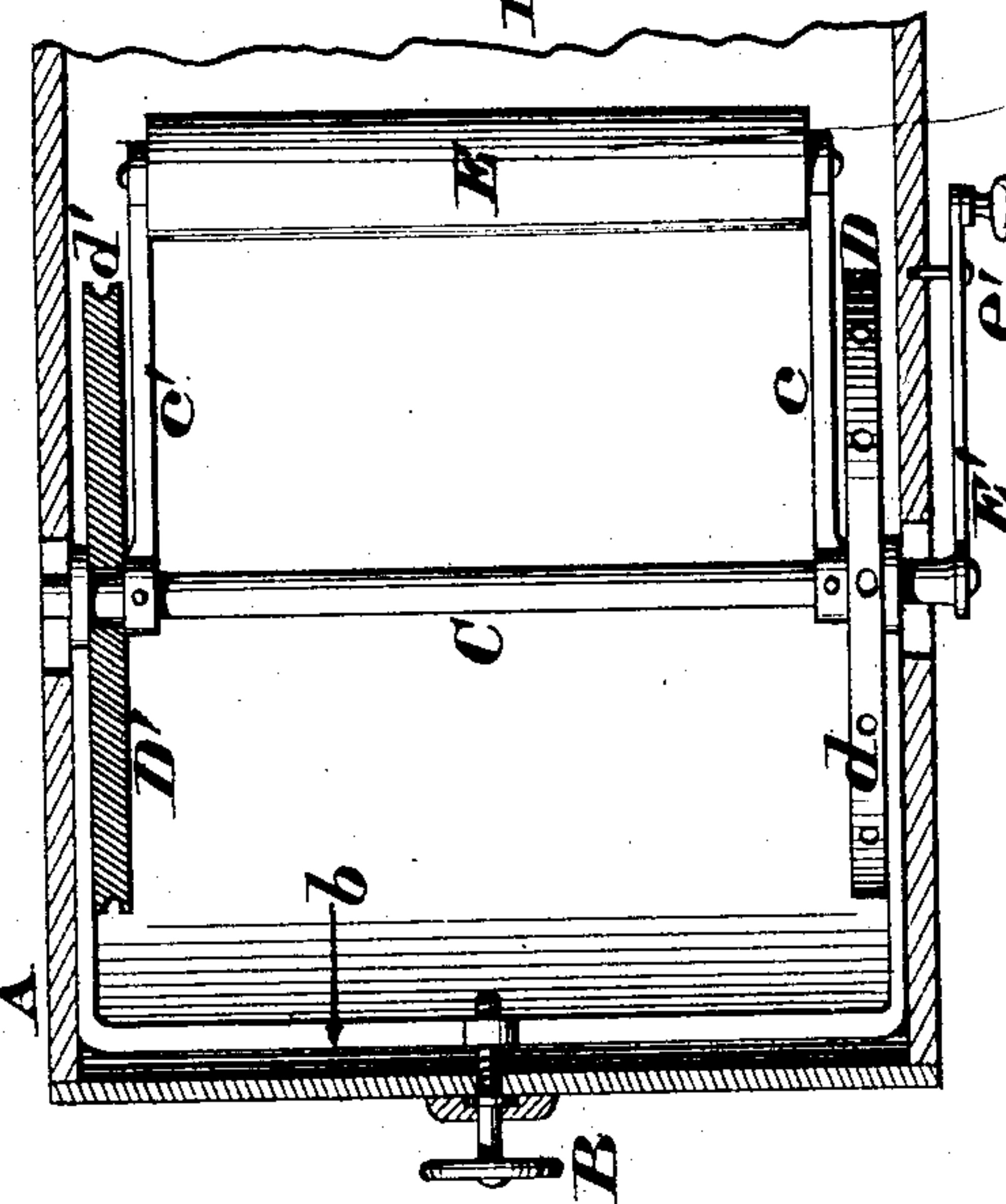
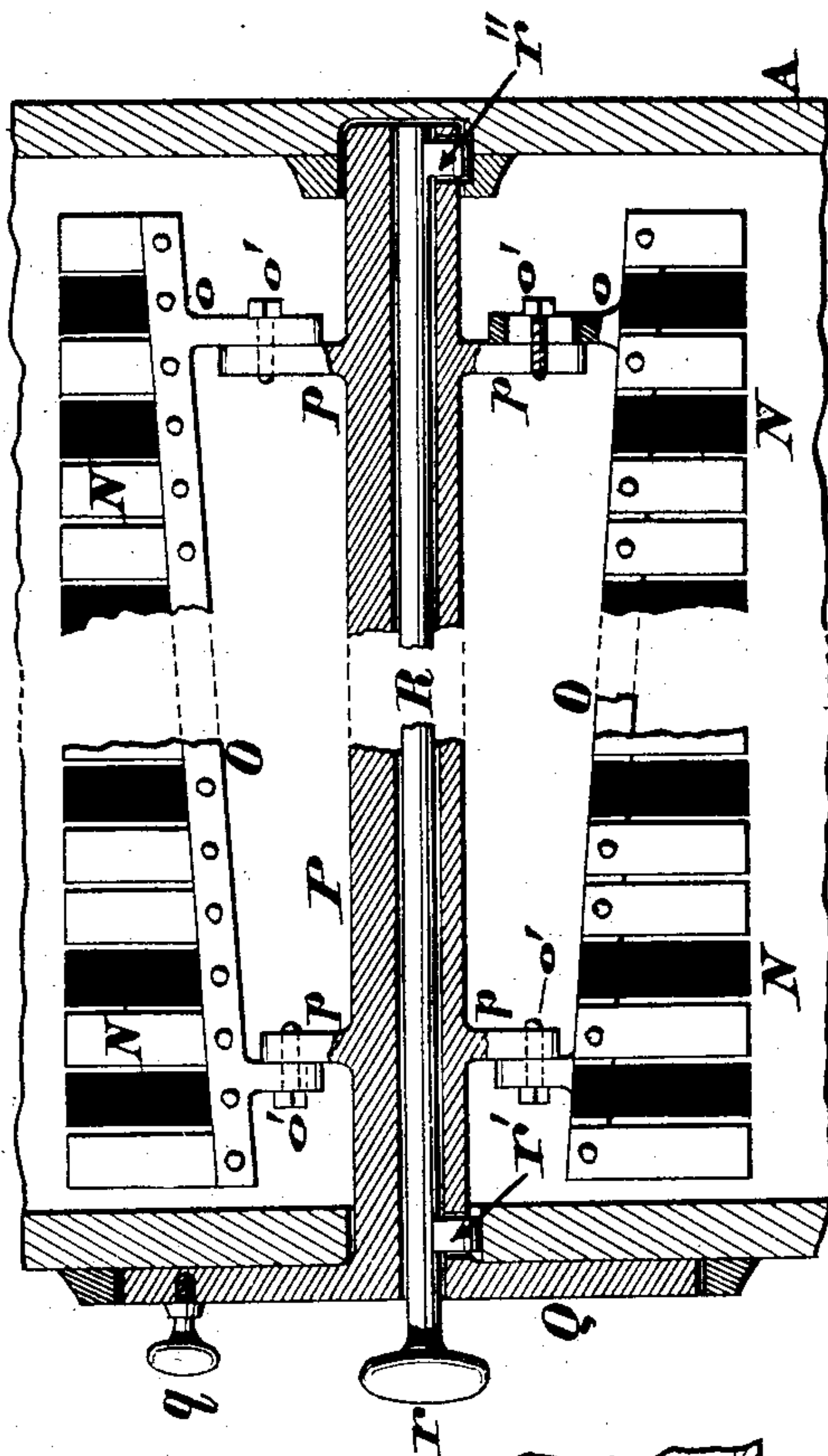
