

No. 661,005.

Patented Oct. 30, 1900.

G. VARRELMAN & C. M. FELS.
MUSICAL BOX.

(Application filed Sept. 22, 1899.)

(No Model.)

4 Sheets—Sheet 1.

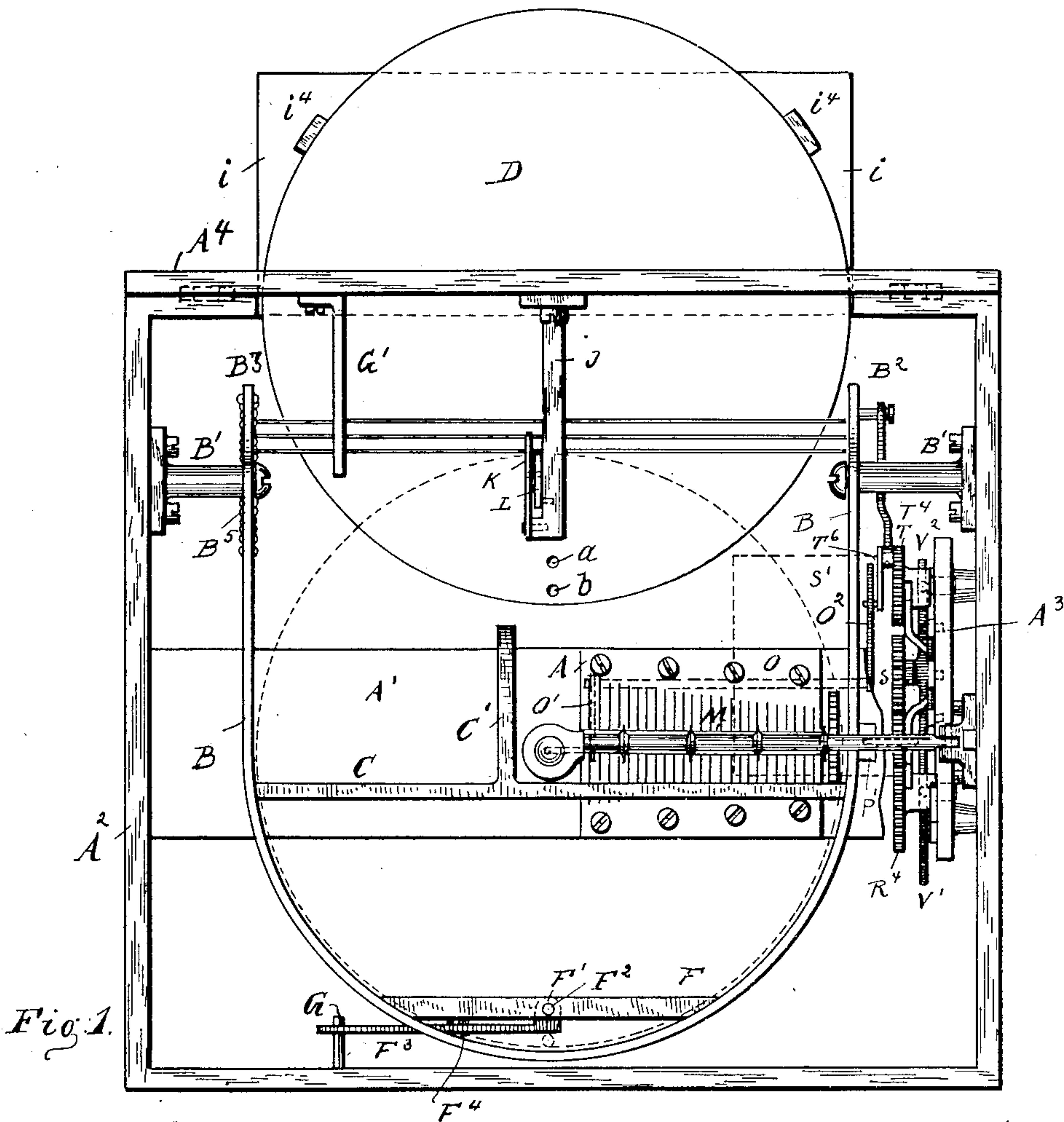


Fig. 1.

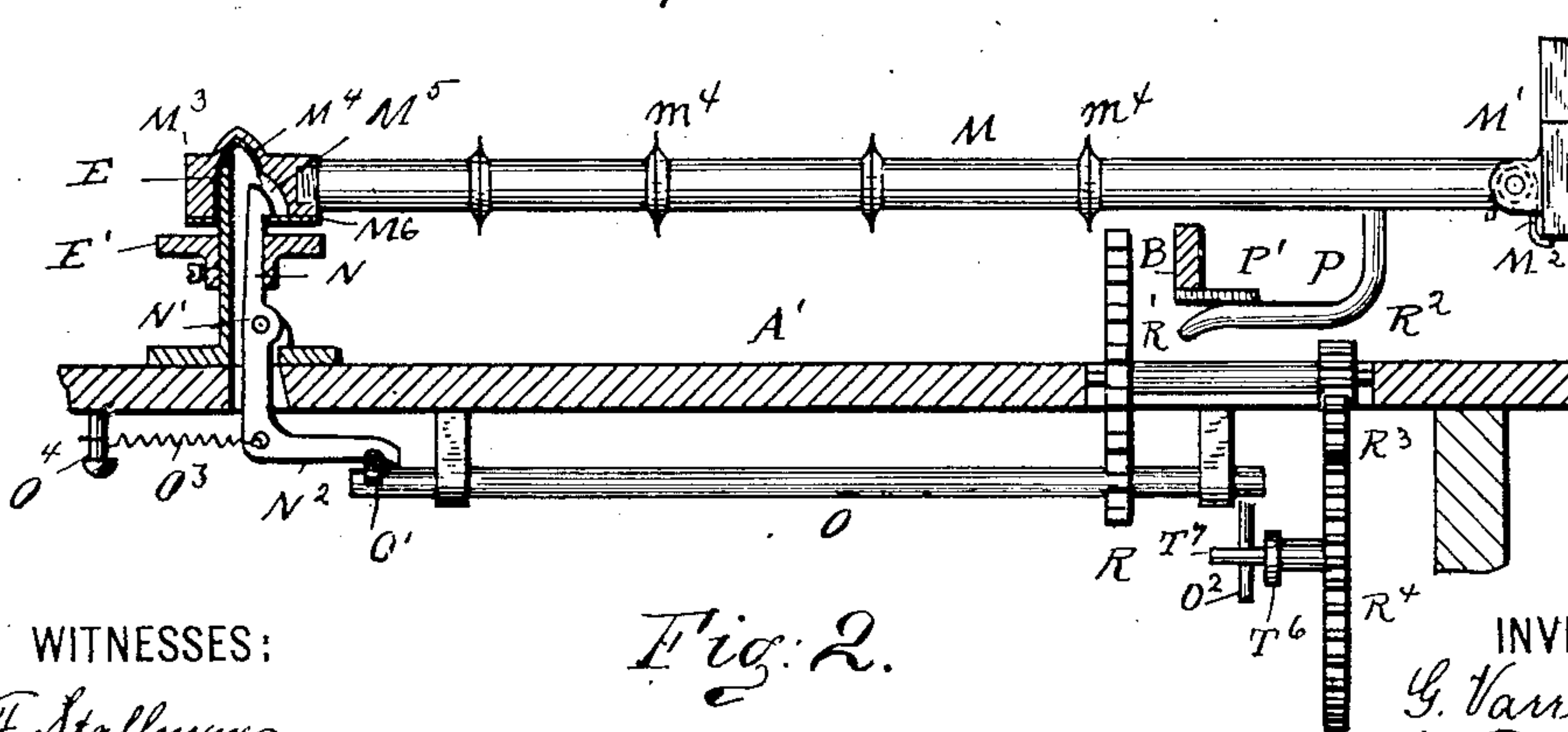


Fig. 2.

