

(No Model.)

3 Sheets—Sheet 1.

F. STONE.

MECHANICAL MUSICAL INSTRUMENT.

No. 245,238.

Patented Aug. 2, 1881.

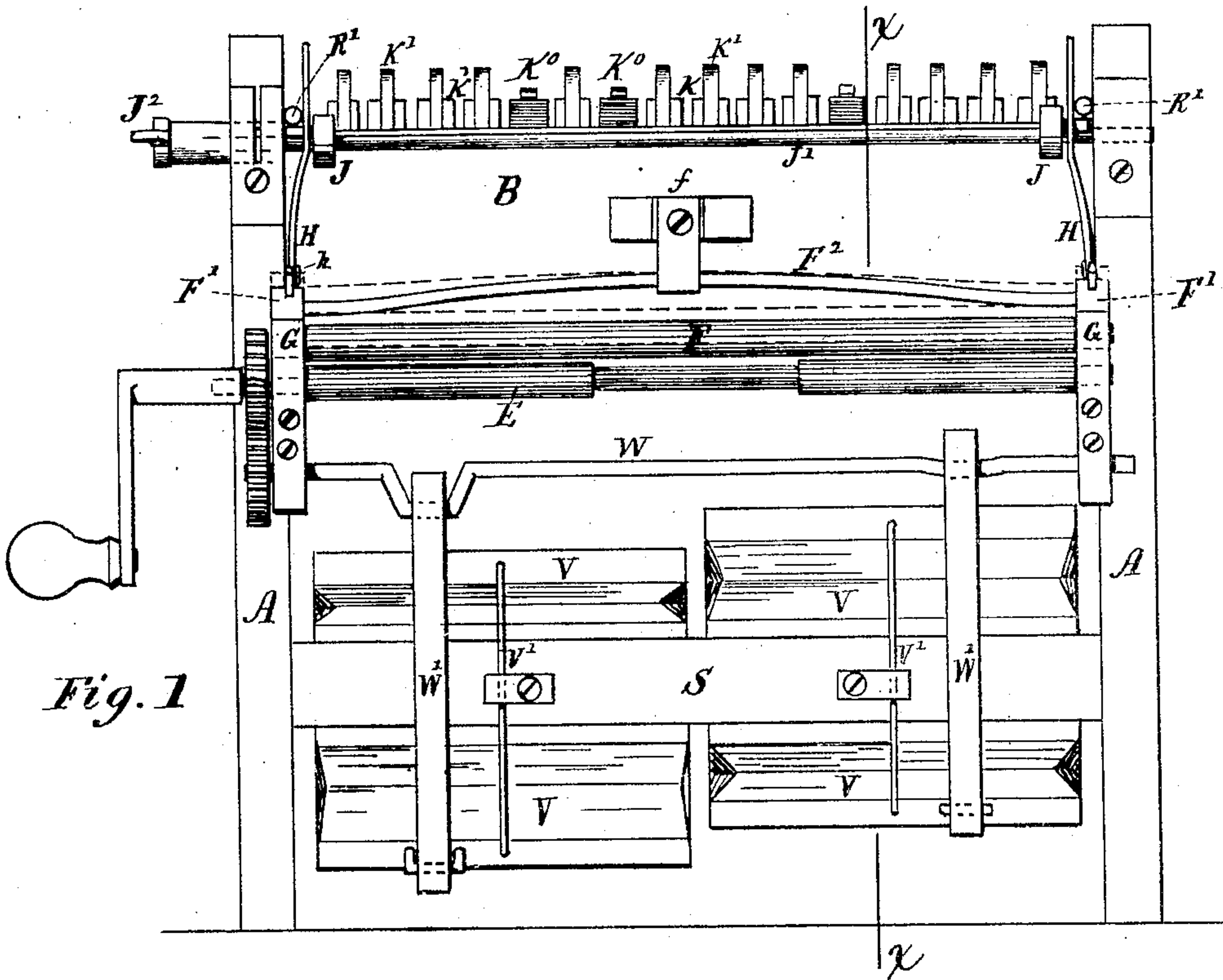


Fig. 1

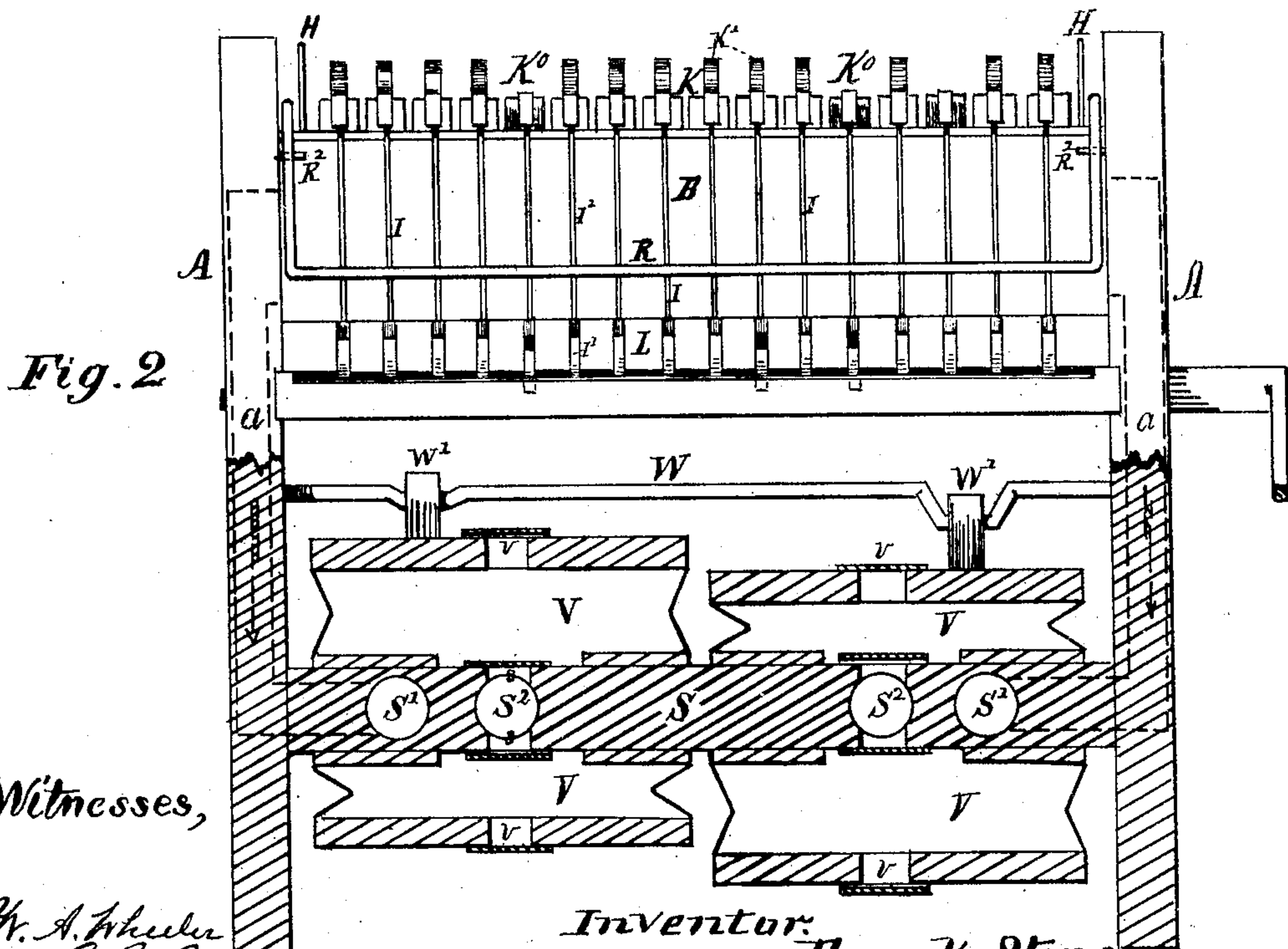


Fig. 2

Witnesses,

W. A. Wheeler
S. R. Patton

Inventor.

Frank Stone
By Chas H. Burlingame Atty

(No Model.)