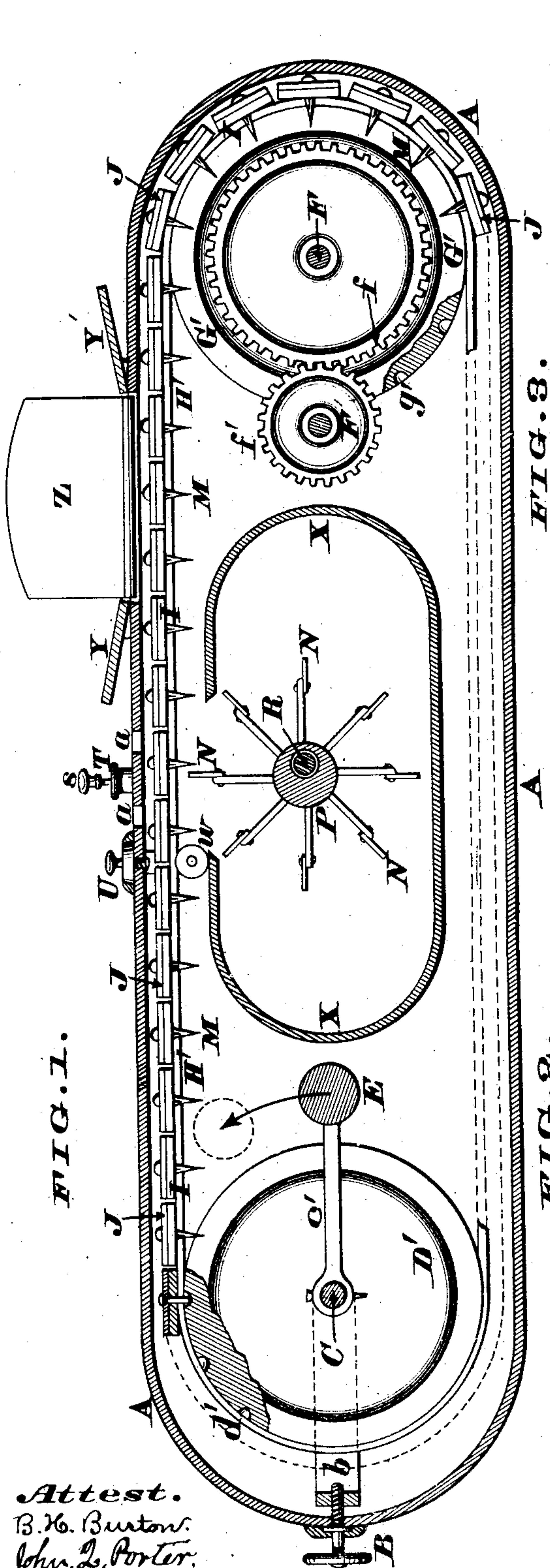