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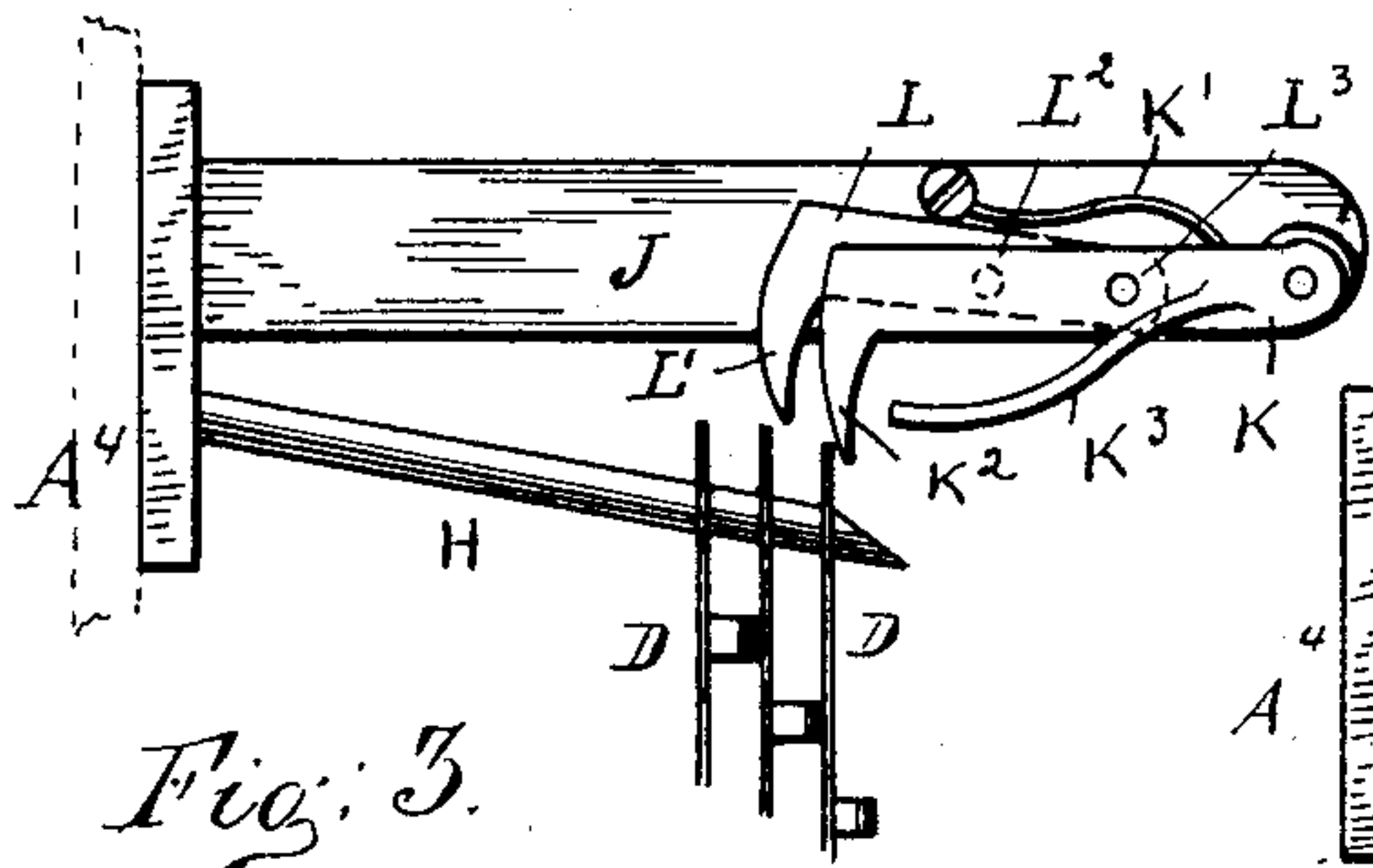


Fig. 3.

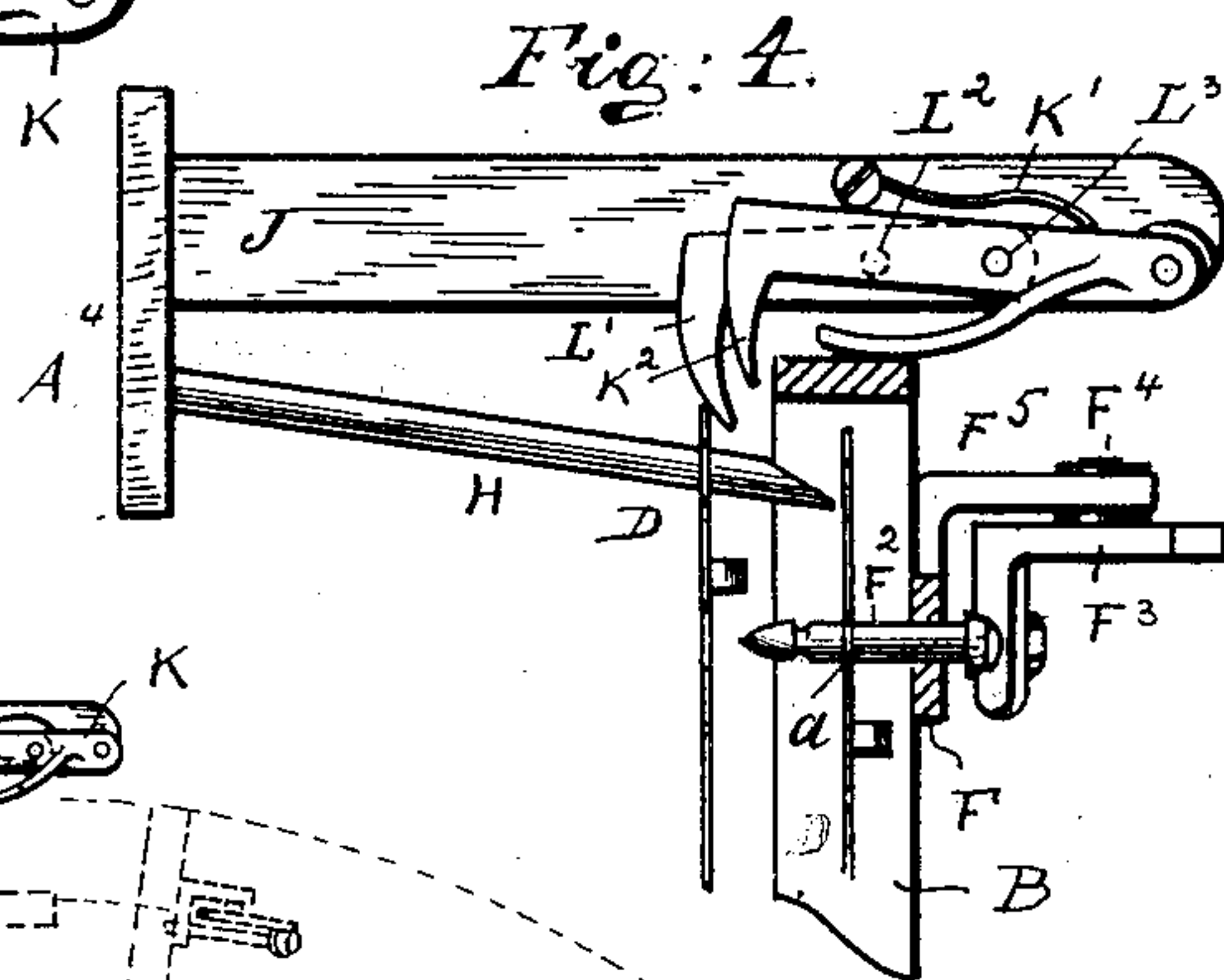


Fig. 4.