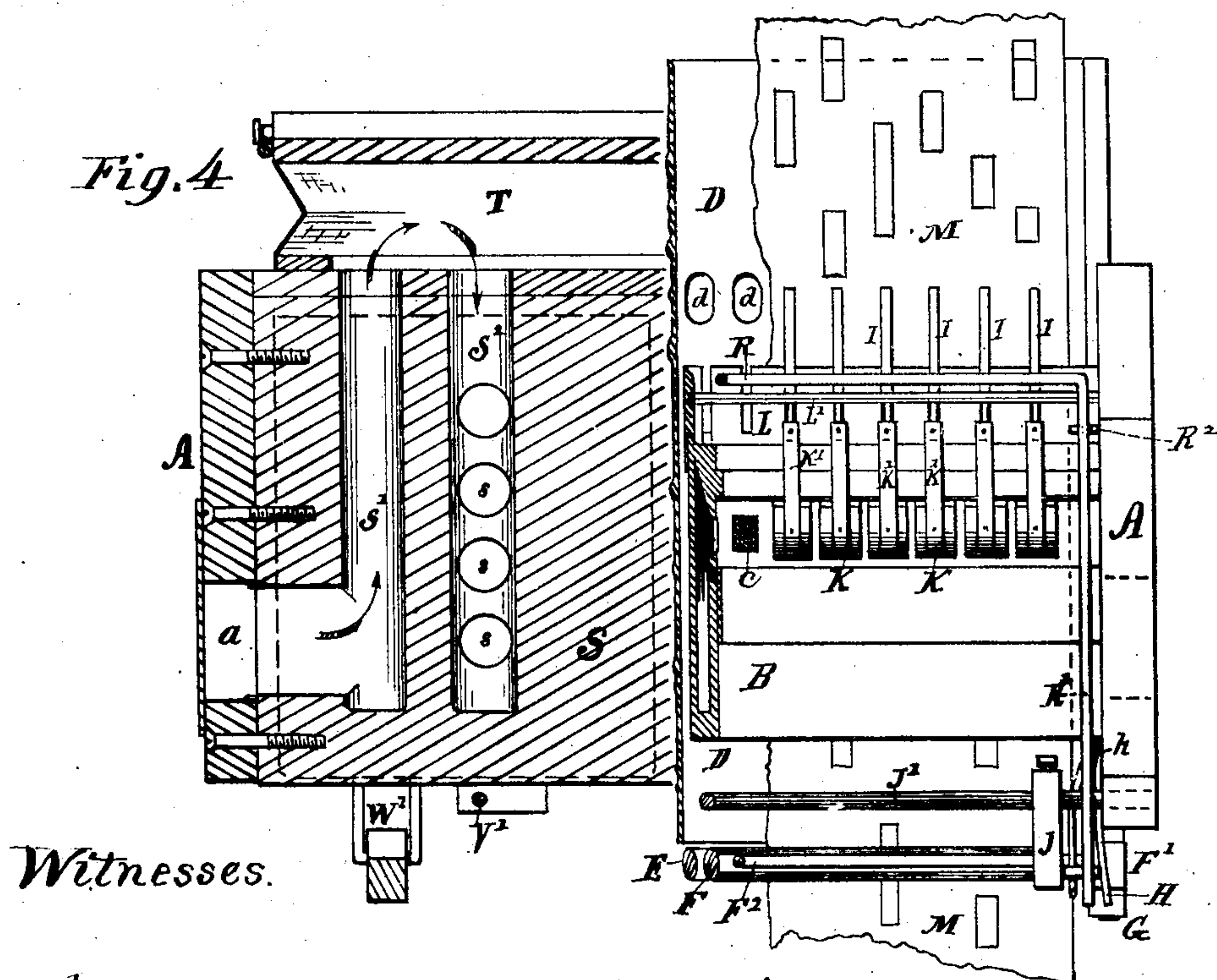
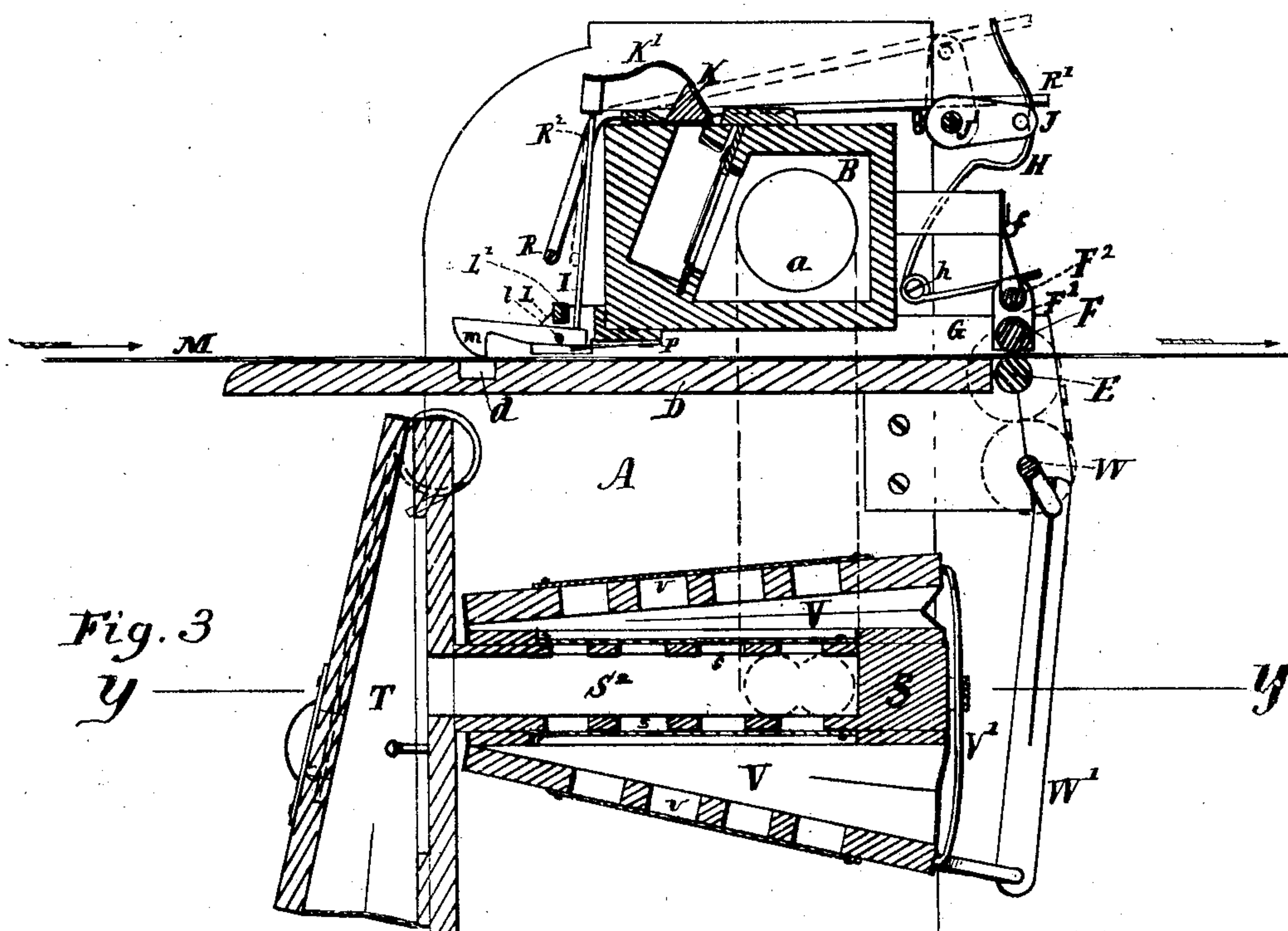