W. H. ALLEN.
Mechanical Musical Instrument.
No. 239,303. Patented March 29, 1881.



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FIG. 4.

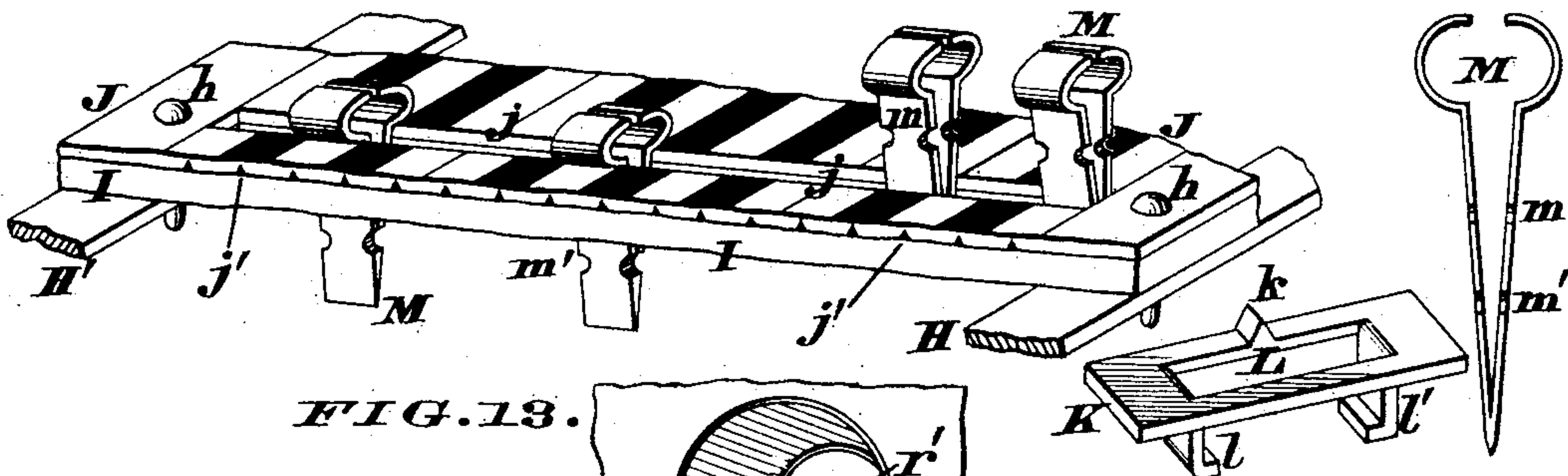


FIG. 13.

FIG. 5.

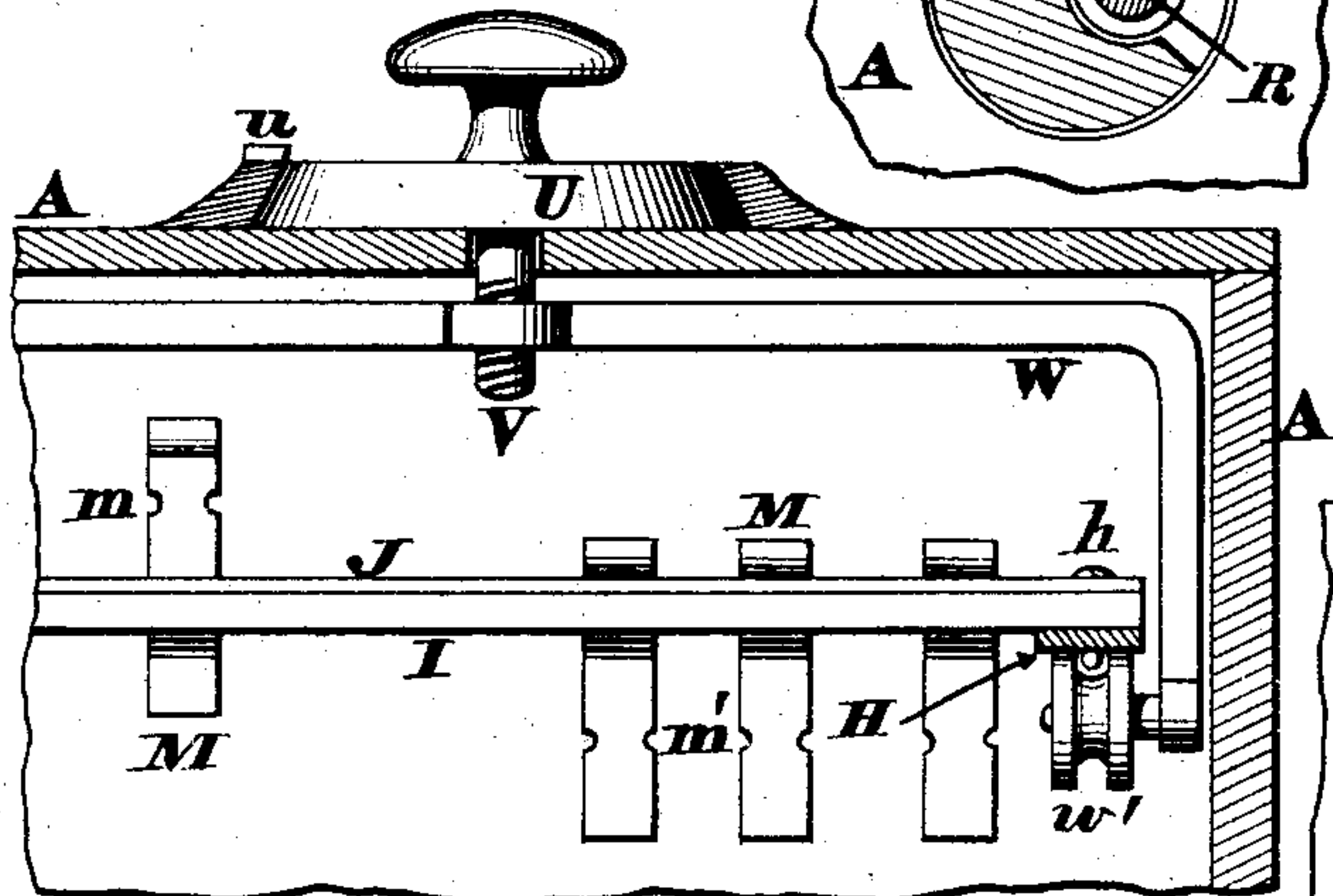


FIG. 6.