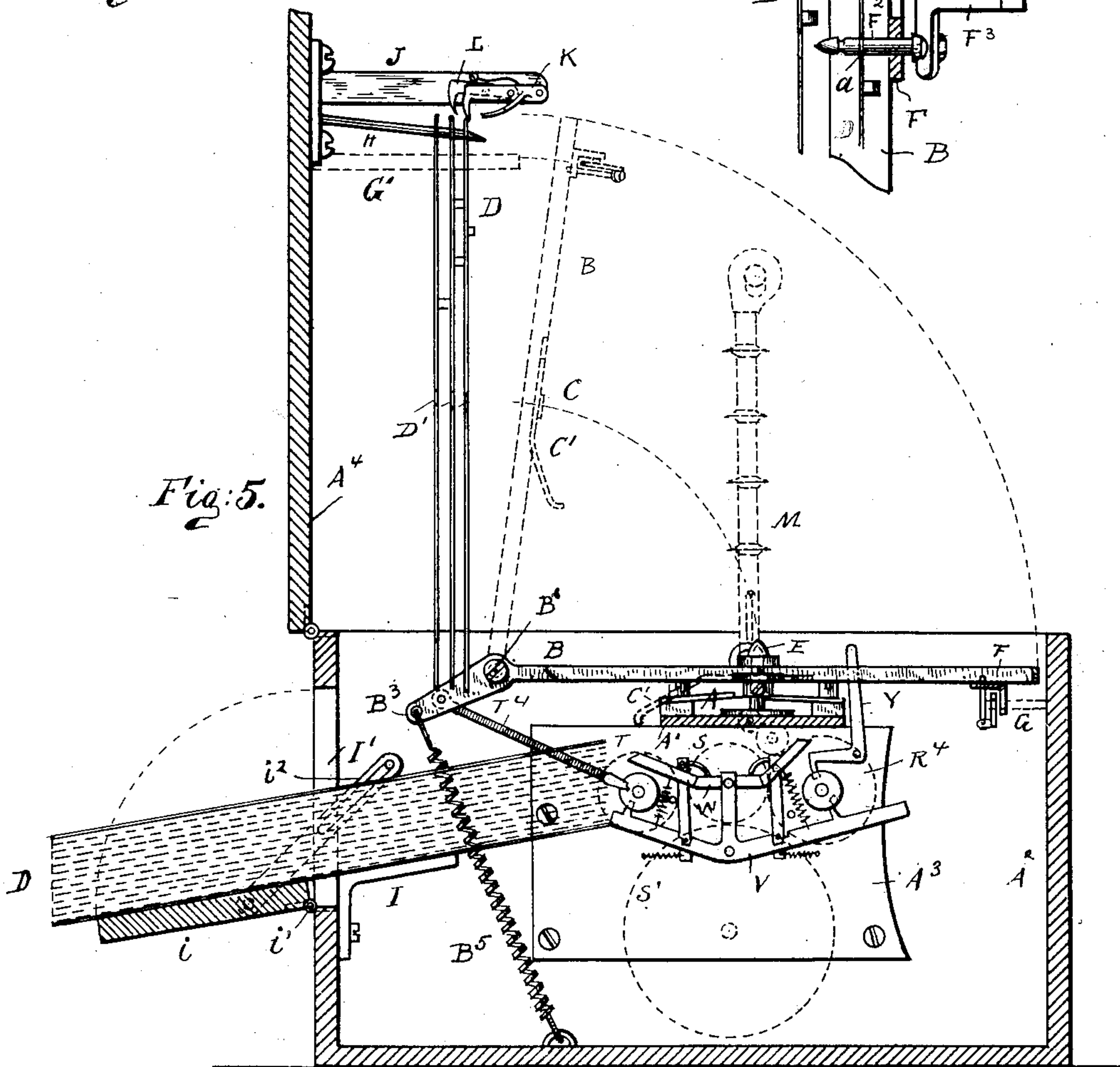


Fig. 5.

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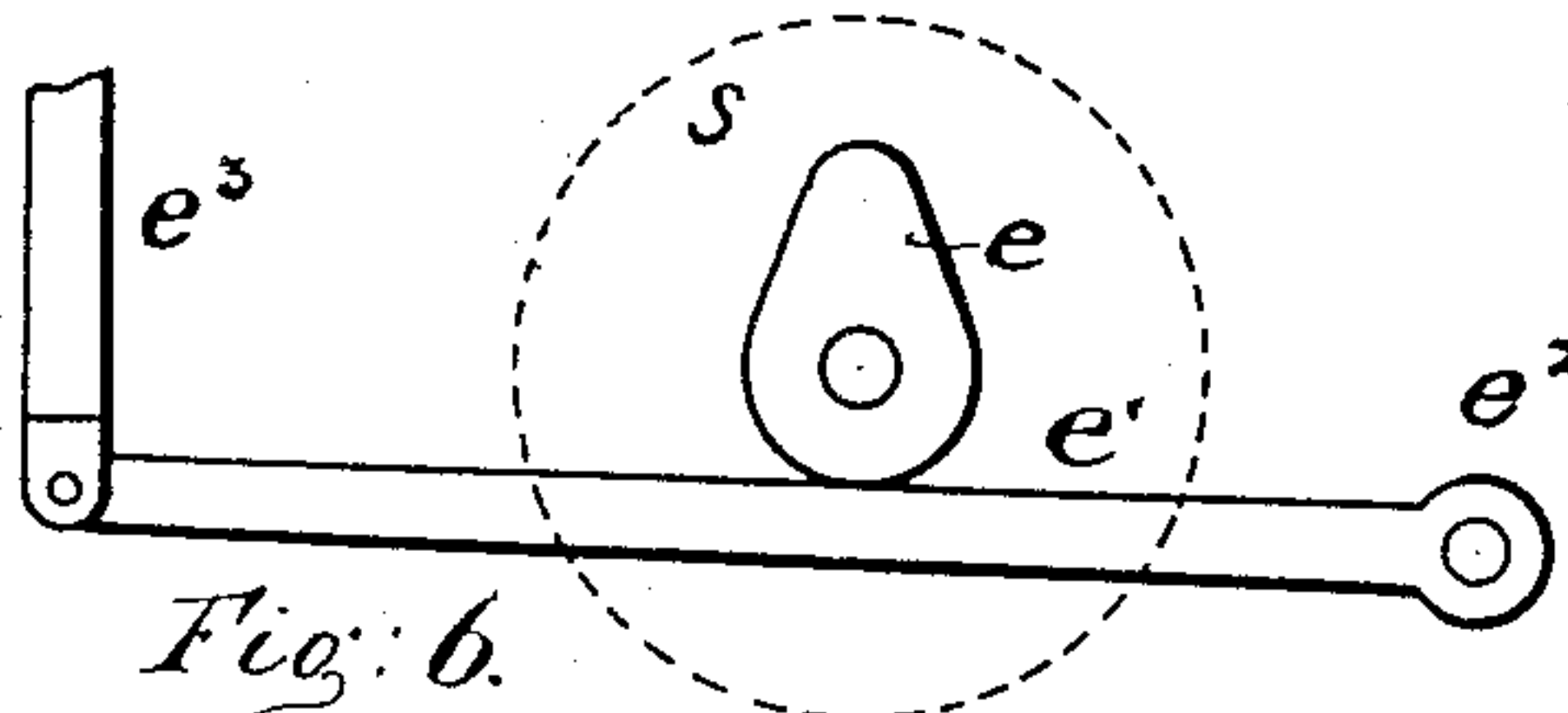


Fig. 6.

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4 Sheets—Sheet 3.