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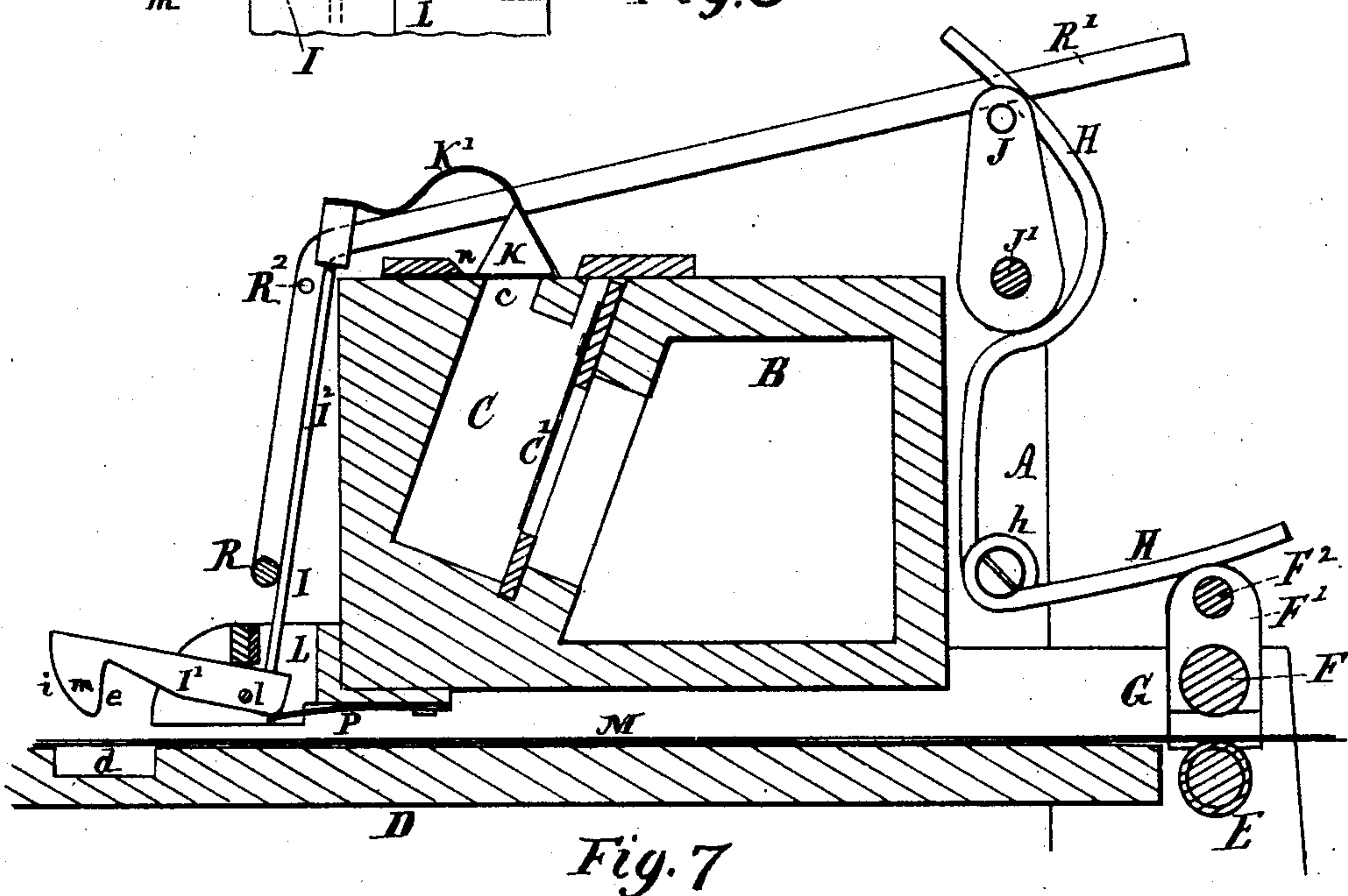
