

J. SAMPERE.  
 TEMPO REGULATING DEVICE FOR MECHANICAL MUSICAL INSTRUMENTS.  
 APPLICATION FILED JUNE 11, 1904.

906,743.

Patented Dec. 15, 1908.

FIG. 1.

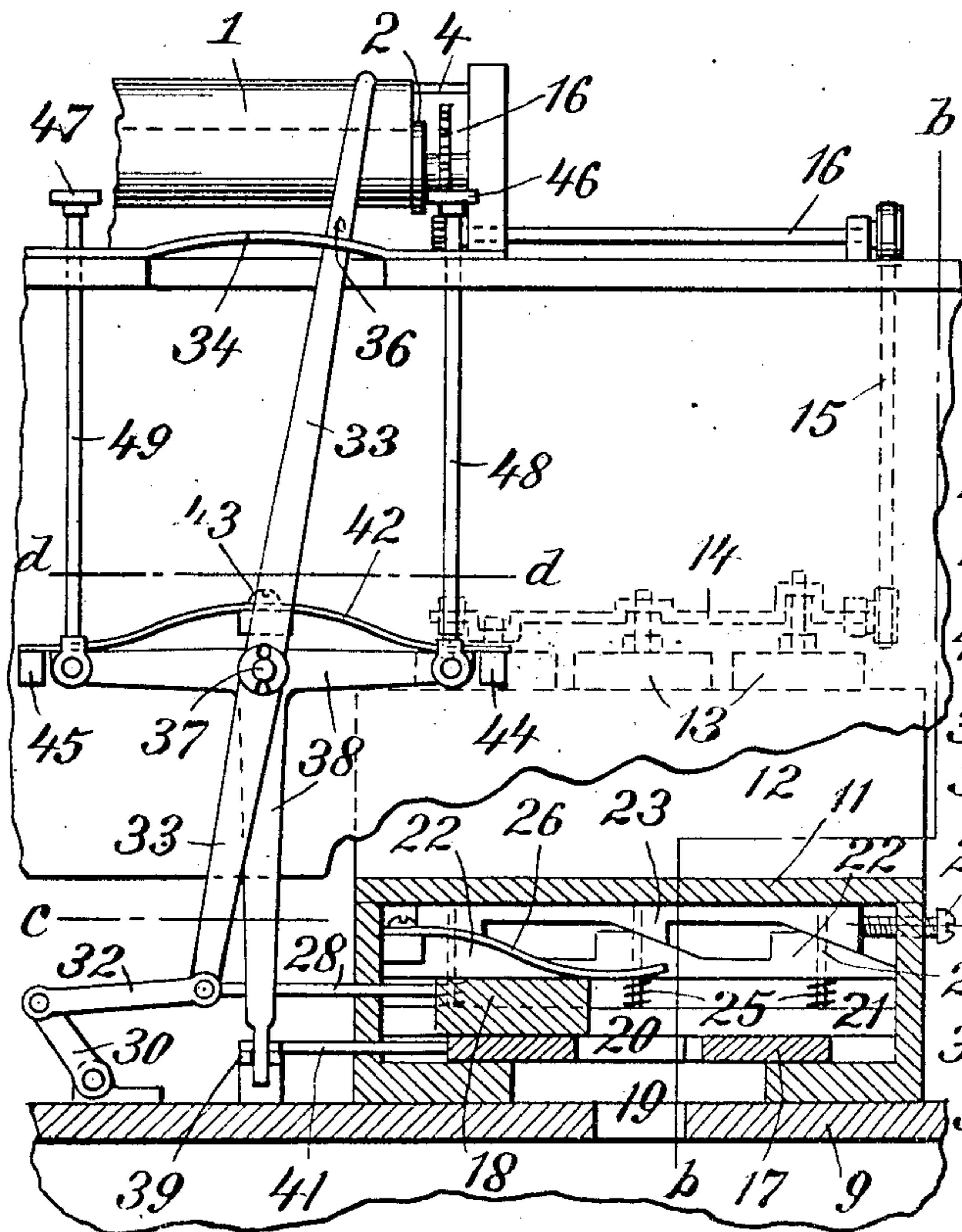


FIG. 2.