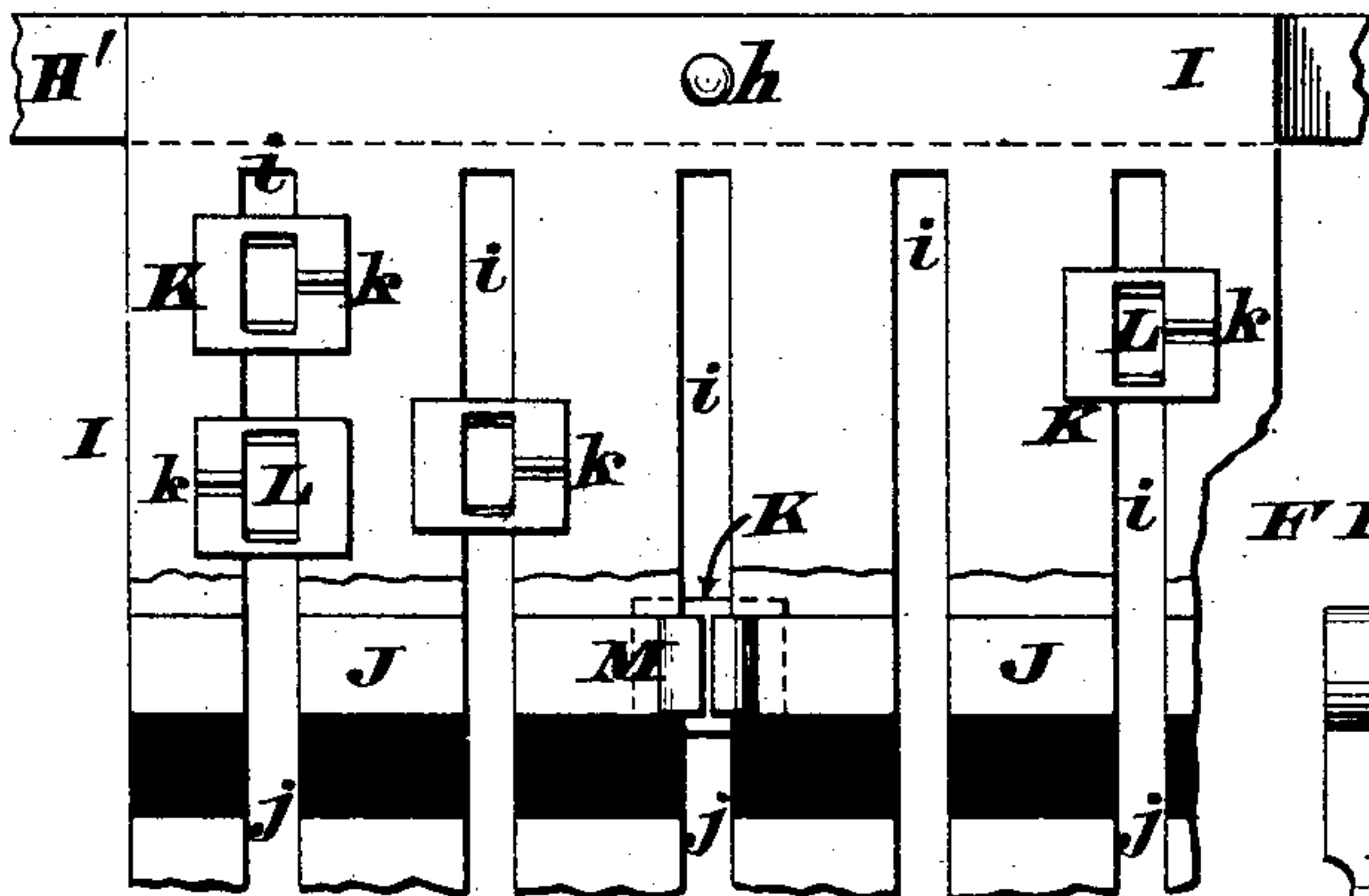


FIG. 7.

