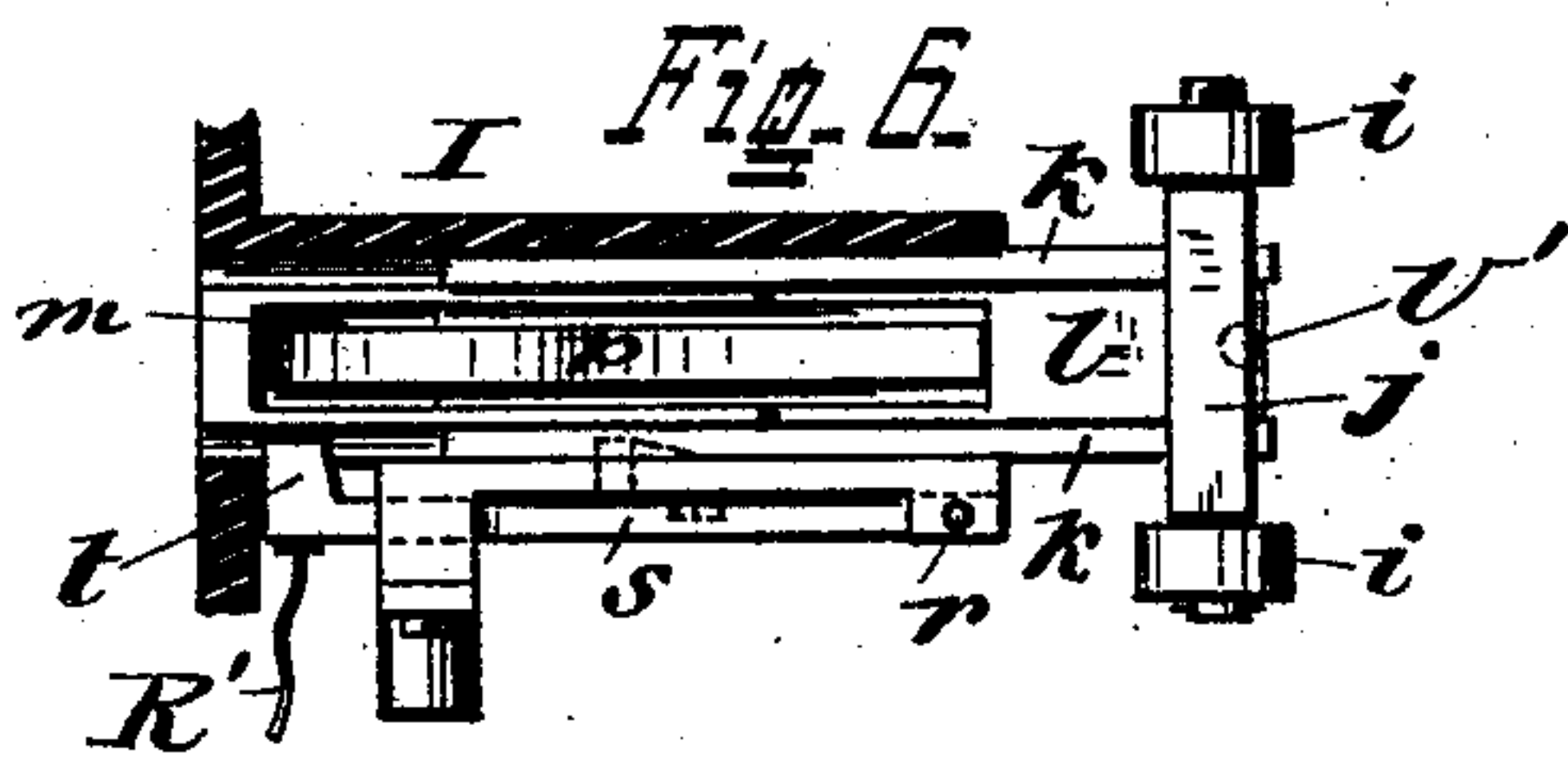
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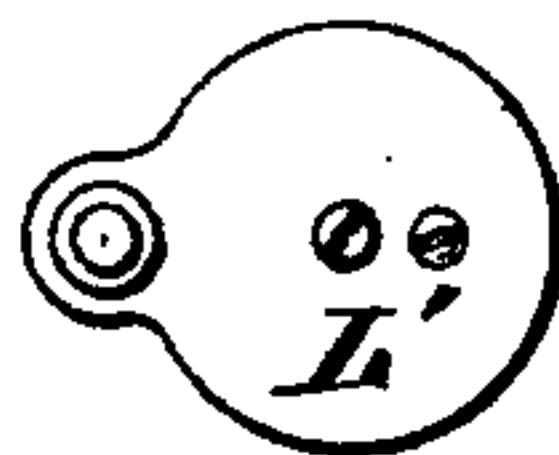
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