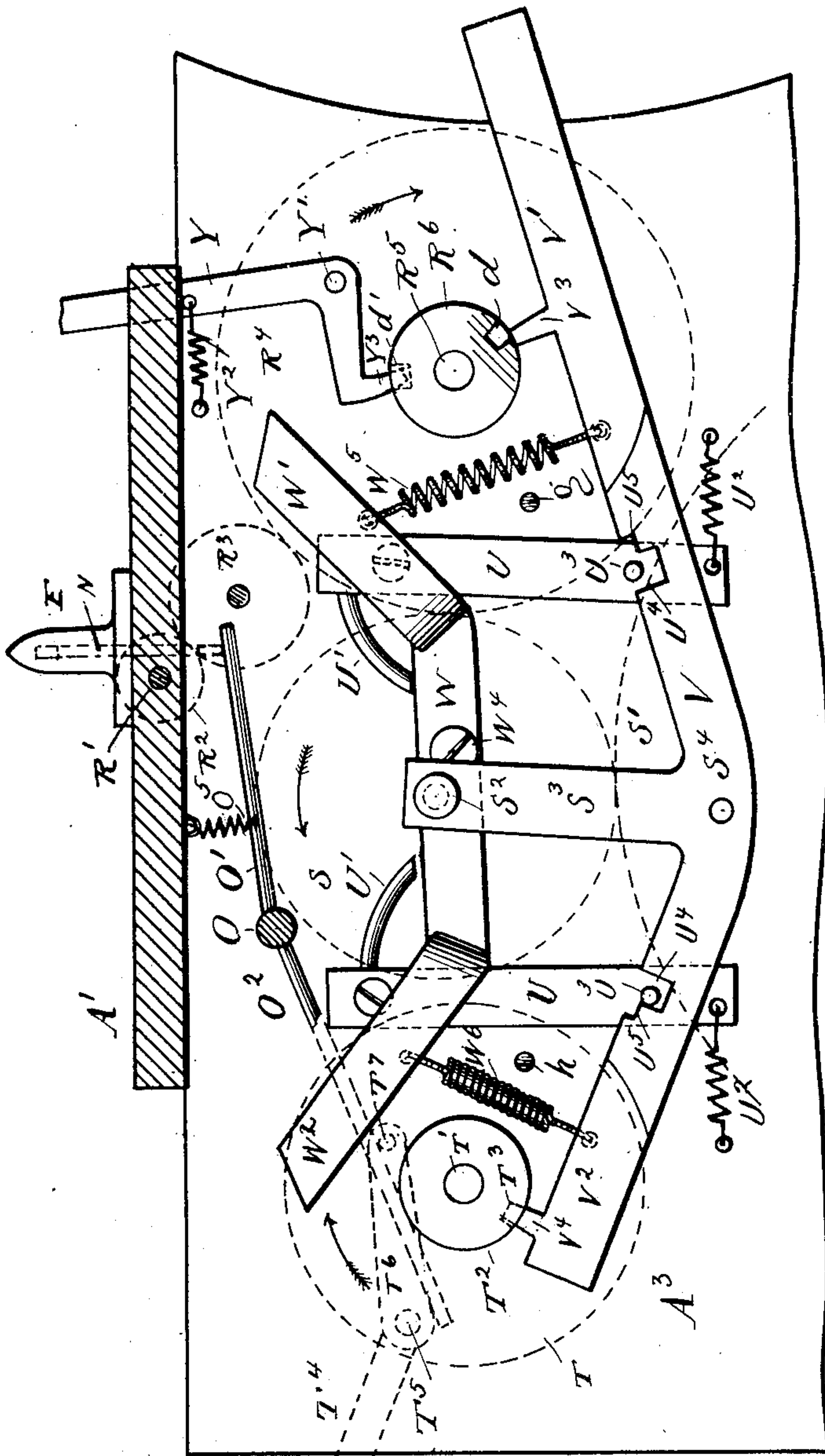


Fig. 7.

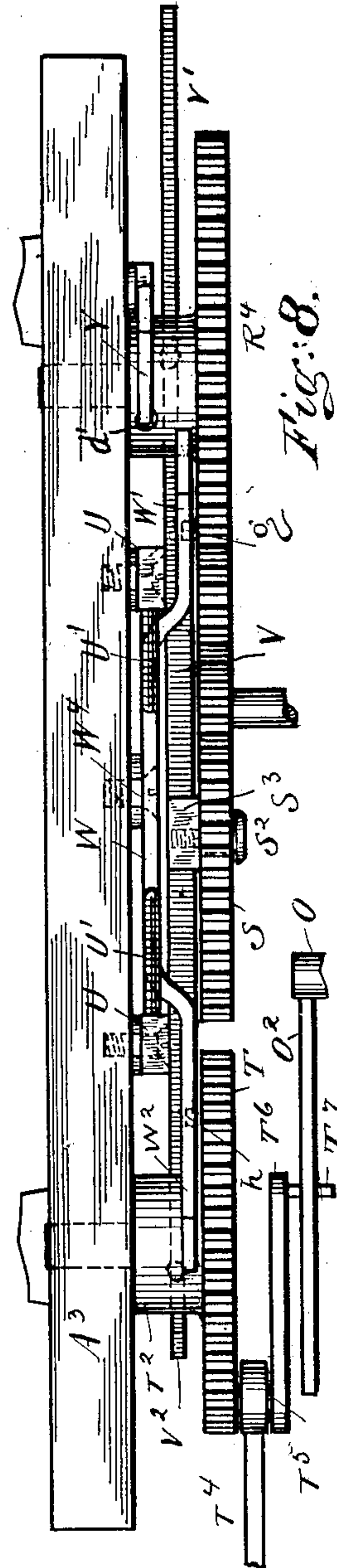


Fig. 8.

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4 Sheets—Sheet 4.