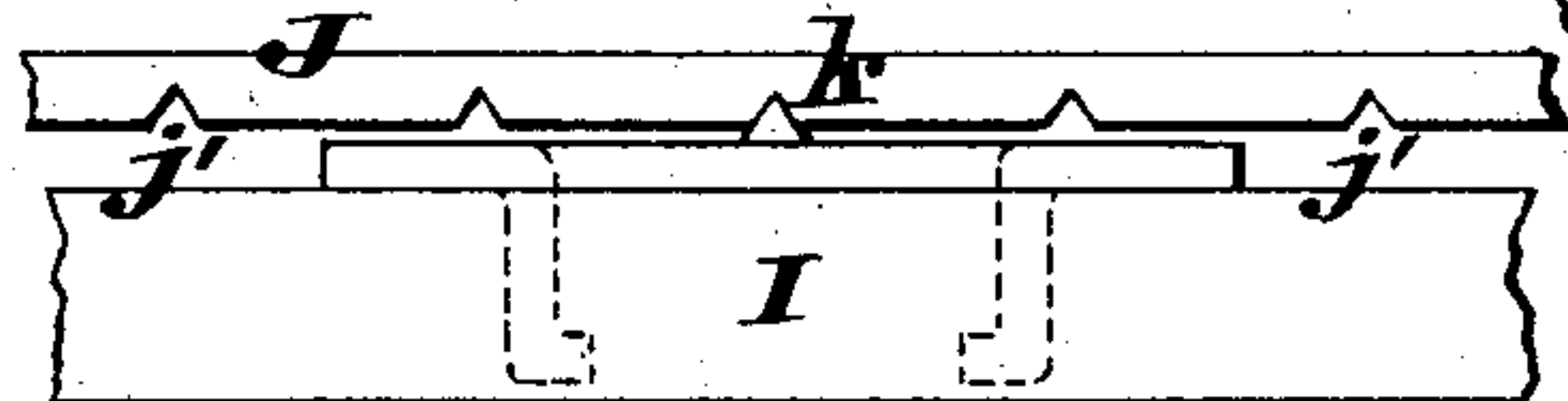


FIG. 12.



FIG. 10.

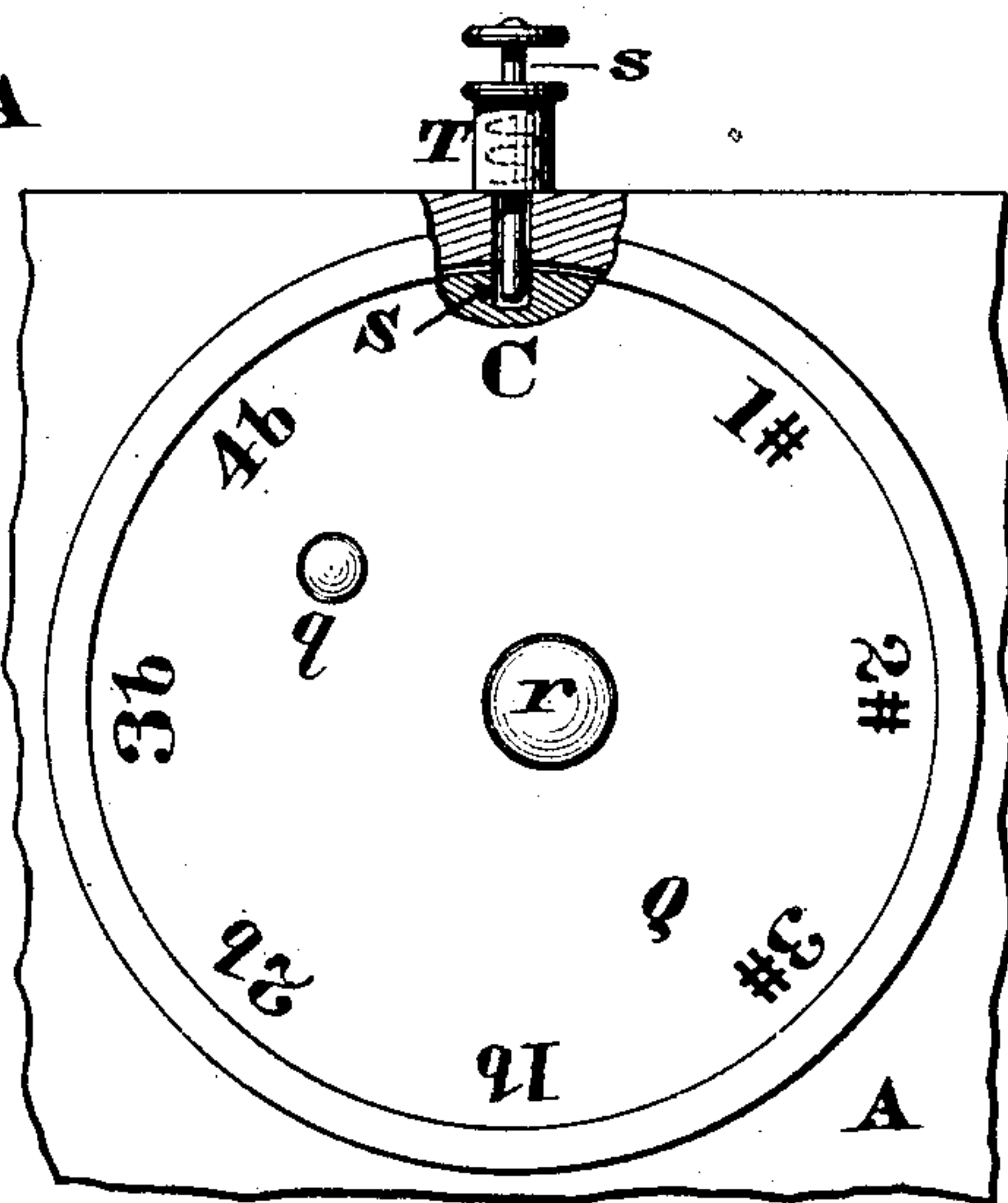
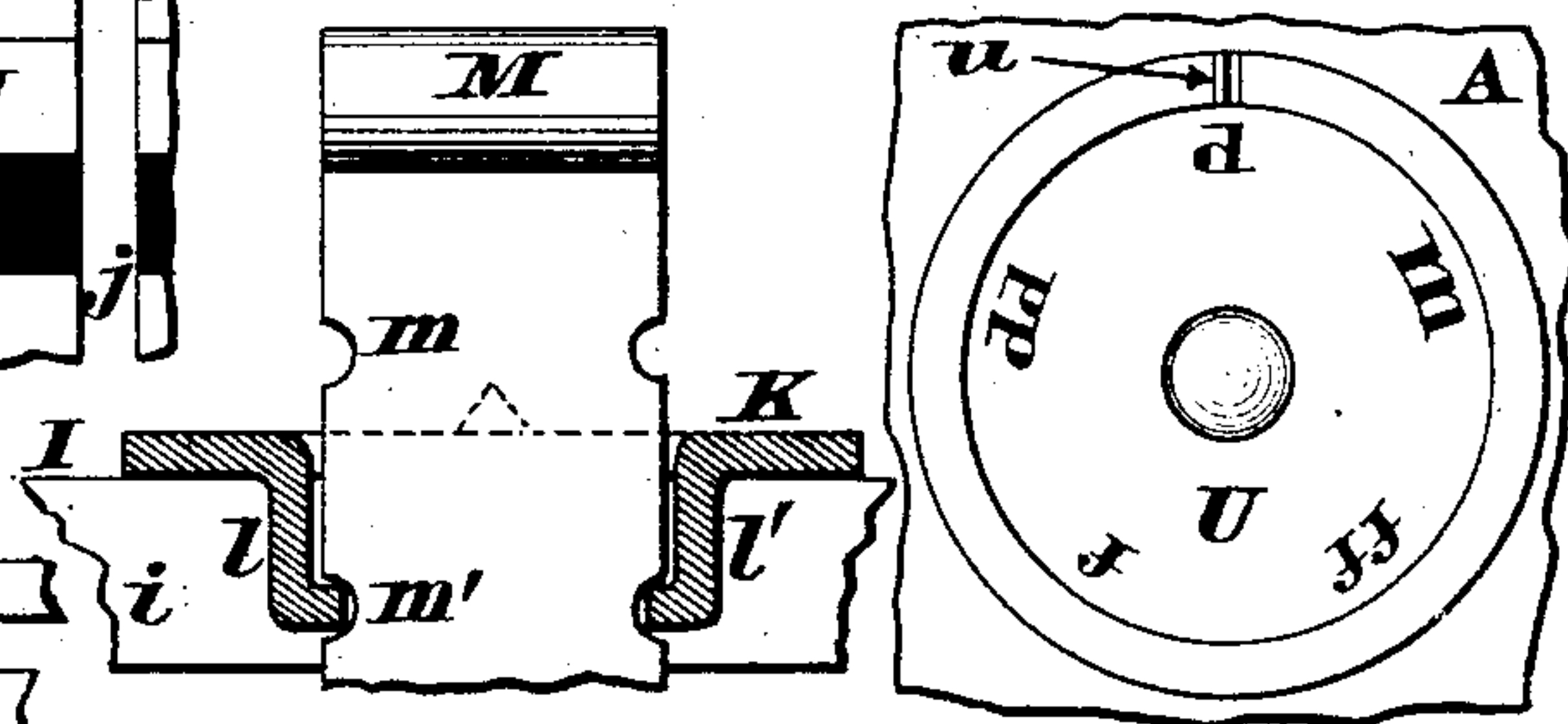