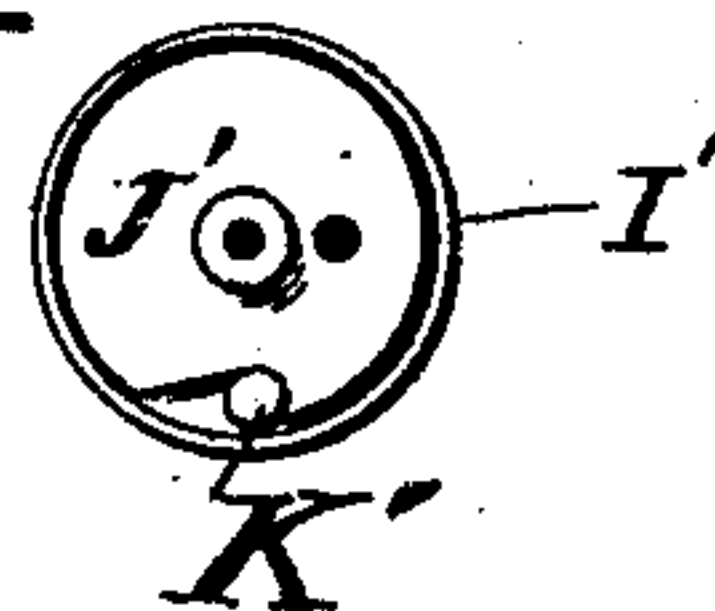
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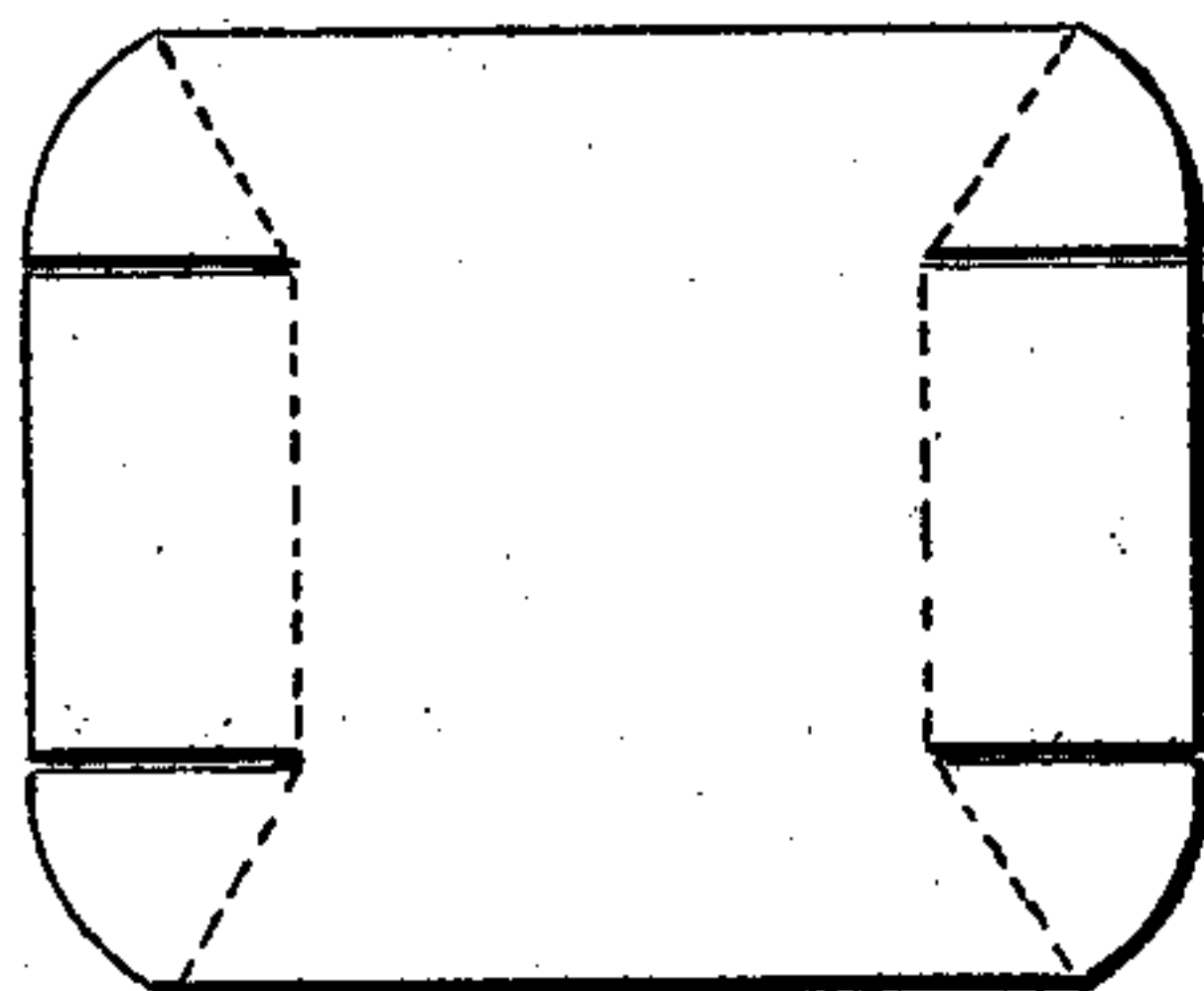
*Fig. 8.*