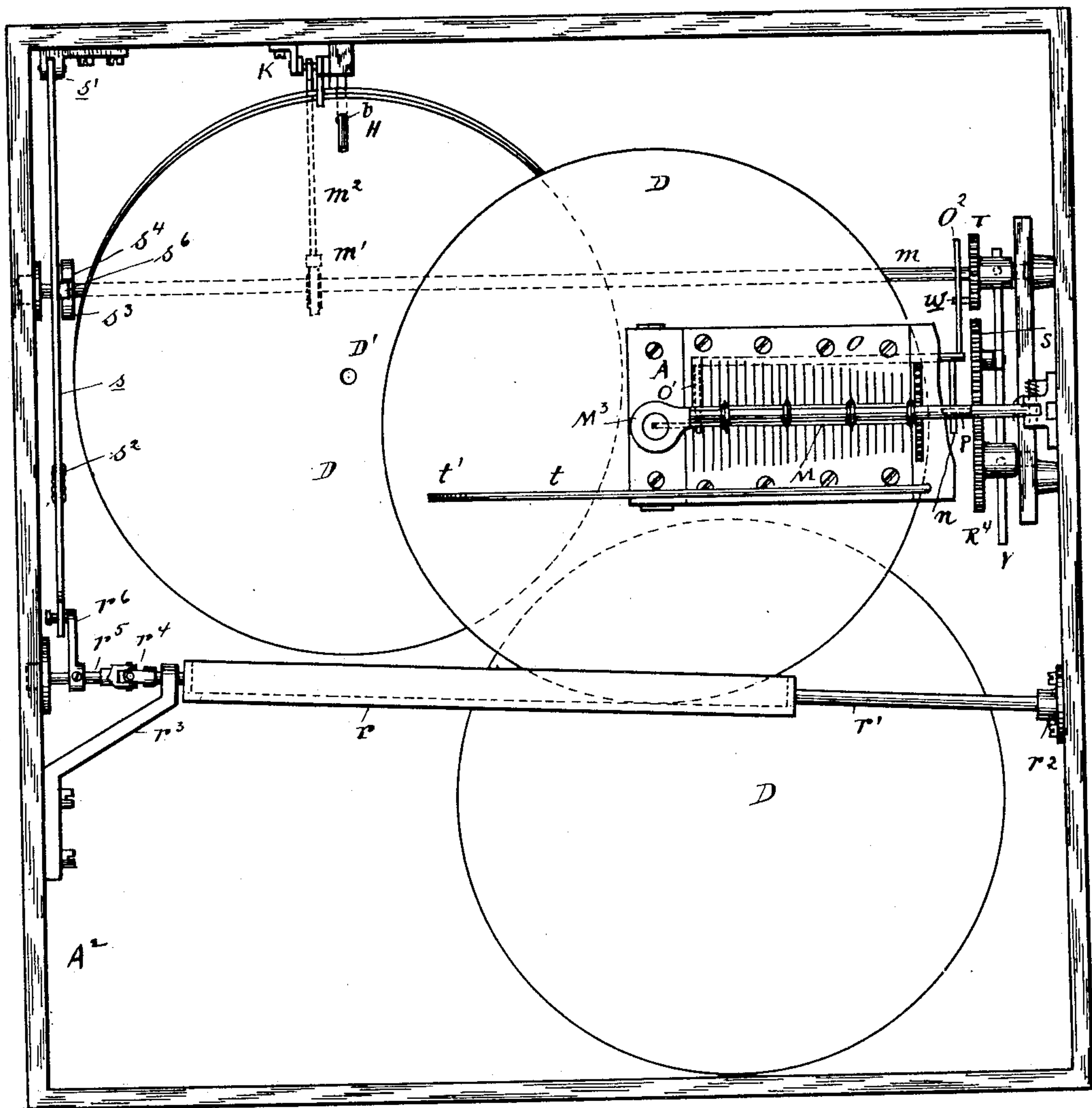


Fig. 9.

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UNITED STATES PATENT OFFICE.

GEORGE VARRELMAN AND CHARLES M. FELS, OF NEW YORK, N. Y.

MUSICAL BOX.

SPECIFICATION forming part of Letters Patent No. 661,005, dated October 30, 1900.

Application filed September 22, 1899. Serial No. 731,281. (No model.)

To all whom it may concern:

Be it known that we, GEORGE VARRELMAN, a resident of the city of New York, borough of Brooklyn, county of Kings, and CHARLES M. FELS, a resident of the city of New York, borough of Manhattan, county of New York, State of New York, citizens of the United States, have invented certain new and useful Improvements in Musical Boxes, of which the following is a specification.

This invention relates to improvements in music-boxes; and the object of our invention is to provide a new and improved music-box which is so constructed that the note-disks used for operating the music-producing mechanism are automatically brought into playing position and after having been played are automatically removed.

In the accompanying drawings, forming a part of this specification, and in which like letters of reference indicate like parts in all the views, Figure 1 is a plan view of our improved musical box, the cover being raised in position for playing. Fig. 2 is an enlarged vertical sectional view of parts of the same, showing the construction of the retaining-bar and its locking mechanism. Figs. 3 and 4 are enlarged detail views of the trigger for releasing the note-disks. Fig. 5 is a vertical transverse sectional view of the improved musical box, showing its rear end opened. Fig. 6 is a detail view showing a modification of the mechanism for raising the swing-frame. Fig. 7 is an enlarged detail side view of the mechanism for shifting the motor-wheel. Fig. 8 is a plan view of the same. Fig. 9 is a front elevation of a similar instrument having the music-combs arranged vertically.

The music-box mechanism is of the well-known construction, with one or two combs A secured on a base-plate A' and combined with star-wheels, which pick the teeth of the comb or combs and which star-wheels are operated by a rotating metal disk provided on its under side with teeth or provided with slots for operating the star-wheels. The entire mechanism is contained in a casing A², from the inner surfaces of the side walls of which two studs B' project and on which studs a U-shaped frame B is pivoted in such a manner that said frame can swing from the normal horizontal position over the base-plate

A' into a vertical position, as shown in dotted lines in Fig. 5. This frame B is provided at the end of one leg with an extension B³, to which a helical spring B⁵ is attached, which is also attached to the bottom of the casing A², so as to counterbalance the said swing-frame B.

The swing-frame B is provided at or near its center with a cross-bar C, having at or near its center an arm C', inclined downward and toward the rear for guiding the disks downward and toward the rear.

The size of the swing-frame B is such that a note-disk D fits within the rounded part of said swing-frame, as shown in dotted lines in Fig. 1, and this frame B is so mounted, constructed, and arranged that when a note-disk rests on the same and the frame and disk D are in horizontal position the central hole D' of the note-disk will register with the central pin E of the music-box mechanism, around which pin said disk is to rotate while playing. The central pin E is provided with a support E' and secured thereto and upon which support the disk D rests while rotating to operate the music-producing mechanism.

The swing-frame B is provided at its closed end with a cross-bar F, having an aperture F', through which a pin F² can pass, which is attached to one end of a lever F³, pivoted friction-tight at F⁴ to a bracket F⁵ of said cross-bar and which lever F³ extends beyond the frame B, so that it can strike against a pin G, projecting from the inner surface of the front of the box or casing A² and can also strike against a bracket G', projecting from the inner surface of the hinged cover A⁴ of the box when said cover is in vertical position, said bracket G' being so located, as appears from Fig. 1, as to be in substantially the same vertical plane of the projecting end on the lever F³. An inclined pin H projects from the inner side of the cover A⁴ near the swinging edge of the same and about at the center between the sides. Vertically above said pin a bracket J projects from the under side of said cover, and to one side of said bracket, at the free end thereof, a trigger K is pivoted, which is pressed downward by a spring K' acting on it. The trigger is provided at its free end with a rectangular, tapering, slightly-rounded, and pointed nose

K², and from the side of the trigger a downwardly-curved arm K³ extends to within a short distance from the inner edge of the nose K² at the end of said nose. A lever L, having
 5 a nose L' like the nose K² of the trigger K and slightly in advance of the same, is pivoted at L² to the bracket J in such a manner that the trigger K overlaps said lever L, and the rear end of said lever L is pivoted at L³
 10 to the trigger K.

A series of note-disks D are suspended from the inclined rod H, said rod passing through the driving-holes *b* in the rim part of the disks, which disks are held from sliding off
 15 the pin H by the above-described trigger, as shown in Figs. 3 and 4.

When the frame B is swung into vertical position, its outer edge part strikes the curved arm K³ of the trigger K and swings
 20 said trigger upward against the tension of the spring K', whereby the nose K² of the trigger is moved upward and above the edge of the front disk D on the pin H and permits this disk to slide off said pin and upon
 25 the frame B. At the same time the nose L' of the lever L is moved downward by the upward movement of the trigger and passes in front of the second note-disk D on the rod H, as is shown in Fig. 4, thus preventing
 30 said second disk from sliding off the pin H. When the frame B swings downward and the trigger is no longer held by the same in raised position, the spring K' presses the trigger downward, whereby the lever L and
 35 its nose L' are raised, and releases the second disk D on the pin H, permitting said disk to slide downward on the pin H; but at the same time that the nose L' is moved upward the nose K² of the trigger is moved downward and
 40 in front of this second note-disk D, which has taken the place of the one just removed and holds the same, as shown in Fig. 3, and so on. The retaining-bar M of the conventional construction and provided with rollers *m*⁴ in the usual manner is hinged to a
 45 plate M' on the inner surface of one side wall of the casing A² and is pressed upward by a spring M² acting on its hinged end. On the free end of the retaining-bar M a head M³
 50 is secured, which is provided on its under side with a recess M⁴ for receiving the upper end of the central pin E and with a lateral recess M⁵ for receiving the hooked upper end of a latch N, pivoted in a vertical slot in the
 55 central pin E at N'. A helical spring O³ has one end attached to the lower end of the latch N and the other end to a pin O⁴ on the under side of the base-plate A', which spring tends to press the upper hooked end of the latch N
 60 into the lateral recess M⁵ in the head M³, so as to engage the apertured plate M⁶, secured to the under side of the head M³.