FIG. 9.

FIG. 11.



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UNITED STATES PATENT OFFICE.

WILLIAM H. ALLEN, OF WASHINGTON, INDIANA.

MECHANICAL MUSICAL INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 239,303, dated March 29, 1881.

Application filed December 3, 1880. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM H. ALLEN, of Washington, Daviess county, Indiana, have invented a new and useful Musical Instrument, of which the following is a specification.

My instrument, which I have called the "Transgraphone," consists, essentially, of an endless staff, sufficiently flexible or pliable to be readily engaged over a set of disks or wheels, which wheels are so journaled in the case or box of the instrument as to impart the desired travel or feed to said staff. This staff is pierced with numerous transverse slots, each slot being furnished with a number of tongues capable of being adjusted in said slots for the purpose of producing any desired note as soon as these tongues come in contact with the reeds of the instrument. These reeds, of which any number of distinct sets may be employed, are applied to a shaft disposed transversely of the box, and capable of being locked for the time being, or while any special tune is being played; but when the tune is finished, or when it is desired to vary the pitch of the instrument, said shaft can be instantly rotated so as to bring a new set of reeds into service. In addition to this leading feature of my invention I have devised various improvements in the details of construction, as hereinafter more fully described, and pointed out in the claims.

In the annexed drawings, Figure 1 is a longitudinal section of my instrument, a portion of the endless staff being broken away and its position indicated by dotted lines. Fig. 2 is a horizontal section through the tension devices and canceling-roller of the instrument. Fig. 3 is an enlarged horizontal section through the reed-drum, the central portion of the same being broken away. Fig. 4 is a perspective view of a portion of the endless staff, two of the tongues being shown protruding through the slot of said staff, and two other tongues being represented as retracted or in a non-effective position. Fig. 5 is a transverse section of a portion of the upper part of the box taken in the plane of the "dynamic dial." Fig. 6 is a plan of a part of one of the slats of the endless staff, a portion of the cap of said slat being broken away so as to expose the arrangement of the slides that carry the

shiftable tongues. Fig. 7 is an enlarged side elevation, showing the method of securing the slides between the slats and their caps. Fig. 8 represents a side elevation of one of the tongues and a perspective view of its slide. Fig. 9 is an enlarged section, showing one of the tongues engaged with a slide, said section being taken longitudinally of the latter device. Fig. 10 is an elevation of the dial at the outer end of the reed-drum. Fig. 11 is a plan of the dynamic dial of the instrument. Fig. 12 is an enlarged plan of one of the notched driving-wheels detached from its shaft. Fig. 13 is a transverse section of the dynamic dial shaft, taken in the plane of one of the locking-cams.