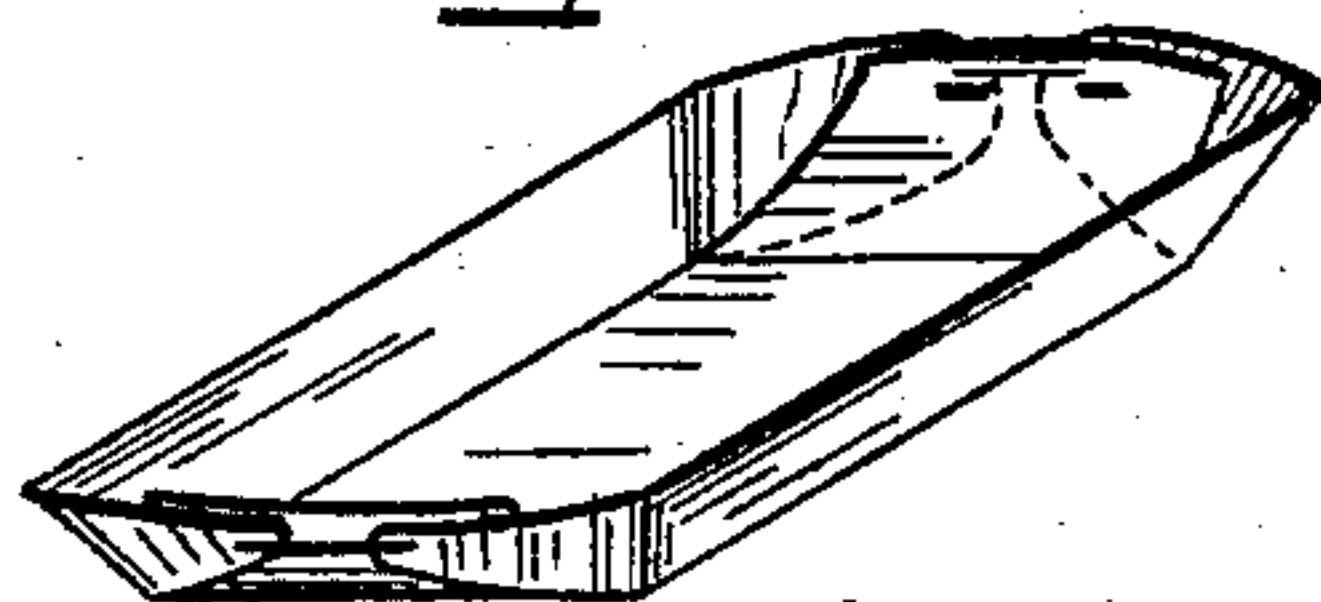
*Fig. 9.*



*Fig. 10.*



*Fig. 11.*



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(No Model.)

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Fig. 12.