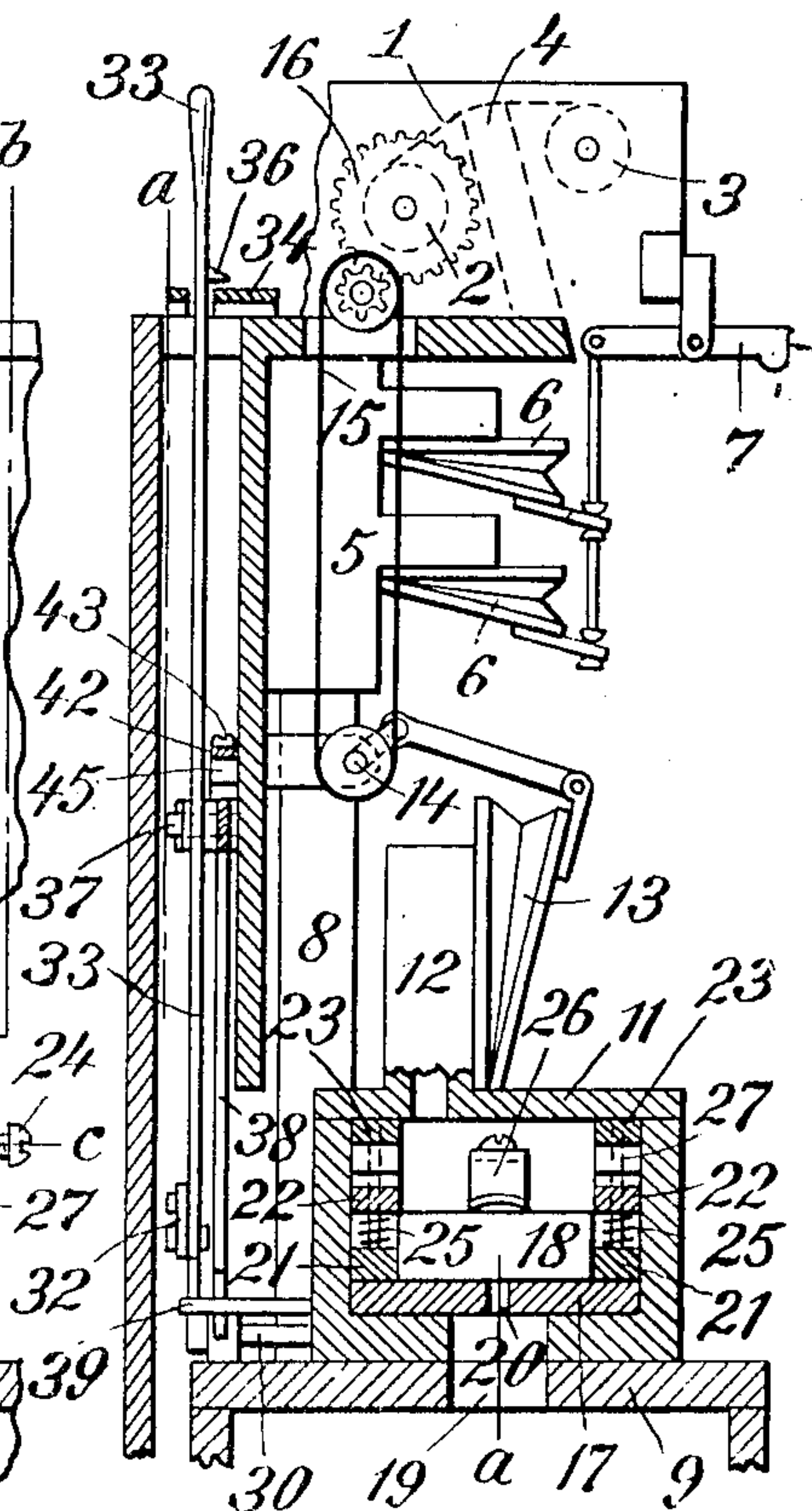


FIG. 3.