The latch N is provided at its lower end with an arm N², which rests upon the arm O' of a rock-shaft O, journaled beneath the base-plate A', and provided at the opposite end
 65 with an arm O², extending in the direction

opposite to that of the arm O'. A helical spring O⁵, attached to the arm O' and to the under side of the base-plate A', pulls said arm
 70 upward.

The retaining-bar M is provided near its hinged end and on its under side with an L-shaped arm P, which extends under an outwardly-extending plate P' on the under side
 75 of the swing-frame B when both of the parts are in lowered position, as shown in Fig. 2.

The driving-wheel R for rotating the note-disk D by engaging holes *b* along the edges of the same is fixed on a shaft R', carrying a
 80 pinion R², engaged by an intermediate cog-wheel R³, which in turn is engaged with the cog-wheel R⁴, mounted to rotate on the stud R⁵ on the side plate A³ of the mechanism. The cog-wheel R⁴ has a central hub or neck
 85 R⁶, provided with two opposite holes or recesses *d* and *d'*, Fig. 7.

From the barrel S' (shown in dotted lines) of a spring-motor of any well-known kind a cog-wheel S is driven, which wheel is cen-
 90 trally pivoted at S² on the upper end of the central member S³ of an inverted-T-shaped lever V, pivoted at S⁴ to the side plate A³.

A cog-wheel T is mounted to turn on a stud T', projecting from the side plate A³, and is
 95 provided with a hub or neck T², having a hole T³. A link T⁴ is pivoted by the stud T⁵ to the side of the wheel T, and its opposite end is pivoted to the end of an arm B² of the swing-frame B. An arm T⁶ extends from the
 100 stud T⁵ to a point slightly beyond the periphery of the hub or neck T², and from the free end of said arm T⁶ a pin T⁷ projects laterally under the arm O² of the rock-shaft O.

A substantially U-shaped lever W, having
 105 upwardly and outwardly inclined end arms W' and W², is pivoted friction-tight to the side plate A³ at W⁴, and its arms W' and W² are connected by the helical springs W⁵ and W⁶ with the opposite arms V' and V², re-
 110 spectively, of the lever V, which arms V' and V² are provided on the upper edges with the studs or teeth V³ and V⁴, which can pass into the holes *d* and T³ of the hubs or necks R⁶ and T² of the wheels R⁴ and T, respectively.
 115 A straight lever U is pivoted near its upper end and near the lower end of each inclined arm W' and W² of the lever W to the side plate A³ and is located between the said arms W' and W² and the side plate A³. A
 120 curved arm U' extends from the upper end of each lever U to the upper edge of the straight portion of the lever W, but is not connected with said lever W. A helical spring
 125 U² is attached to the lower end of each pivoted lever W and to the side plate A³ and pulls the lower end of each of said levers U outward, so that the curved arms U' U' are pressed toward the upper edge of the lever W. A pin U³ extends laterally from the lower
 130 end of each lever U through a recess U⁴ in the upper edge of the corresponding arm V' or V² of the lever V, and each recess has a shoulder or offset U⁵ in its outer side edge.

A pin h projects from the inner side of the wheel T to act on the bottom edge of the inclined arm W^2 of the lever W , and a pin g projects from the inner side of the wheel R^4 to act on the bottom edge of the inclined arm W' of the lever W . The stopping and starting lever Y is pivoted at Y' to the side plate A^3 , and a spring Y^2 is attached to the said lever Y and to the side plate A^3 and serves for pressing the tooth Y^3 on the lower end of said lever Y upon the periphery of the hub or neck R^6 of the wheel R^4 .

A bracket I , slightly inclined, is attached to the inner surface of the rear wall of the box or casing A^2 , and this rear wall is provided with an opening I' , which can be closed by a door i , hinged at i' to open downward and outward and when held in open position by the brace i^2 to form an outer continuation of the bracket I and with the latter a support for the discharged note-disks D , as shown in dotted lines in Fig. 5. The door i has two stops i^4 .

In place of the mechanism shown and described for swinging up the frame B the construction shown in Fig. 6 may be used, and the same consists of a cam e on the shaft of the wheel S , which cam acts on a lever e' , fulcrumed at one end, as at e^2 , and having its opposite end connected by a pivoted link e^3 with the arm B^2 of the swing-frame B .

In the construction shown in Fig. 9 the disks D at all times are held vertically, the combs A are mounted in a vertical plane, and the retaining-bar M is mounted to swing outward horizontally. The wheels S , R^4 , and T are mounted in the manner previously described and as shown in Figs. 7 and 8, with the difference that in the construction shown in Fig. 9 the wheel T is fixed on a shaft m , extending entirely across the casing and carrying an eccentric m' , which operates a rod m^2 for tripping the trigger mechanism K described in substantially the same manner as the swing-frame B does it. The retaining-bar M has the hook P , previously described; but in this construction an arm n of the shaft O passes over said hook. A shelf r is secured on an inclined shaft r' , mounted at one end in a step-bearing r^2 on a side wall of the casing A^2 and on the other end in a bracket r^3 on the other side wall, and the latter end of the shaft r' is connected by a universal joint r^4 with a short horizontal shaft r^5 , having a crank r^6 , which is engaged with the swinging end of a lever s , pivoted at its upper end s' to the casing A^2 and pressed by a spring s^2 against a cam-disk s^3 on the shaft m , which cam-disk s^3 has a shoulder or offset s^4 in its rim. A guide-rod t extends longitudinally over the bottom part of one comb A and has its free end t' bent outward, so as to guide the note-disks D to the combs, the disks being held between said guide-rod t and the combs.

The operation is as follows: Referring to the construction shown in Figs. 1 to 5 and

Figs. 7 and 8, a number of note-disks D —say from ten to fifteen or more—are placed upon the inclined pin H in such a manner that the note projections on the disks are to the front, the cover A^4 being raised, as shown in Fig. 5. To start the instrument, the starting and stopping lever Y , Fig. 7, is moved to the right, so as to withdraw the tooth Y^3 on its lower end from the hole d' in the hub or neck R^6 of the wheel R^4 , which wheel at once begins to rotate in the direction of its arrow, Fig. 7. When the wheel R^4 has rotated but a very short distance, the hole d in the hub or neck R^6 arrives at the tooth V^3 of the lever V , and under the action of the spring W^5 , which is in greater tension than the spring W^6 , the tooth V^3 is forced into the hole d , whereby the right-hand arm V' of the lever V is swung upward and the central member S^3 of the lever V is moved to the left, and thereby the wheel S is disengaged from the locked wheel R^4 and engaged with the wheel T , which it rotates in the direction of its arrow. Thereby the arm B^2 of the swing-frame B is pulled downward by means of the link T^4 and the swing-frame B swung into vertical position. As the frame B swings up it also carries up with it the retaining-bar M , which has been unlocked from the central pin E . It will be observed that as the wheel T begins to rotate in the direction of its arrow the pin T^7 begins to move from under the arm O^2 of the rock-shaft O , permitting the spring O^5 to pull upward the arm O' of the rock-shaft O , which acting on the outer end of the arm N^2 of the latch N presses the arm upward, thereby disengaging the hooked upper end of the latch N from the plate M^5 on the head M^3 . The spring O^5 holds the parts in this position until the wheel T has almost completed its revolution—that is, until the pin T^7 lifts the arm O^2 —by which time the frame B has been swung down, a note-disk brought into playing position, and the retaining-bar M swung down, as will appear shortly. When the swing-frame B arrives at the vertical position, as indicated in dotted lines in Fig. 5, a disk D slides off the pin H in the manner already described upon the frame B , and at the same time the pin F^2 on the lever F^3 is passed through the hole a in the said disk as the outer end of the lever F^3 strikes against the bracket G' , whereby the other end, carrying the pin F^2 , is moved toward the inner side of the raised cover A^4 and the pin passed through the hole a . The swing-frame B is then swung down, and the pin F^2 holds the note-disk just removed from the pin H in place on said frame. As the swing-frame descends the plate P' on the same engages the hook P on the retaining-bar M and swings the latter down, and as by this time the pin T^7 has raised the arm O^2 and lowered the arm O' of the rock-shaft O , and thereby released the catch N , the latter locks the retaining-bar M in place. By this time the pin h on the wheel T has arrived at the bottom edge of the arm W^2 of the