Referring to Fig. 1, A represents a box or case of any suitable size, shape, and material, said box being slotted or perforated on top, as at *a*, to permit the sound to escape. Furthermore, the top of the box has an opening closed with two hinged lids, Y Y', which latter, when thrown open, allows a leaf, Z, to be turned up for the purpose of holding a book or sheet while the music is being set up in the instrument.

Fitted in one end of the box is a screw, B, with which latter is engaged an adjustable yoke, *b*, that affords journal-bearings for a shaft, C, having two wheels or disks, D D', loosely mounted thereupon, the peripheries of these disks being provided, respectively, with sockets *d d'*, for a purpose that will presently appear.

Projecting rigidly from shaft C are two arms, *c c'*, the free ends of which have journaled in them a canceling-roller, E, composed of metal or other hard material. The outer end of this shaft has fastened to it a limber lever or crank, E', having a pin, *e'*, adapted to snap into one of two holes in the side of box A, so as to maintain the canceling-roller either in its elevated or depressed position.

Situated at the opposite end of the box is a counter-shaft, F, carrying a gear-wheel, *f*, that engages with the pinion *f'* of driving-shaft F', which latter may have an external crank to be operated by hand; or said driving-shaft F', or the one F, may be run with a train of clock-work or otherwise.

Firmly secured to the counter-shaft F are a

pair of driving-wheels, $G G'$, said wheels being of the same diameter as the disks $D D'$, and having their peripheries indented or socketed at $g g'$, as seen in Figs. 1 and 12. Adapted to pass around these wheels or disks are two endless belts, $H H'$, preferably composed of thin steel or other pliable metal, rivets or pins h being employed for attaching to said belts or bands a series of transverse slats, I , which latter are inflexible. The lower ends of the pins h project below the bands $H H'$, so as to enter the sockets of the disks, and thereby insure a positive travel of the endless staff when the driving-wheels $G G'$ are set in motion.

The transverse slats I are provided with any suitable number of vertical slots, i , five being shown in Fig. 6, and each slot has secured to it a separate cap, J , which is comparatively pliable, and has openings j exactly in line with said slots i . Furthermore, the upper surfaces of all the caps of the endless staff are painted orenameled in imitation of the general arrangement of the black keys, representing flats and sharps on a key-board, as represented in Figs. 4 and 6, which disposition of flats and sharps may be repeated, so as to afford as many octaves as desired. The under side of each cap has a small groove, j' , directly under the center of every flat and sharp, and also under every white degree of the endless staff, which grooves are adapted to receive transverse ribs k , projecting upwardly from small slides K , whose peculiar construction is more clearly shown in the perspective view of Fig. 8. Each slide has a longitudinal slot, L , terminating with two downward projections, $l l'$, whose extremities are bent inward for the purpose of engaging with the tongues M , as seen in Fig. 9. These tongues M are made of any appropriate metal or composition of metals, and are shaped as shown in Fig. 8, their edges having an upper set of notches, m , and a lower set, m' . As many of these tongues may be fitted in each slot as occasion may require, but for almost all ordinary pieces of music four or five of them will be sufficient. When the endless staff is set in motion these tongues are adapted to come in contact with either set of a series of reeds, N , which may be arranged in any suitable manner; but the construction seen in Fig. 3 is preferred. Here the reeds are shown attached to bars O , having slotted lugs o to receive bolts or screws o' , wherewith said lugs are radially adjusted to arms p , projecting from a hollow shaft, P , the exposed end of which carries a dial, Q , upon which are painted or otherwise affixed the customary signatures that indicate the musical pitch of the reeds, as seen in Fig. 10. q is the knob of this dial.

The long reeds N of all the bars O must be placed next to the signature-dial Q , and the endless staff must be so arranged with reference thereto as to cause the colored spaces of said staff to coincide or pass exactly over the colored reeds at all times. Shaft P is bored longitudinally and eccentrically to receive another shaft, R , having an external knob, r , and

two internal swells or cams, $r' r''$, which latter pass through suitable openings in the inclosing-shaft P , and are adapted to come in contact with the boxes or bearings of the same, as seen in Figs. 3 and 13. The periphery of dial Q has a socket, S , directly in line with each musical character on the face of said dial, into either one of which sockets a stop-pin, s , may be forced by a spring coiled within a suitable housing, T . (See Fig. 10.)

Revolving upon the top of box A is a dynamic dial, U , provided with the customary musical characters for indicating the power of the tone of the instrument, as seen in Fig. 11, a fixed index, u , being employed for determining how far to turn said dial. Attached to this dial is a screw, V , carrying an adjustable hanger, W , in the ends of which are journaled grooved rollers $w w'$, for supporting that portion of the endless staff in proximity to the reeds N .

X is the sound-board of the instrument.