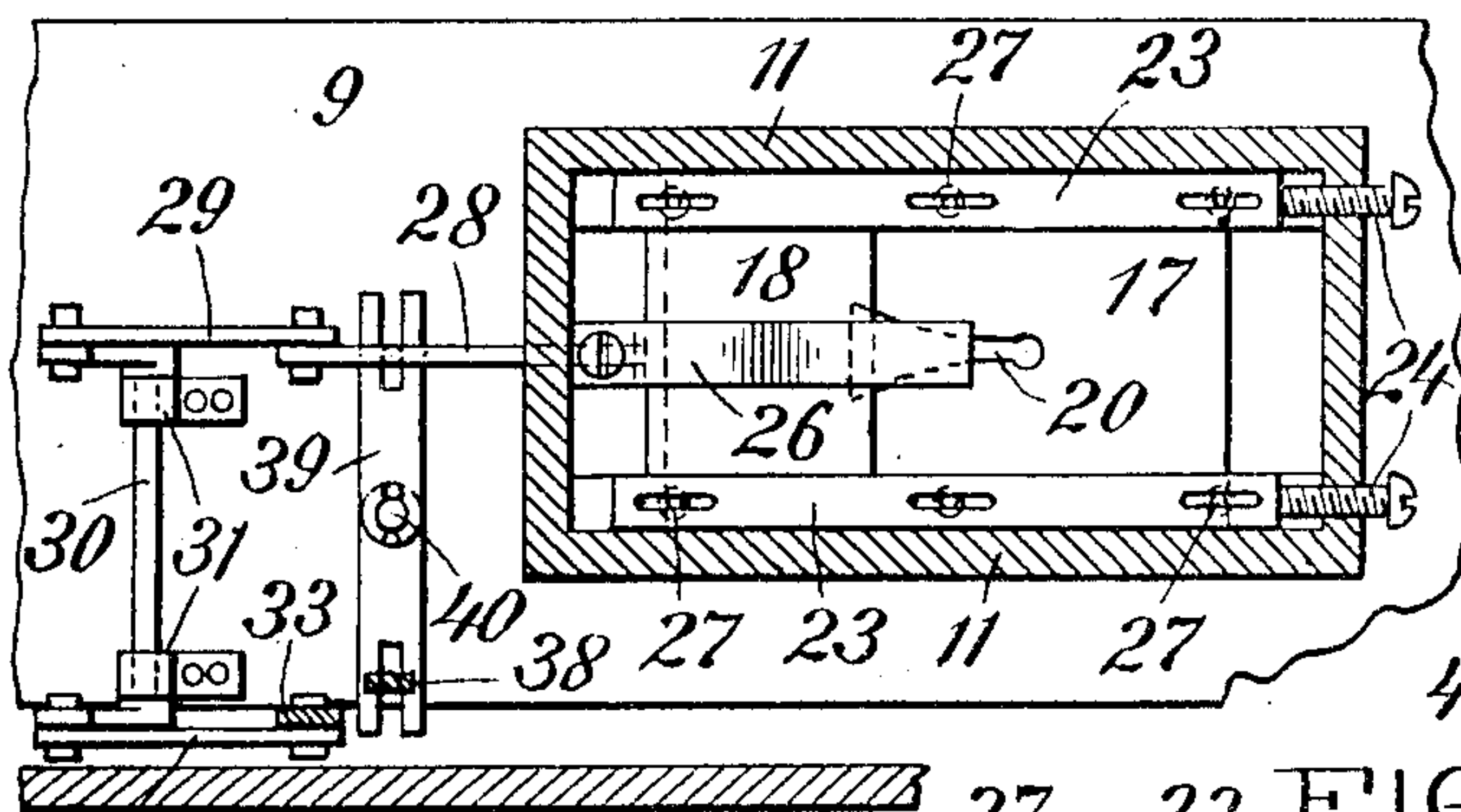


FIG. 4.