lever W and raised the same, whereby the spring W⁶ has been brought in greater tension, and as the opposite arm W' has been swung down the tension of the spring W⁵ is reduced, and when the hole T³ in the hub or neck T² arrives at the tooth V⁴ on the arm V² of the lever V the said tooth snaps into the hole T³ under the action of the spring W⁶, and thus the arm S³ of the lever V is swung to the right and the wheel S disengaged from the wheel T and engaged with the wheel R⁴, which begins to rotate and operates, by means of the intermediate gearing, the driving-wheel R, which rotates the disk D on the frame B, and thus the music-producing devices are operated. The tooth V³ is withdrawn from the hole d in the hub or neck R⁶ of the wheel R⁴ at the same time the tooth V⁴ snaps into the hole T³. After a short time the pin g on the wheel R⁴ strikes the bottom edge of the arm W' of the lever W and raises this arm and brings the spring W⁵ in tension, at the same time slackening the spring W⁶, and so on the wheels R⁴ and T are rotated alternately to rotate a disk and operate the swing-frame B until the lever Y is adjusted to cause its tooth Y³ to snap into the hole d' of the hub or neck R⁶ at the end of a tune, whereby the entire mechanism is stopped. When either end of the lever W is swung up, it permits the spring U² of the opposite lever U to pull the lower end of said lever outward and to bring the pin U³ of said lever upon the shoulder U⁵ of the corresponding notch N⁴, thus locking the lever V in place for the time being. For example, when the tooth V³ snaps into the hole d of the hub or neck R⁶ on the wheel R⁴ the arm V² swings downward and the pin U³ on the left-hand lever U is drawn by the spring U² of said left-hand lever U upon the shoulder U⁵ on the arm V² of the lever V, whereby said lever is temporarily locked in place. The other lever U is held in place by the raised part of the lever W, which bears against the arm U' of said other lever U. When the left-hand arm W² of the lever W is raised by the pin h on the wheel T, the pin U³ on the left-hand lever U is withdrawn from the shoulder U⁵ on the arm V² of the lever V and the right-hand lever U is released, so that when the tooth V⁴ snaps into the hole T³ in the hub T² the right-hand pin U³ is drawn by its spring U² upon the shoulder U⁵ on the arm V' of the lever V. Fig. 7 shows the parts in intermediate position—that is, not locked by either pin U³, as the pins only lock the lever V when the mechanism is in operation and not when at rest, as shown in Fig. 7. Attention is called to the fact that the lock thus formed prevents the lever V from interfering with the wheel T or R⁴, that is rotated at the time being, and prevents accidental rotation of the other wheel. When the swing-frame B swings down, the outer end of the lever F³ strikes against the pin G and is moved upward, whereby the end carrying the pin F² is moved

downward, and the pin F² is thus withdrawn from the hole a in the disk D on the swing-frame B, leaving said disk free to rotate. When the swing-frame B rises, the disk D on the same and which has just completed a rotation slides off the rear part of said swing-frame and upon the bracket I and the door i or upon a disk previously deposited on said bracket.

Referring now to the modified construction shown in Fig. 9, the operation is as follows: When the mechanism is started and the wheel T rotated in the manner described, the pin w on the wheel T releases the arm O² of the shaft O and the head of the retaining-bar M is unlocked from the central pin E in the manner previously described, and at the same time the retaining-bar M is thrown outward slightly, but sufficiently to release the disk D, that has just been rotated, and at the same time the tooth or projection s⁶ of the lever s drops off the offset s⁴ of the cam-disk s³, and thereby the shelf r is tilted toward the rear and the disk D slides edgewise off the same to the bottom of the casing, as shown by one disk D in Fig. 9, and then the shelf r is immediately brought back into its original position. By that time the rod m² has tripped the latch K and one disk D is released from the pin H and drops edgewise upon the shelf r, down which it rolls, and while so rolling is guided by the rod t, the fixed end of which forms a stop to hold the disk in the proper position. By this time the pin w on the wheel T moves outward the arm O² of the rock-shaft O, and the arm n and O' of this rock-shaft are moved inward. The arm n by acting on the L-shaped arm P of the retaining-bar M presses said arm against the disk, which retaining-bar is then locked in place by the latch N in the manner previously described. The wheel R⁴ is then rotated in the manner previously described and the disk D rotated around the central pin E, and so on.

Having described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a musical box, the combination with a music-producing mechanism, adapted to be operated by a rotating note-disk, of a frame mounted to swing toward and from the music-producing mechanism and to convey a note-disk upon said mechanism, substantially as herein shown and described.

2. In a musical box, the combination with a music-producing mechanism, adapted to be operated by a rotating note-disk, of a frame mounted to swing toward and from the music-producing mechanism and to convey a note-disk upon said mechanism, which frame is closed at the swinging end and open at the hinged end, substantially as herein shown and described.

3. In a musical box, the combination with a music-producing mechanism, adapted to be operated by a rotating note-disk, of a frame mounted to swing toward and from the music-

producing mechanism and to convey a note-disk upon said mechanism, and a cross-bar on said frame, substantially as herein shown and described.

5 4. In a musical box, the combination with a music-producing mechanism, adapted to be operated by a rotating note-disk, of a frame mounted to swing toward and from the music-producing mechanism and to convey a note-disk upon said mechanism, a cross-bar on said frame and an inclined arm extending from said cross-bar toward the hinged end of the frame, substantially as herein shown and described.

15 5. In a musical box, the combination with a music-producing mechanism, adapted to be operated by a rotating note-disk, of a frame mounted to swing toward and from the music-producing mechanism and to convey a note-disk upon said mechanism, and a balancing-spring attached to an arm at the hinged end of said frame, substantially as herein shown and described.

25 6. In a musical box, the combination with a music-producing mechanism, adapted to be operated by a rotating note-disk, of a frame mounted to swing toward and from the music-producing mechanism and to convey a note-disk upon said mechanism and a motor for operating said frame, substantially as herein shown and described.

30 7. In a musical box, the combination with a music-producing mechanism, adapted to be operated by a rotating note-disk, of a frame mounted to swing toward and from the music-producing mechanism and to convey a note-disk upon said mechanism, a motor, gearing for operating said frame, gearing for rotating a note-disk for operating the music-producing mechanism, and means for throwing the motor in gear alternately with the frame-operating gear, and the music-mechanism-operating gear, substantially as herein shown and described.

45 8. In a musical box, the combination with a music-producing mechanism, adapted to be operated by a rotating note-disk, of a frame mounted to swing toward and from the music-producing mechanism and to convey a note-disk upon said mechanism, which frame is open at the rear end to permit the disk being lifted by the frame to slide off the frame and a support for receiving said sliding disk, substantially as herein shown and described.

55 9. In a musical box, the combination with a music-producing mechanism, adapted to be operated by a rotating note-disk, of a frame mounted to swing toward and from the music-producing mechanism and to convey a note-disk upon said mechanism, and a pin from which a series of note-disks can be suspended vertically, a trigger mechanism for holding the note-disks on the said pin and releasing them singly substantially as herein shown and described.