In fitting up my instrument each slot i is furnished with as many slides $K L$ as will hold the tongues M for said slot, the slides being interposed between the slats I and caps J in such a manner as to cause the prolongations $l l'$ of said slides to traverse said slots, as seen in Figs. 7 and 9. Furthermore, in fitting up the instrument care must be taken to dispose the ribs k of each alternate slide on the opposite sides of the slots i , as seen in Fig. 6, for the purpose of preventing the caps J being sprung too far, which would result if all the ribs were located on the same sides of the slots. The slides having been thus properly disposed, each of them has applied to it one of the tongues M , which tongue is simply slipped down into said slides until its prolongations $l l'$ snap into the lower notches, m' . After all of the slides have been furnished with their appropriate tongues, any desired piece of music can be readily set upon the instrument by carrying out the following instructions: The lids $Y Y'$ are first opened, the holder Z turned up, and the book or sheet of music is placed upon the latter. This opening of said lids or leaves affords unobstructed access to a number of the adjacent slats, and the performer then proceeds to shift the slides K until their positions in the endless staff exactly agree with the position of the notes on the music-sheet, this transverse shifting of said slides being readily effected on account of the flexible nature of the caps J , which caps will spring far enough to allow the ribs k to become disengaged from the grooves j' by a slight exertion of force. As soon as each slide has been properly disposed, a tongue, M , is then forced all the way down within said slides until the prolongations $l l'$ snap into the upper notches, m , and thereby maintain said tongue in its depressed or effective position. The entire piece of music is set up in this manner, any "rests" occurring in the same being provided for by simply leaving a sufficient number of tongues in their elevated or non-effect-

ive position. The proper pitch of the tune being known, the performer turns the dial Q around until the corresponding signature on the face of the same is brought to a position vertically above the axis of shaft P, when the stop-pin *s* flies into the appropriate peripheral socket of said dial, as seen in Fig. 10. The eccentric-shaft R is then turned so as to bring its cams *r' r''* in contact with the bearings or boxes of shaft P, and thus lock the latter securely in position. These various operations serve to maintain directly above the shaft P whatever set of reeds N may be necessary to insure the proper pitch of the instrument. The power of the tone of the instrument is regulated by the dynamic dial U, the latter being turned so as to lower the hanger W when a loud tone is desired, and vice versa, the depth of tone being caused by the tongues M having a somewhat extended bearing on the reeds N; but the moment said hanger W is elevated, its rollers *w w'* lift the endless bands H H' far enough to cause but a limited contact of said tongues and reeds. These precautions having been attended to, the performer then proceeds to turn the shaft F and its attached driving-wheels G G', the peripheral sockets *g g'* of which engage with the protruding ends of pins *h*, and cause the endless staff to travel at any desired speed. As this staff travels along, it is evident the protruding or depressed tongues M must come in contact with the appropriate reeds, and produce the desired note. The same tune will be played continuously while the tongues M remain unchanged; but when it is desired to commence another piece of music the canceling-roller E is swung up, as indicated by dotted lines in Fig. 1, so as to be brought in contact with the lower ends of the tongues, thereby elevating the latter to their inoperative position and canceling the old tune. Any other tune can then be set up, as previously described, and played as long as desired. In a modified form of the instrument the driving-wheels G G' may have teeth to engage with an endless staff composed of suitable links, or said teeth may be adapted to enter the slots *i*, and thereby propel said staff. I claim as my invention—

1. A musical instrument consisting, essentially, of a flexible endless staff slotted transversely and stretched around two pairs of wheels or disks, each of said slots being furnished with a series of adjustable tongues adapted to come in contact with a set of reeds when said staff is set in motion, all arranged to operate as herein described, and for the purpose set forth.

2. The combination, in a musical instrument, of an endless slotted staff, a series of adjustable tongues, and two or more sets of reeds mounted on a rotating shaft, all arranged and adapted to operate as described, and for the purpose set forth.

3. The combination, in a musical instrument, of an endless slotted staff, a series of adjustable tongues, a set of reeds, and a dynamic device for raising and lowering said staff for the purpose described, said tongues being arranged and adapted to be brought in contact with said reeds as the staff travels, as herein described.

4. In a musical instrument, an endless slotted staff carrying a series of adjustable tongues, said staff being supported on two continuous flexible bands, and being propelled by means of protruding pins or rivets entering peripheral notches in suitable wheels or disks, all combined and adapted to operate as herein described.

5. The combination, in a musical instrument, of an endless staff, H H' I *i*, driving-wheels G *g* G' *g'*, carrying-wheels D *d* D' *d'*, pins *h*, and tension device B *b*, as herein described.

6. In combination with the endless slotted staff H H' I *i* and vertically-shiftable tongues M, the swinging canceling-roller E, for the object stated.

7. In combination with the endless staff H H' I *i* and adjustable tongues M, the dynamic dial U, screw V, vertically-shiftable hanger W, and grooved rollers *w w'*, as herein described.

8. The shaft P, armed with several sets of reeds N, of different pitches, said shaft being traversed by an eccentric-shaft, R, carrying one or more cams, *r'*, as and for the purpose specified.

9. The combination of reeds N, shaft P, eccentric-shaft R, and cams *r' r''*, the outer end of said shaft P being provided with a signature-dial, Q, for the purpose described.

10. In combination with the reed-shaft P and notched signature-dial Q S, the stop-pin *s*, as specified.

11. The combination of slotted slides K L *l l'* and notched tongues M *m m'*, as herein described.

12. The combination of slotted slat I *i*, slotted cap J *j*, and slotted slide K L *l l'*, the upper surface of said slide having a rib, *k*, that enters either one of the grooves *j'* on the under side of said cap, as herein described.

In testimony of which invention I hereunto set my hand.

WILLIAM H. ALLEN.

Witnesses:

JAMES H. LAYMAN,
JOHN Q. PORTER.