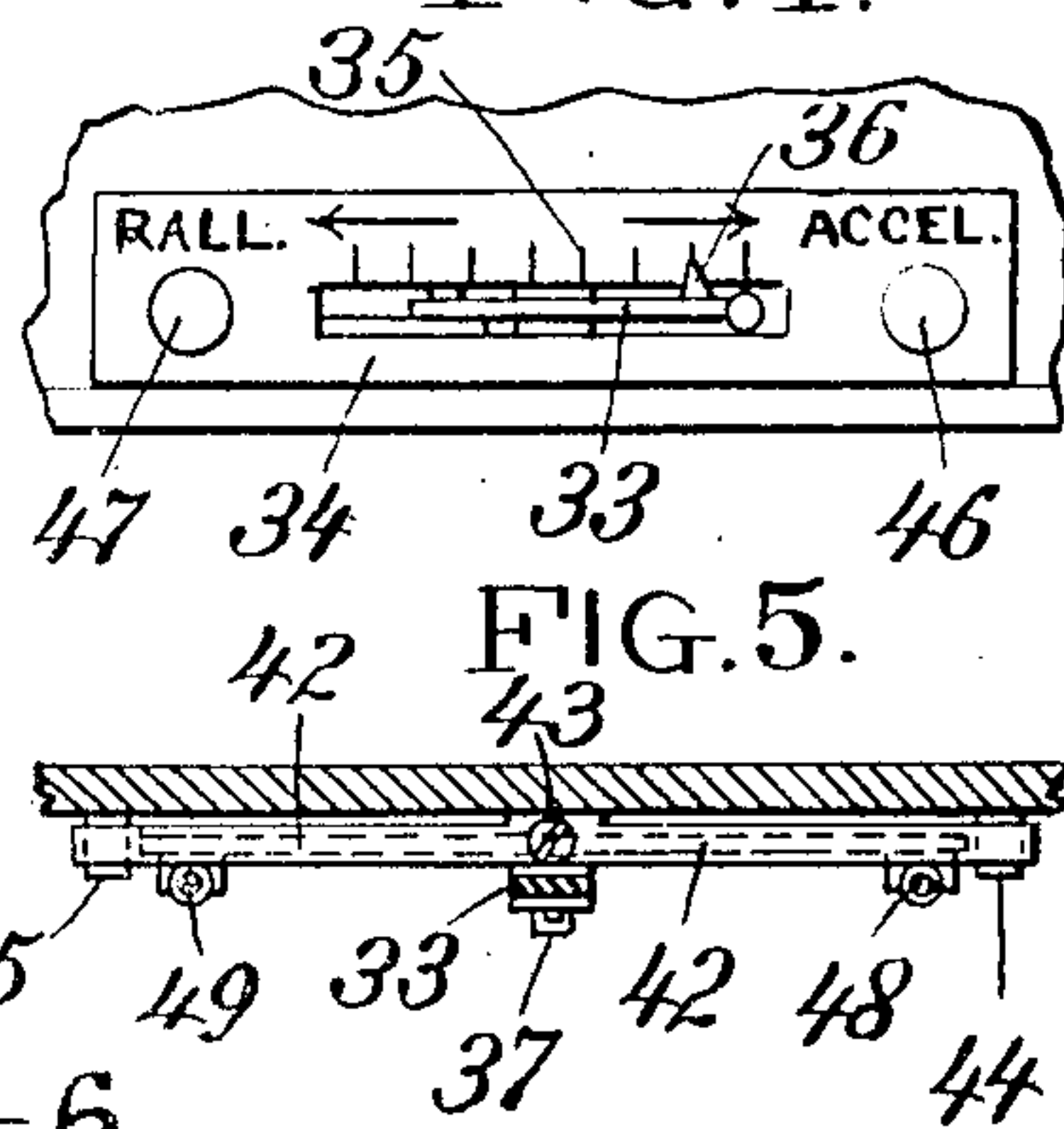