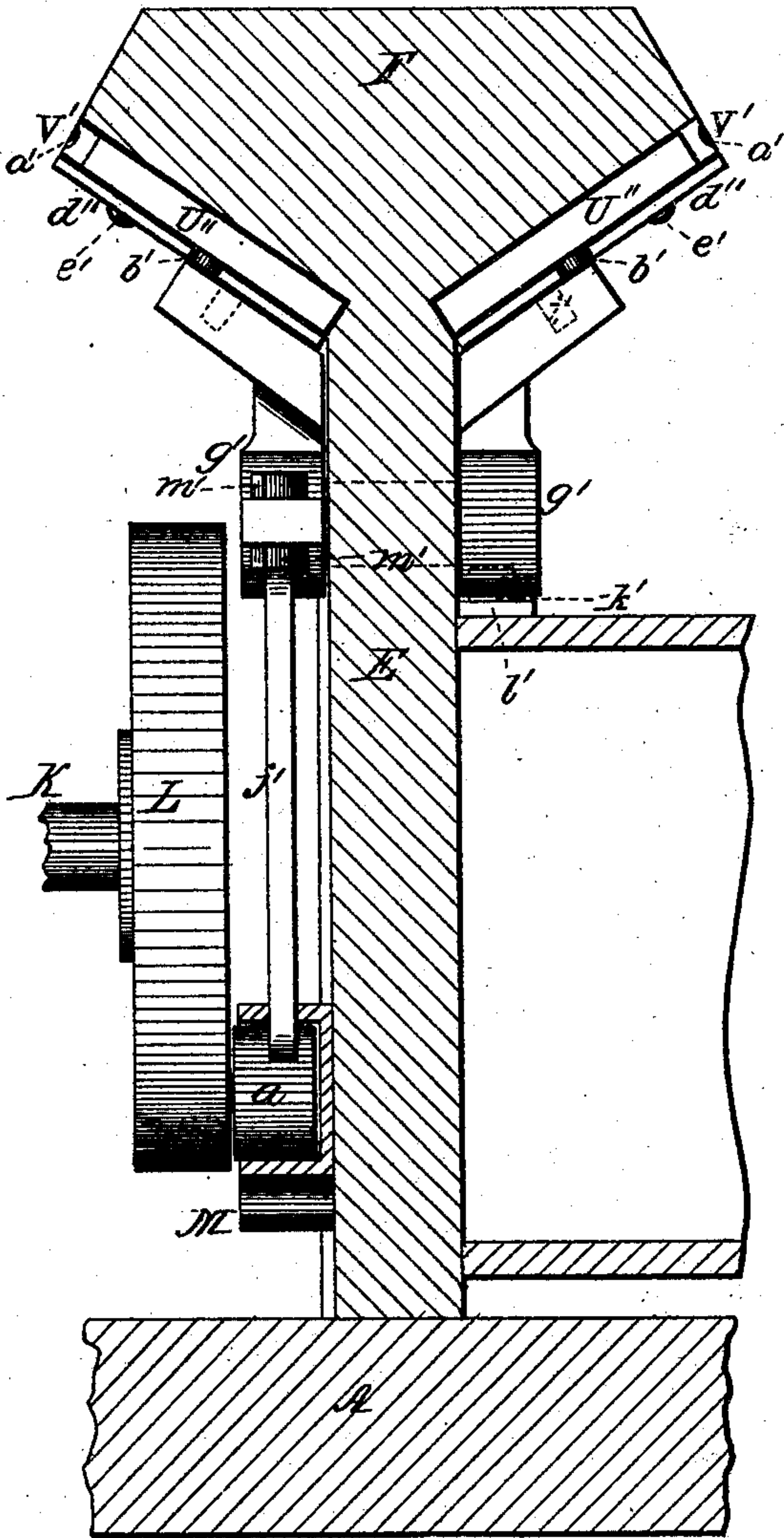