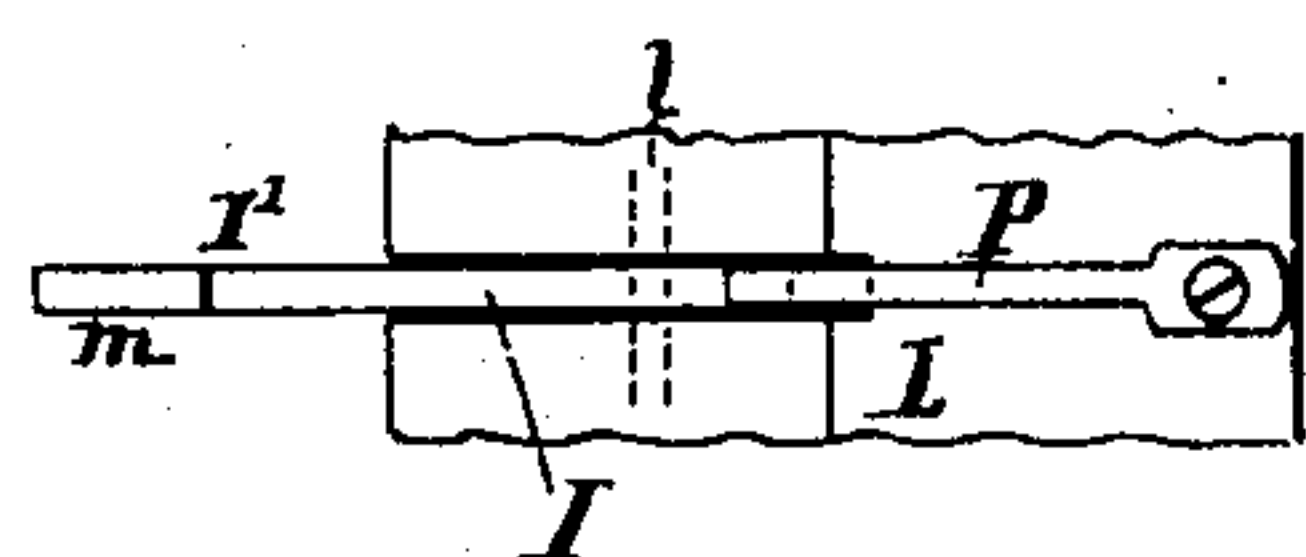
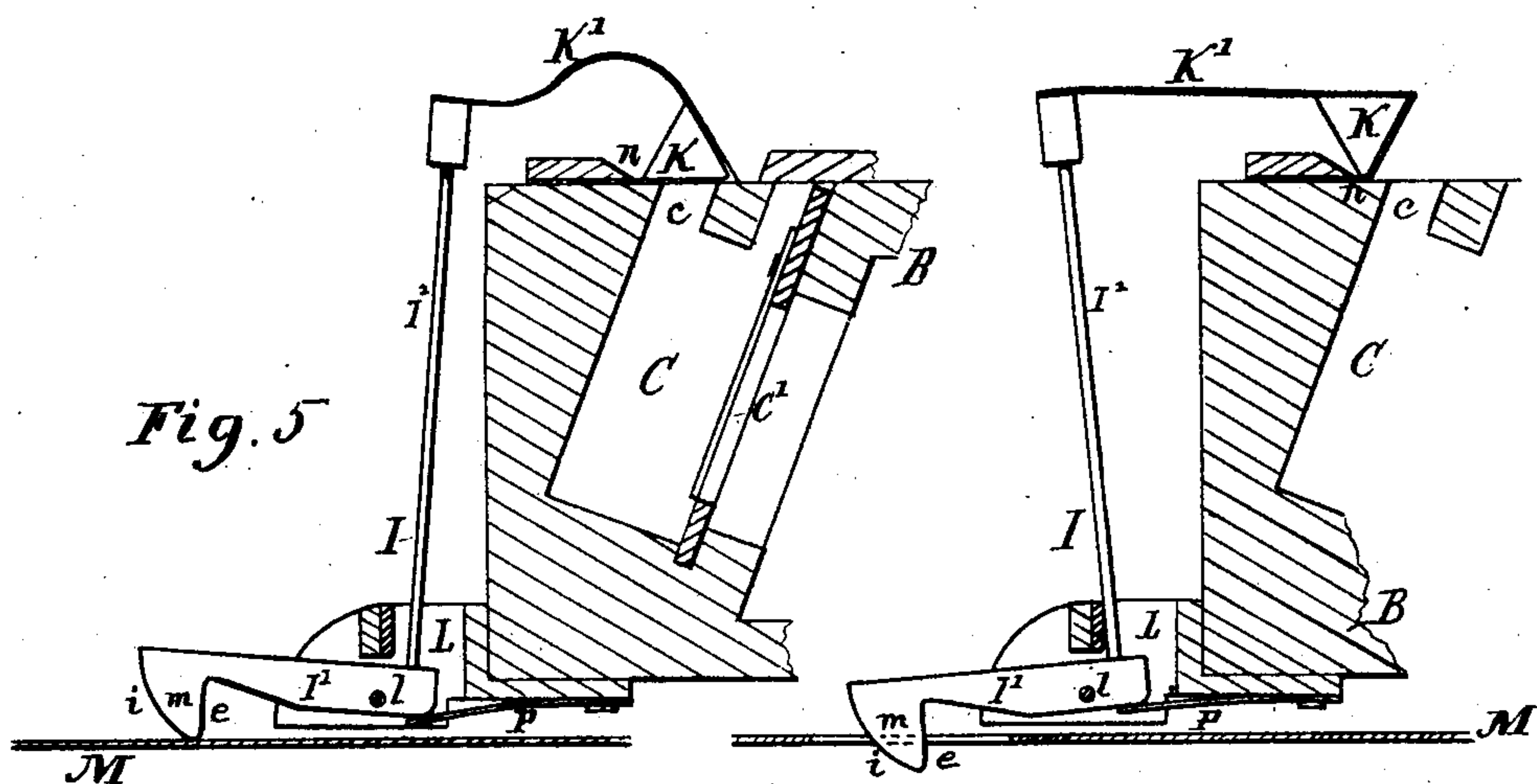
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S. R. Barton.