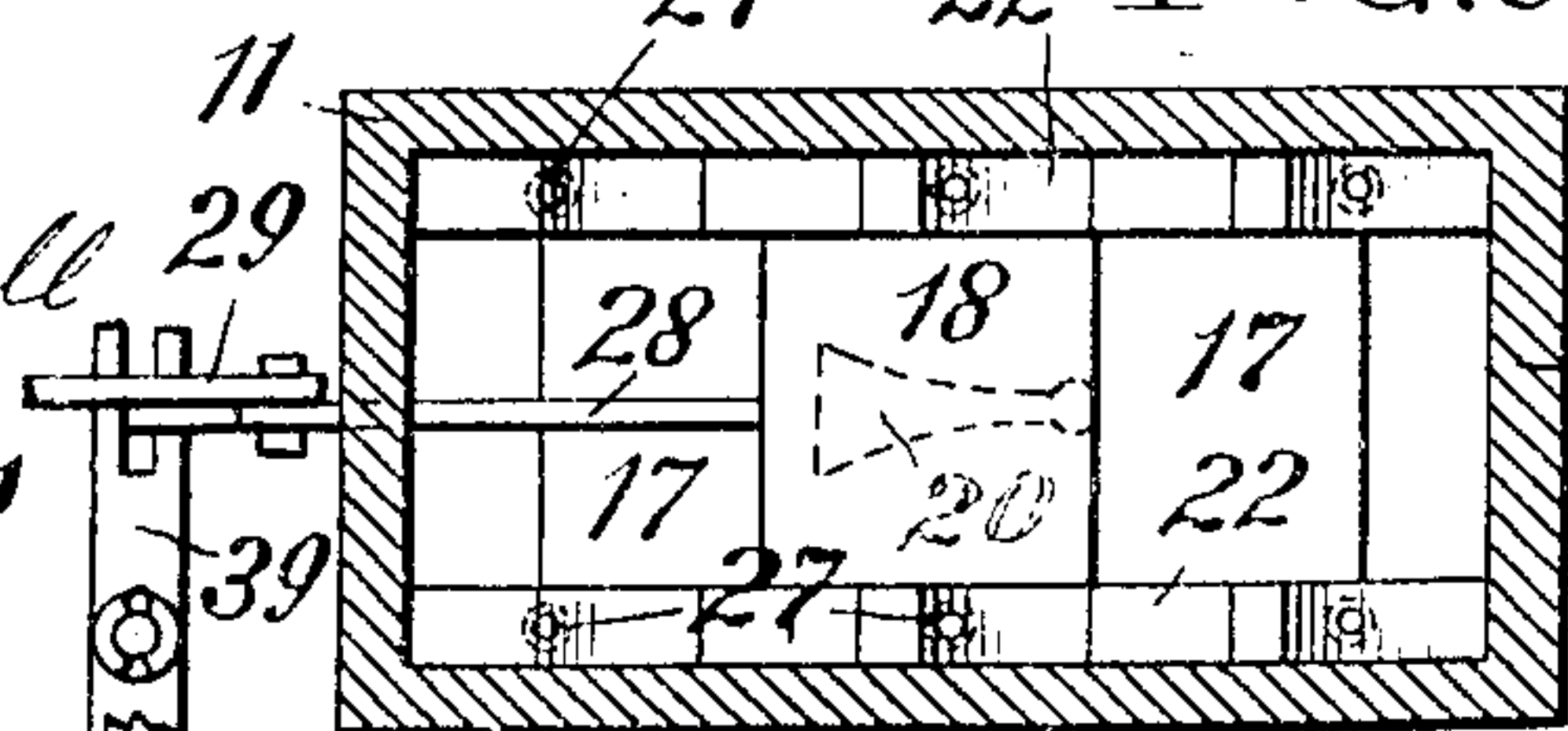