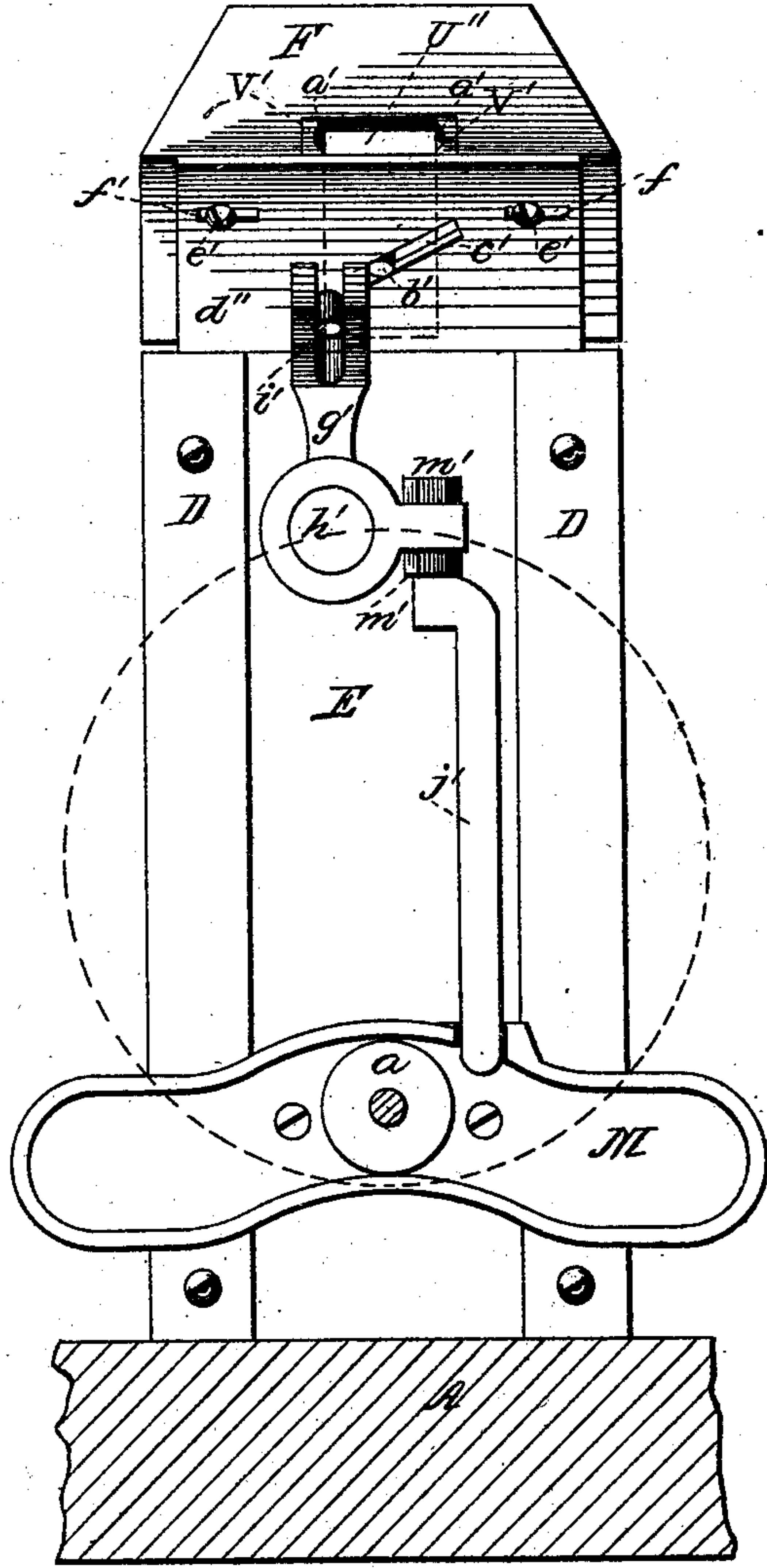