Inventor

Frank Stone
By Chas. H. Burleigh
Atty.

UNITED STATES PATENT OFFICE.

FRANK STONE, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO THE
MUNROE ORGAN REED COMPANY, OF SAME PLACE.

MECHANICAL MUSICAL INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 245,238, dated August 2, 1881.

Application filed April 22, 1881. (No model.)

To all whom it may concern:

Be it known that I, FRANK STONE, of Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Mechanical Musical Instruments; and I declare the following to be a description of my said invention, sufficiently full, clear, and exact to enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, which form a part of this specification.

My present invention relates to certain improvements in the construction and arrangement of the action devices in that class of mechanical musical instruments wherein the valves are operated by means of vibrating fingers actuated from or controlled by a suitably-prepared music-sheet passed in contact with their ends; the objects of my invention being, first, to provide a finger device which will run with light touch and without injuring the perforated music-sheet; second, to provide a valve mechanism sensitive, quick, and easy of operation; third, to afford facilities for raising the fingers when reversing the movement of the music-sheet; fourth, to afford a simple and convenient means for relieving and raising the presser-roll from the music-sheet; fifth, the improvement of the bellows and feeder mechanism, and their arrangement within the instrument with constructive convenience and efficiency. I attain these objects by the mechanism herein illustrated and described, the particular subject-matter claimed being hereinafter definitely specified.

In the drawings, Figure 1 is a rear view of a mechanical musical instrument embracing my improvements. Fig. 2 is a part front, part sectional, view of the same. Fig. 3 is a vertical sectional view at line *x x*, Fig. 1. Fig. 4 is a part top plan, part horizontal, section at line *y y*, Fig. 3. Figs. 5, 6, and 7 are detail sectional views on larger scale, showing the parts in different positions of their action; and Fig. 8 is a bottom view of one of the finger-levers and its spring.

The outside casings and devices for rolling up the music-sheet are not herein shown. Such

parts may be of ordinary or any suitable construction.

A denotes the end frames, with air-passages *a*; and B indicates the wind-chest, its inner chamber communicating with said passages.

C indicates the reed-cells, provided with reeds *C'* and with inlet-openings *c*, all of which may be substantially as heretofore constructed.