FIG. 5.

32 WITNESSES:

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# UNITED STATES PATENT OFFICE.

JOSE SAMPERE, OF NEW YORK, N. Y., ASSIGNOR TO THE REGINA COMPANY, OF RAHWAY, NEW JERSEY, A CORPORATION OF NEW JERSEY.

## TEMPO-REGULATING DEVICE FOR MECHANICAL MUSICAL INSTRUMENTS.

No. 906,743.

Specification of Letters Patent.

Patented Dec. 15, 1908.

Application filed June 11, 1904. Serial No. 212,174.

*To all whom it may concern:*

Be it known that I, JOSE SAMPERE, a subject of the King of Spain, residing at the city of New York, State of New York, United States of America, have invented certain new and useful Improvements in Tempo-Regulating Devices for Mechanical Musical Instruments, of which the following is a specification.

In mechanical musical instruments such as piano-players and self-playing pianos it is common to use a traveling music-sheet operated by a pneumatic motor under control of a valve mechanism for varying the speed of the sheet to regulate the tempo of the music. Probably the most convenient means for adjusting the valve mechanism and a recognized standard device for this purpose, is a lever working along a tempo-indicating scale. It is most desirable that this lever shall always work freely or not against spring pressure or other resistance which can only interfere with or obstruct those niceties of adjustment of the motor valve mechanism so necessary to assure the best rhythmic effects in rendering the music.

In this invention such a free working standard tempo lever device is employed and may alone be used for adjusting its coupled means or valve to regulate the tempo of the music. The invention however, also includes important means, preferably an auxiliary valve, and devices, preferably a lever and push-buttons, operating said auxiliary valve independently of the main tempo lever and intended more especially for use by the expert performer and permitting variation of the tempo to either faster or slower than the standard or normal tempo in which any piece of music is written. This standard tempo may be assured by adjusting the main tempo lever to the proper mark on the scale prior to manipulating the auxiliary valve or device for obtaining temporarily either faster or slower time of the music. When the means operating said auxiliary valve or device is released the standard or normal tempo indicated by the main tempo lever is at once automatically restored.

The invention will first be described and then will be particularly defined in claims hereinafter set forth.

Reference is made to the accompanying

drawings forming part of this specification, and in which—

Figure 1 is a front elevation of portions of an automatic piano-player embodying the invention, parts being removed and other parts being in vertical section on the irregular line *a—*a** in Fig. 2. Fig. 2 is a transverse vertical sectional view taken on the irregular line *b—*b** in Fig. 1. Fig. 3 is a sectional plan view taken on the line *c—*c** in Fig. 1. Fig. 4 is a detail plan view showing the tempo indicating scale and the main tempo lever and push-buttons. Fig. 5 is a detail sectional plan view taken on the line *d—*d** in Fig. 1; and Fig. 6 is a detail sectional plan view showing the auxiliary valve port closed for stopping the music-sheet motor.

The numeral 1 indicates the music-sheet which passes from a delivery roll 2 to a take-up roll 3 over an interposed tracker 4 having channels communicating with passages in a casing 5 on which are supported valved pneumatics 6 by which the levers 7 are operated to play a piano or like instrument to the keys of which these levers are adjusted. The casing 5 may communicate by a trunk 8 with a main wind-chest 9 to which bellows of any suitable kind are to be connected for producing air currents through the music-sheet motor and thence through the valve-chest 11, which practically is an air passage between the motor wind-chest 12 and the main wind-chest 9. The chest 12 contains suitable valves controlling collapse and inflation of the motor pneumatics 13 which rotate the motor shaft 14 from which a belt 15 leads to gearing 16 by which the music-rolls and sheet 2, 3, 1, are operated during mechanical playing.