Fig. 13.



Witnesses  
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By his Attorneys

Stem & Beck



# UNITED STATES PATENT OFFICE.

WEBSTER ROBERTS, OF CLEVELAND, ASSIGNOR TO THE CRUME & SEFTON  
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## TRAY-MACHINE.

SPECIFICATION forming part of Letters Patent No. 369,078, dated August 30, 1887.

Application filed January 2, 1885. Serial No. 151,749. (No model.)

*To all whom it may concern:*

Be it known that I, WEBSTER ROBERTS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Tray-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to improvements in tray-machines of that class which bend and form the previously scored and cut blanks by the means of dies which at the time of bending overlap the ends and bring them into position to receive the fastening-staples, which are likewise made, driven, and clinched by the same machine.

My object is to render the machine more efficient, and at the same time to lessen the complication of its parts; and the novelty consists in the combinations of elements employed, the construction of the parts, and their arrangement, all as will be herewith set forth and specifically claimed.

In the accompanying drawings, Figure 1, Sheet 1, is a front elevation of the machine. Fig. 2, Sheet 2, is a sectional end elevation through the line *xx* of Fig. 1. Fig. 3, Sheet 2, is an end elevation of the machine. Fig. 4, Sheet 3, is a sectional front elevation of the upper part of the machine through the line *yy* of Fig. 2. Fig. 5, Sheet 3, is a plan view of the machine in section through the line *zz* of Fig. 1. Fig. 6, Sheet 4, is a sectional plan view of one of the staple forming and driving mechanisms through the line 1 1 of Fig. 4. Fig. 7, Sheet 4, is a sectional plan view of the same through the line 2 2 of Fig. 4. Fig. 8, Sheet 4, is an end elevation of the wire-feeding clutch mechanism. Fig. 9, Sheet 4, is a corresponding view with the plate removed. Fig. 10, Sheet 4, represents the blank as cut and scored previous to being placed in the machine. Fig. 11, Sheet 4, represents the finished tray. Fig. 12 is a transverse section, representing in detail the construction of the male die, clincher-anvils, and operating devices. Fig. 13 is a side view of said male die,

looking at the side on which the actuating devices are located.

The same letters of reference are used to indicate identical parts in all the figures.

The frame of the machine may consist of a base, A, sides B B, and cross-head or crown C, as shown; or it may be of any suitable construction.

Secured upon the base A, half-way between the walls B B, is a vertical socket or guide, D, in which is confined, but free to travel up and down, the shank E, carrying at its top the male tray-forming die F, of the shape shown. Directly over this die F is the female tray-forming die G, attached to or forming part of a pendent support, H, whose upper end is secured to the head-piece C. Extending at right angles from and secured to the ends of the female die G are guide-sockets I, whose lower ends open into and communicate with the interior of the female die G. Within these sockets the staple forming and driving mechanisms are confined and operate, as will be presently explained.

Suitably journaled in pillows J is a horizontal shaft, K, extending through an opening in the wall B and driven by power in any suitable manner. The inner end of this shaft has keyed upon it a disk, L, to which is secured, near its periphery, a stud carrying a friction-roller, *a*, which is confined in the horizontal slot of a cam-piece or lifter, M, which is rigidly fastened to the shank E, thus constituting a cam arrangement, which causes the vertical reciprocation of the shank and male die as the shaft is revolved. Also keyed upon the shaft K, just outside of the wall B, is a cam wiper-wheel, N, which engages with the pendent stud *b* of a crank-arm, *c*, keyed upon the lower end of a vertical shaft, O, which is journaled in brackets P, secured upon the outer side of the wall B, as seen in Figs. 1 and 3. To cause the stud *b* to constantly engage with the cam-surface of the wiper-wheel, I employ any suitable spring, *d*—in this instance a spiral spring connected at one end to a stud or pin projecting from the crank-arm *c*, and at the other end to the wall B, as seen in Fig. 3.



It is evident that the wiper-wheel might have an annular cam-groove into which the stud upon the crank-arm would constantly fit, so as to give a positive oscillation of the shaft O in both directions, and thereby dispense with the spring, or a counter-weight, which might be employed in place of a spring.

To the upper end of the shaft O is keyed a horizontal arm, R, carrying additional horizontal supporting-fingers, *c*, rectangular in cross-section, between and upon which are supported the tray-blanks that are thereby fed into the machine, one at a time, by the reciprocating vibration of the arm R. The location of the arm R and fingers *c* is such as to carry the tray-blank close and directly under the female die. The relative arrangement of the parts is such that when the male die is at its lowest point the arm R begins to swing in just as the male die begins to ascend, and the travel of the parts is such that the tray-blank will be properly disposed under the female die just before the male die reaches the under side of the tray-blank to carry it up within the female die. Also keyed upon the shaft K, just within the wall B, is an eccentric disk, S, around which is fitted an eye or loop upon the lower end of a pitman-arm, T, whose upper end is pivoted to a slide, U, secured and traveling upon ways *f*, attached to the inner side of the wall B. The opposite wall B is also provided with a corresponding slide, U, and a simultaneous vertical reciprocation is imparted to both slides from the pitman T by the following means: Journaled in brackets V upon the head-piece C is a rock-shaft, W, with projecting arms *g* at each end. Each of these arms *g* is connected by a pivoted link, *h*, passing down through openings in the crown-piece C' to the slides U, so that as the one slide receives its vertical reciprocating movement directly from the pitman T a similar and simultaneous reciprocating movement is communicated to the opposite slide U through the links *h*, arms *g*, and rock-shaft W.