D indicates the raceway or table for supporting and guiding the perforated music-sheet M as it passes through the instrument. Said table D is located at a short distance below the wind-chest B, and is rigidly held in position between the side frames, A, its ends being let into grooves formed horizontally across the inner sides of the end frames, A.

E indicates the feed-roller for moving forward the music-sheet, said roll being arranged at the rear edge of the table D for operation in the usual manner.

F denotes the presser-roll, for holding the music-sheet in contact with the feed-roll E. This presser-roll F is mounted in bearings *F'*, which are arranged to slide up and down in the guides or brackets G, said bearings being connected with each other by a bar, *F²*, the central part of which is suspended or supported at a fixed position by means of a strap, bracket, or other suitable device, as at *f*, and at a height sufficient to raise the roll F clear from the sheet M when the depressing force is removed from the bearings *F'*.

H denotes the pressure-levers, for forcing the roll F against the feed-roll. Said levers are formed of wire or other suitable material, fulcrumed or pivoted through the coil or angle at *h*, with their lower arms resting upon the bearings *F'*, while their upper arms engage with the crank-arms J on a rocker-shaft, *J'*, arranged across the upper part of instrument, as illustrated. When said arms J are turned down, as in Fig. 3, the levers H will press down the bearings *F'*, springing the bar *F²*, so as to set the roll F firmly down upon the music-sheet M, for assisting the feed-roll E in moving it forward, and when the arms J are turned up, as in Fig. 7, the strain on levers H is removed, and the spring-action of the bar *F²* relieves

the pressure on the roll F and raises said roll clear of the music-sheet, as indicated in Fig. 7, and by dotted lines in Fig. 1.

I indicates the vibrating fingers or levers, 5 for operating the valves K, which admit air to the reeds. Said levers I are made in the form shown, and consist of a foot-piece, I', pivoted at or near the heel, as at *l*, to the support-bar L, and the upward-projecting arm or 10 wire I², fixed in the rear end of said foot-piece I', and forming therewith an angle-lever. The front end of the part I' is made with an under rounded curve, *i*, and offset *e*, forming a hook or rider, *m*, which runs on the music-sheet and 15 drops through the perforations thereof as they pass beneath it. The fingers or levers I are arranged with their rider ends *m* forward of their pivots *l*, or standing in the direction from which the music-sheet is drawn, and are in full 20 clear view in front of wind-chest, instead of beneath it.

The valve K, I arrange to operate in the manner indicated, the valve being hinged at *n* to swing upward, as shown, and to act as a 25 clapper over the aperture *c*. The top of the valve-block is connected with the end of the vibrating finger or lever I by means of a flexible attachment, K', which is of such length that it can loop or buckle when the valve K 30 is closed, the movement of the lever I being slightly greater than the swing of the valve K, so that the straightening of the flexible attachment will snap or jerk the valve from its seat with a quick rolling action, thereby over- 35 coming any tendency to stick down by reason of the suction of the bellows, and rendering the action easy, sharp, and positive, while the touch of the fingers I on the music-sheet is light and sensitive.

40 Figs. 3 and 5 show the valve K closed, and Fig. 6 shows the valve as drawn open by the dropping of the finger I. In Figs. 1 and 2 valves are shown open at K^o. In the present instance the valve K is of triangular form, and 45 is connected by a strap to an angle-lever, I. I do not desire, however, to confine myself to those particular forms, as other forms may be used without departure from the nature of my invention, the essential features of which are 50 a rolling or hinged valve, an actuating-lever or its equivalent, and a flexible connection capable of buckling or having slackness when the valve is closed.

The levers I and valve K are arranged in 55 regular series, as indicated, the levers being pivoted in slots formed in the supporting-bar L, which extends across the lower front part of the wind-chest B, and also forms a top guide for the music-sheet, causing it to run close to 60 the surface of the table D. Depressions *d* are formed in said surface to permit action of the finger ends *m*.

Small springs P are arranged in connection with the fingers I for pressing them down and 65 actuating the valves. Said springs are arranged to act on the heels of the levers, (see

Figs. 5 to 8,) and can be made very light, as the construction and arrangement of the valves and levers are such that they operate with ease and require but little assistance from the 70 springs. The proportional balance between the spring and rider-point *m* is such that said point bears very lightly on the perforated music-sheet, and thus avoids the liability of tearing out the paper between the perforations. 75

R indicates a swinging bar for raising all of the fingers I from off the paper when reversing or rewinding the music-sheet M. Said bar has its ends R' extending upward and forward 80 near the side frames, A, so as to work in connection with the crank-arms J of the rock-shaft J', and said parts R' are so pivoted or fulcrumed at R² that when the arms J are turned upward the bar R will swing forward, as illustrated in Fig. 7, and raise all of the levers I 85 in the manner shown. The bar R and the levers H are both operated simultaneously for relieving the presser-roll F and raising the fingers I by turning the shaft J' by its thumb-piece J², which may be located at the exterior 90 of the casing.