65 10. In a musical box, the combination with a music-producing mechanism, adapted to be

operated by a rotating note-disk, of a frame mounted to swing toward and from the music-producing mechanism and to convey a note-disk upon said mechanism, a pin on the swinging end of said frame, for holding a disk, while the same moves downward with and on the frame, substantially as herein shown and described.

75 11. In a musical box, the combination with a music-producing mechanism, adapted to be operated by a rotating note-disk, of a frame mounted to swing toward and from the music-producing mechanism and to convey a note-disk upon said mechanism, a pin on the swinging end of said frame, for holding a disk, while the same moves downward with and on the frame, and means for projecting said pin when the frame arrives at the vertical position and means for withdrawing said pin when the frame arrives in the horizontal position, substantially as herein shown and described.

80 12. In a musical box, the combination with a music-producing mechanism, adapted to be operated by a rotating note-disk, of a frame mounted to swing toward and from the music-producing mechanism and to convey a note-disk upon said mechanism, a pin on the swinging end of said frame, for holding a disk, while the same moves downward with and on the frame, and means for withdrawing said pin, when the frame arrives in lowered position, substantially as herein shown and described.

90 13. In a musical box, the combination with a music-producing mechanism, adapted to be operated by a rotating note-disk, of a frame mounted to swing toward and from the music-producing mechanism and to convey a note-disk upon said mechanism, a lever pivoted on the swinging end of the frame, a pin on one end of said lever, which pin can be projected through the frame to project from the inner side of the same, and a projection for tripping said lever when the frame arrives in lowered position to withdraw said pin, substantially as herein shown and described.

115 14. In a musical box, the combination with a music-producing mechanism, adapted to be operated by a rotating note-disk, of a frame mounted to swing toward and from the music-producing mechanism and to convey a note-disk upon said mechanism, a lever pivoted on the swinging end of the frame, a pin on the inner end of said lever, which can be projected through the frame, a projection for tripping the outer end of said lever when the frame arrives at the raised position and a projection for tripping the outer end of the lever when the frame arrives at the lowered position, substantially as herein shown and described.

125 15. In a musical box, the combination with a music-producing mechanism, adapted to be operated by a rotating note-disk, of a pin for holding a series of note-disks suspended, a trigger having a projection for holding the disks on said pin, the trigger being so mounted that the projection can be raised, a lever operated by the trigger to move in opposite di-

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rection and also serving to hold disks on said pin, substantially as herein shown and described.

16. In a musical box, the combination with
5 a music-producing mechanism, adapted to be operated by a rotating note-disk, of a pin for holding a series of note-disks, a trigger-lever pivoted to a suitable support and having its
10 free end near the end of said pin, a lever pivoted to the trigger-lever and to the support and also having its free end near the end of said pin and means for operating said trigger mechanism, substantially as herein shown and described.

17. In a musical box, the combination with
15 a music-producing mechanism, adapted to be operated by a rotating disk, of a pivoted retaining-bar, a central pin around which the disk rotates, and a latch in said central pin
20 for locking the free end of the retaining-bar, substantially as herein shown and described.

18. In a musical box, the combination with
25 a music-producing mechanism, adapted to be operated by a rotating disk, of a pivoted retaining-bar, a central pin around which the disk rotates, and a latch in said central pin for locking the free end of the retaining-bar and means for opening the latch automatically when the disk is to be removed, substan-
30 tially as herein shown and described.

19. In a musical box, the combination with
35 a music-producing mechanism, adapted to be operated by a rotating disk, of a pivoted retaining-bar, a central pin around which the disk rotates, and a latch in said central pin for locking the free end of the retaining-bar, means for exchanging the note-disks and de-
40 vices for opening said latch in the central pin from the note-disk-exchanging means, substantially as herein shown and described.

20. In a musical box, the combination with
45 a music-producing mechanism adapted to be operated by rotating note-disks of a motor, gearing for rotating the note-disks from said motor, mechanism for automatically placing
50 note-disks into playing position in relation to the music-producing mechanism, gearing for operating said note-disk-exchanging mechanism from the motor, alternately with the
55 music-producing mechanism, a pin, from which the supply of note-disks is suspended, a trigger for releasing them singly which trigger is operated by the note-disk-exchanging mechanism, substantially as herein shown and described.

21. In a musical box, the combination with
60 a music-producing mechanism, adapted to be operated by rotating note-disks, of a motor, a cog-wheel driven by the motor and mounted on a pivoted frame to swing to either side,
65 a cog-wheel pivoted on a plate of the music-box frame at each side of the swinging wheel and adapted to be engaged therewith, one of said cog-wheels operating the music-producing mechanism and the other a note-disk-exchanging mechanism, a hub on each cog-wheel

on the plate, each hub having a hole and two teeth on the lever on which the swinging cog-wheel is pivoted, a separate spring acting on each end of said pivoted lever and means for
70 alternately bringing the two springs in tension, substantially as herein shown and described.

22. In a musical box, the combination with
75 a music-producing mechanism, adapted to be operated by rotating note-disks, of a motor, the cog-wheel S driven by the motor and adapted to engage the cog-wheels T and R⁴ having the hubs T² and R⁶ having holes T³ and d, the pivoted inverted-T-shaped lever
80 V carrying the cog-wheel S and having the teeth V³ V⁴, the U-shaped lever W, pivoted friction-tight, the springs W⁵ and W⁶ connecting the levers V and W, and the pins g and h on the cog-wheels R⁴ and T respec-
85 tively, substantially as herein shown and described.

23. In a musical box, the combination with
90 a music-producing mechanism, adapted to be operated by rotating note-disks, of a motor, the cog-wheel S driven by the motor and the cog-wheels T and R⁴ adapted to be engaged by the wheel S, said wheels T and R⁴ having the hubs T² and R⁶ having holes T³ and d, the pivoted inverted-T-shaped lever
95 V carrying the cog-wheel S and having the teeth V³, V⁴, the U-shaped lever W pivoted friction-tight, the springs W⁵ and W⁶ connecting the levers V and W and the pins g and h on the cog-wheels R⁴ and T respectively,
100 and means for automatically locking the lever V in place to prevent displacements of parts, substantially as herein shown and described.

24. In a musical box, the combination with
105 a music-producing mechanism, adapted to be operated by rotating note-disks, of a motor, the cog-wheel S driven by the motor, the cog-wheels T and R⁴ having the hubs T² and R⁶ provided with holes T³ and d, the inverted-T-shaped lever V carrying the wheel S and
110 having pins V³ V⁴ and shouldered recesses U⁴, the pivoted lever W, the springs W⁵ W⁶, connecting the levers W and V, the pivoted locking-levers U, the pins U³ on the same, the arms U' on said levers U and the springs
115 U², substantially as herein shown and described.

25. In a musical box, the combination with
120 a motor, of a disk-rotating mechanism driven from said motor, a disk-exchanging mechanism driven from said motor, a pivoted disk-retaining bar, a central pin for rotating note-disks, an automatic latch in said central pin for locking the free end of the retaining-bar, and means for holding said latch in inoper-
125 ative position while the motor operates the disk-exchanging mechanism, substantially as herein shown and described.

26. In a musical box, the combination with
130 a casing having a hinged cover, of music-producing mechanism in the casing, a disk-suspending pin on the inner side of the cover,

a trigger mechanism for releasing the disks
singly from said pin, a swinging frame for
receiving the released disks and conveying
them upon the playing mechanism and means
5 for operating said frame, substantially as
herein shown and described.

Signed at New York city, in the county of

New York and State of New York, this 12th
day of September, A. D. 1899.

GEO. VARRELMAN.

CHARLES M. FELS.

Witnesses:

OSCAR F. GUNZ,

N. M. FLANNERY.