Each of the slides U is provided upon each of its sides with slotted brackets A', whose slots are of the shape shown more particularly in Figs. 1 and 4. Confined within these slots are friction-rollers *i*, journaled upon the ends of a cross-head, *j*. Attached to the cross-head are two parallel metal plungers, *k*, which, as seen in Figs. 4, 6, and 7, are fitted so as to travel within the sockets I, and are caused to reciprocate by the slots in the brackets A' acting upon the cross-head *j* through the medium of the friction-rollers *i*. Fitted between the plungers *k* is an independently-operated sliding driving-tongue, *l*, whose lower end travels between spring-compressed jaw-blocks *m*, supported in jaws or guides *n*, secured within the sockets I. These jaw-blocks are provided with ledges or shoulders *o* at their outer sides, which toward their middle are beveled off to form a tapering or wedge-shaped recess, which causes the driver in its descent to open the jaws to permit the finished staple to pass be-

tween them into the driving-throat, and they are held together by any suitable springs, *p q*.

Upon the front side of each of the sockets I is pivoted at *r*, Figs. 6 and 7, an arm, *s*, having a perforated head or die, *t*, at its lower end, which extends through an opening in the side wall of the socket, and is held compressed by a spiral spring, *d'*, confined in any suitable housing and bearing against the arm. Extending from the inner side of the arm *s* is a stud or pin, *v*, which passes through a perforation in the side wall of the socket and bears against an inclined surface or groove in the adjacent plunger *k*.

Suitably secured to the front side of the female die is a frame, B', provided with lugs, in which are journaled a lower shaft, C', having keyed upon its ends annular grooved rollers D' and an upper shaft, E', upon which are keyed ribbed rollers F', whose ribs fit into the groove of the rollers D', and which pairs together form the staple-wire feeders.

The journal-blocks of the shaft E' are preferably free to slide vertically, and are held down to insure the proper feeding of the wire between the rollers by means of a cross-spring, G', and tension-adjusting screw H', as seen in Fig. 1. The location of the wire-feeding rollers is such as to direct the wire R' in a straight line into and through the perforations in the heads *t*. Upon the outer end of the upper shaft, E', is keyed a flanged disk, I', within the recess of which and fitted loosely upon the shaft E' is a disk, J', having an inclined cam notch or depression on its periphery to receive a small clamping-roller, K'. Covering the disk J' is a plate, L', secured by a screw or other means to the disk J', and carrying a projecting stud or pin, which fits and travels in a curved slot, M', formed in a vertically-adjustable bracket-plate, N', secured to the adjacent slide U.

By reference to Fig. 1 it will be seen that the adjustment of the bracket-plate N' is secured by having the bolts N<sup>2</sup> located permanently on the side of the slide U extend through vertically-elongated slots N<sup>3</sup>, and be clamped in position therein by means of the nuts N<sup>4</sup> engaging said bolts. The arrangement of the parts is such that at the commencement of the upward stroke of the male die the shaft E', through the medium of the roller K', acting as a binding-clutch, will cause the staple-wire to be fed in through the heads *t* and between the jaw-blocks just behind their ledges or shoulders *o* by the revolution of the shaft E'. The return upward stroke of the slide U will merely retract the plate L' and disk J' without turning back the shaft E', as will be readily understood. By means of the vertical adjustment of the slotted plate N' the extent of the rotation of the shaft E' can be regulated so as to insure the feeding in of the exact amount of wire necessary to form the staples.

O' is the usual gravitating folder-rod, free to move up and down in the support H and provided with the fingers P' at its lower end.



So much of the machine as is used for bending and lapping the folds of the tray-blank is or may be similar to such parts used in the ordinary tray-machine, except as may be hereinafter pointed out.

The manner in which the staples are formed, driven, and clinched is as follows: As before stated, the wire is fed in through the die-heads *t*, whose inner ends are rounded to form a cutting-surface, and extends across between the jaw-blocks *m*, which are at this time closed. Directly after the wire is fed in the plungers *k* begin their descent, the heads *t* are thrown slightly out by the inclined grooves acting on the studs *v*, the wire is cut off by the plungers adjacent to the heads *t* acting against the rounded ends of said die-heads *t*, and its ends are bent down to form staples around the edges of the jaw-blocks *m*, which are still closed. Just at this moment the drivers *l* receive their forward impulse from the wiper-blocks *S'*, secured to the slides *U*, and, moving down, bear upon the backs of the staples and open the jaw-blocks *m*, to permit the passage of the staples into the throats *T' T'*, through which they are forced, and are driven through the lapped ends of the tray and are clinched by anvils confined and working in the male die, as will be presently explained. The drivers *l* are provided with studs *U'*, which, upon the retraction of the plungers by the upward strokes of the slides *U*, are caught by the cross-heads *j*, and thus the drivers are retracted with the plungers. The jaw-blocks are again closed by the springs *p q*, fresh wire is fed in, and the operation of bending and driving is repeated.