S indicates the feeder-board or bellows-feeders support. Said board is fixed in horizontal position between the side frames, A, and is 95 provided with air-passages S', leading from the side passages, *a*, to the bellows T, which are arranged in upright position at the front part of the instrument, and with passages S², leading back from the bellows into the board, and communicating through suitable valved openings, 100 *s*, with the feeders V, that are arranged upon the top and bottom of the feeder-board S, in the manner shown. The upper and lower feeders are connected to operate in unison by a rod, V', so that one is filling while the other is ex- 105 hausting, and both receive their motion from the crank-shaft W by pitmen W', in the manner indicated, said crank-shaft W being geared to the music-feed shaft E, and operated in the ordinary manner by the crank E', or in any other 110 suitable way. The feeders V are provided with valves *v*, arranged as indicated, and act to exhaust the air in the bellows T, which draws the air from the wind-chest B by way of the passages *a* and *s'*, the course being indicated 115 by the arrows. This peculiar construction of the feeder-board S, and the arrangement therewith of the bellows T and feeders V, in the manner shown, forms a very compact, simple, and efficient apparatus, giving great wind- 120 power with economy of space, ease of operation, and cheapness of manufacture.

L' indicates a buffer-strip, of wood and felt, let into the support-bar L to serve as a stop to the forward throw of the valve-actuating 125 levers I.

The direction in which the music-sheet passes through the instrument when playing is indicated by the arrows in Fig. 3.

What I claim as of my invention, and desire 130 to secure by Letters Patent, is—

1. In a mechanical musical instrument

adapted to be operated by a traveling perforated music-sheet, the lever or finger I, composed of the upright wire I², and foot-piece I', pivoted or fulcrumed at or near its heel, as shown, and provided with the rider-head *m*, having front under curve, *i*, and offset *e*, said finger being arranged in relation to the direction of the movement of the music-sheet, as set forth.

2. In a mechanical musical instrument provided with the wind-chest, reeds, and reed-cells having inlet-passages, as shown, the rolling or clapper valves, hinged as described, in combination with said inlet-passages, and a series of actuating-fingers controlled by the music-sheet for operating said valves, substantially as set forth.

3. In a mechanical musical instrument, the combination, with the air-inlet passage *c* and actuating finger or lever I, of a valve hinged to its seat, as described, to have a rolling or swinging action, and connected to said actuating-finger by a flexible attachment, substantially as hereinbefore set forth.

4. In a mechanical musical instrument, the combination of the rolling or hinged valves for closing the air-inlets, as shown, the actuating-fingers governed by the traveling music-sheet, and arranged, as described, to have a swinging movement greater than the swing of the valves, and the flexible attachments or bands connecting said valves with said fingers, and adapted to buckle or stand slack when the valves are closed, substantially as and for the purpose set forth.

5. In a mechanical musical instrument, the combination, substantially as hereinbefore described, of the actuating-levers I, pivoted in the bar L, the swinging bar R, with its backward-extended ends R' fulcrumed on the side frames, and the rock-shaft J', provided with crank-arms J for engaging the ends R', and operating said bar for simultaneously raising

the series of levers from the music-sheet, as set forth.

6. In a mechanical musical instrument, the combination, with the presser-roll F, of the spring-levers H, fulcrumed, as at *h*, and the crank-arms J, for actuating said levers to apply or relieve pressure on the roll-bearings, substantially as set forth.

7. In a mechanical musical instrument, the combination, substantially as hereinbefore described, of the stationary table or music-sheet bed D, the feed and presser rolls E F, the pressure-spring levers H, the valve-actuating levers I, the swinging bar R, fulcrumed at the sides R², and the rock-shaft J', with crank-arms J, operating, in connection with both the spring-levers and swinging bar, for simultaneously relieving said presser-roll and raising said actuating-levers from the music-sheet, as set forth.

8. The combination, with the presser-roll mounted in movable bearings, of the bar F², connecting said bearings, and having its central part suspended or supported at a fixed position and at such a height that said bar will be deflected when the roll is pressed down upon the music-sheet, as set forth.

9. The feeder-board S, provided with the air-passages S' and S², as shown, in combination with the bellows T, and compound feeders V, located above and below said board, and arranged for operation as shown and described.

10. The combination, with the actuating-levers I, of the buffers L' and springs P, arranged on the support-bar L for operation as shown and described.

Witness my hand this 20th day of April, A. D. 1881.

FRANK STONE.

Witnesses:

CHAS. H. BURLEIGH,
JOSIAH A. RICE.