In the valve chest 11 are arranged preferred slide valves 17, 18 which preferably work one upon the other and control the area of the air passage between the music-sheet motor and the wind-inducing apparatus, an opening 19 being provided through the valve chest floor and the main wind chest wall to give communication with the bellows. The valve 17 preferably has a port 20 cut through it, and the valves 17, 18 are adjustable relatively to each other to more or less close said port and thereby control the volume of air propelled by the wind-inducing apparatus through the music sheet motor to govern its speed and consequently the speed of travel



of the music-sheet to vary the tempo of the music. A simple and practical method of arranging the valves 17, 18 in the chest 11 is to place the smoothly finished metal valve 17 directly on the perforated chest floor and set the wood block valve 18 upon the valve 17 and between opposite pressure blocks 21, 21 resting on the valve 17. On the blocks 21 are placed pairs of wedge-blocks 22, 23, each pair having meeting inclined faces. The upper wedge-blocks are acted upon by always accessible set screws 24 by which the pressure of springs 25 interposed between the lower wedge-blocks 22 and the blocks 21 may be regulated for holding the valve 17 properly to its seat. The valve 18 is held to its seat on the valve 17 by a spring 26 fixed at one end to the valve chest wall. The springs 25 are arranged upon guide pins 27 held in the blocks, but these pins may be omitted if the opposite ends of the springs be inserted in sockets in the opposing blocks 21, 22.

The main tempo valve 18 has a stem 28 which is coupled by a link 29 to one arm of a U-shaped rocking frame 30 journaled in bearings 31 fixed to the main wind-chest 9. The other arm of the frame 30 is coupled by a link 32 to the lower end of a tempo lever 33 the upper end of which preferably protrudes through the slot of a plate 34 carrying a tempo indicating scale 35 which will have all the usual marks from "Largo" to "Presto" and in this invention also has the marks "Rall" and "Accel"; indicating relatively slower and faster tempo. The lever 33 preferably carries an index finger or pointer 36 working over the scale 35. The lever 33 is fulcrumed on a pin 37 upon which also is preferably fulcrumed a three-armed lever 38 whose pendent arm engages one end of an oscillatory horizontal lever 39 fulcrumed on a pin 40 and coupled at its other end with the stem 41 of the auxiliary tempo valve 17 in the chest 11. Preferably above the horizontal head of the lever 38 is arranged a spring 42 which is fixed centrally by a screw 43 or otherwise to a stud or block on the instrument case. The opposite ends of the spring 42 stop against lugs 44, 45, and also bear upon opposite ends of the head of the valve lever 38 and hold this lever normally in balanced position thereby maintaining the valve 17 in normal balanced position, while permitting free movement of the valve 18 upon the resting valve 17 by the main tempo lever 33. Depression of opposite ends of the head of the lever 38 will move the valve 17 one way or the other beneath the valve 18 while the latter remains at rest. Preferred means for tilting or rocking the lever 38 on its fulcrum 37 are push-buttons 46, 47, respectively fixed to stems 48, 49 which are suitably coupled to opposite ends of the head of the lever 38. These stems preferably

have bearings in the tempo-indicating scale plate 34, and are arranged preferably at opposite sides of the protruding upper end of the tempo lever 33, as shown in Figs. 1 and 4 of the drawings, in order that the fingers of one hand of the performer may easily operate the push-buttons without disturbing the adjusted lever 33.