To clinch the staples I provide anvil-blocks *U''*, which slide between guides *V'*, recessed in the ends of the male die, and whose inner upper ends are inclined, as seen at *a'*, to receive the points of the staples and to bend them inward sufficiently to be caught and clinched by the ascending anvil-blocks. These blocks are provided on their outer sides with pins *b'*, which pass through inclined slots *c'* in plates *d''*, attached to the die by bolts or screws *e'*, passed through horizontal slots *f'*, so that upon sliding the plates horizontally the anvil-blocks will be forced up to clinch the staples. This motion is imparted to the plates *d''* by means of bell-cranks *g'* upon a shaft, *h'*, journaled through the shank *E*, and having their upper ends forked or slotted to engage pins *i'* upon the plates *d''*. An arm, *j'*, extends from one of these bell-cranks down through an opening in the lifting-cam *M*, whose slot is curved upward, as seen at this point; so as to receive the impact of the roller *a*, which lifts it and operates the anvils without further lifting the die *F*. Either of the bell-cranks is provided with a projecting stud, *k'*, which, when the male die descends, strikes against any stop or projection *l'* upon the socket *D*, to cause the retraction of the bell-cranks, the lowering of the arm *j'*, and the retraction of the anvil-blocks. The

arm *j'* is connected to the bell-crank *g'* by adjusting-nuts *m'*, so as to raise and lower it to cause a greater or less action of the anvil-blocks and a consequent tighter or looser clinching of the staples.

By means of the vibration in and out of the die-heads *t* and the adjustment of the parts the wearing of the cutting-plunger by frictional contact is prevented.

Having thus fully described my invention, I claim—

1. In a tray-machine, the combination of a stationary female die, a horizontal blank-feeding arm, devices, substantially as described, for horizontally vibrating said arm to throw it with its blank beneath the female die, sockets located at each side of the female die, wire-feeding devices, substantially as described, for passing the wire into each socket, a plunger for shearing and bending said wire into a staple, a slide for driving it, and a vertically-movable male die, reciprocating anvil-blocks movable relatively on said male die for clinching the staples, and devices, substantially as described, for elevating said male die, as and for the purpose set forth.

2. The combination, with stationary female and movable male dies, of sockets *I*, located at each side of said female die, spring-jaw blocks located in each socket and shouldered to form stops, a feeding and shearing head movable on the side of each socket, a plunger and slide in each socket for respectively bending the wire and opening the spring-jaws to project the staple, and devices, substantially as described, for actuating said plunger and slide, substantially as set forth.

3. The combination, with the male die, of anvil-blocks carried thereby and having projections, plates *d'*, located on said die and having inclined slots to receive said projections, and devices, substantially as described, for elevating said male die and horizontally moving the plates to reciprocate the anvil blocks, substantially as set forth.

4. In a tray-machine, the combination, with the shaft *K* and pitman-arm *T*, operated thereby, of the slides *U*, and the staple forming and driving mechanism, substantially as described, operated thereby, said slides being connected to each other so as to operate simultaneously by means of the rock-shaft *W*, arms *g*, and links *h*, substantially as and for the purpose described.

5. The combination, in a tray-machine, of the male and female dies and vibrating blank-holder, the wire-feeding-clutch mechanism consisting of the feed-shaft *E'*, flanged disk *I'*, disk *J'*, clamping-roller *K'*, plate *L'*, and slotted reciprocating bracket-plate *N'*, and means, substantially as described, for varying or adjusting the moving position of said bracket, as and for the purpose specified.

6. In an automatic tray-machine, the staple forming and driving mechanism consisting of a stationary socket with a guiding-throat, con-



5 taining spring-compressed staple-forming jaw-  
blocks, reciprocating and bending plungers,  
and an independent reciprocating driver, sub-  
stantially as described.

7. The combination, with the slides U, pro-  
vided with slotted brackets N', and wiper-  
block S', of the cross-head j, rollers i, plungers

l, driver l, jaw-blocks m, springs p q, arms s,  
die t, and socket I, substantially as specified.

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