If a novice operates the piano-player or instrument, he may control the tempo wholly by laterally moving the lever 33, and thereby directly moving the valve 18 to the right or left hand and thus altering the area of the port 20 of the auxiliary valve 17 to assure faster or slower operation of the motor and like speed of travel of the music-sheet. In Figs. 1 and 4 of the drawings the lever 33 is adjusted nearly to the right hand end of the scale 35 thereby almost fully opening the port 20 of valve 17 and assuring nearly maximum speed of the motor and music-sheet; while in Fig. 6 of the drawings the valve 18 is shown moved fully to the right hand to close the port 20 and stop the motor and music-sheet, this position of the valve being obtained by moving the lever 33 to the extreme left of the tempo scale 35, as will readily be understood. It will be specially noticed that these adjustments of the lever 33 may be easily made by the novice as the lever moves either way with freedom and never meets a gradually increasing or other resistance such as is offered to a tempo regulating lever by springs in another known mechanism. The novice thus has no difficulty in adjusting and holding the tempo lever 33 to any position along the scale 35 to assure any desired tempo of the music indicated by said scale.

A more or less skillful performer wishing to produce varied and striking musical effects, will move the lever 33 to that position at the scale 35 indicating the standard tempo in which any piece of music is written, thereby adjusting the valve 18 relatively to the port 20 of the valve 17 to assure rendering of the music at such standard tempo while the valve 17 remains at rest. Now by pressing down more or less the push-button 46, thereby rocking the lever 38 and moving the valve 17 to the right hand, the air passage at the valve port 20 will be enlarged to cause rendering of the music at any desired time faster than the standard tempo. As the button 46 thus is depressed, that end of the spring 42 normally resting on the stop 45 will be easily lifted while the other end of the spring will remain on the stop 44 and cannot follow the down swing of the adjacent part of the rocking lever 38. When said push-button 46 is released, the standard tempo will instantly and automatically be restored by readjustment of the lever 38 and valve 17 to their normal balanced positions shown in Fig. 1 of the drawings, by means of the spring 42, or



any equivalent yielding or elastic devices. When the button 47 is depressed, the valve 17 is moved to the left hand to contract the air passage at the valve port 20, and thus obtain slower than the standard tempo, and the spring 42 will be lifted from the stop 44 and will remain at the stop 45, and when the button 47 is released, the spring 42 instantly readjusts the valve 17 to balanced position, thus again restoring the standard tempo of the music. The scale marks "Accel" and "Rall" specially indicate that the adjacent respective push-buttons 46, 47 are to be depressed to assure correspondingly faster and slower tempo of the music.

A prior patent describes a tempo valve adjustable by a lever or stop for regulating air current to a music-sheet motor to give any desired standard or normal tempo of the music, and also describes devices acting upon a movable spring-pressed wall of the ordinary internally-valved pneumatic regulator for varying the tempo from normal at the will of the performer. The hereindescribed invention materially differs from that shown in said prior patent in that the means or valve employed for securing variation of the normal tempo is arranged for operation by or from a connected stop independently and mechanically connected therewith, while at the same time the means or lever for establishing the normal tempo may also be freely moved at any or all times by a novice in playing, as it does not meet spring-pressure or other resistance which could only interfere with those niceties of adjustment which are so necessary for securing proper rhythm of the music when controlled wholly by the tempo lever 33.

Various modified structures may be made by the skilled mechanic within the scope of the appended claims; as for instance, the valve 17 may be coupled to the tempo lever 33, and the valve 18 be coupled to the lever 38, and still permit regulation of the tempo by the lever 38 and push-buttons 46, 47, substantially as above described. The tilting lever 38 also may be arranged for operation directly by the fingers of the performer and the parts 46, 47, 48, 49, then would be dispensed with.

Other modifications may suggest themselves as being most desirable for any special class of mechanical musical instrument in which this invention may either partly or wholly be embodied.

I claim as my invention:—

1. Tempo regulating devices for mechanical musical instruments, including a motor, a wind-chest communicating with said motor by an air passage, and two independently movable means arranged adjacent to each other in said passage and controlling the same opening thereof, and mechanism for operating said means independently of each other.

2. Tempo regulating devices for mechanical musical instruments, including a motor, a wind-chest communicating with said motor by an air passage, and two valves arranged in said passage in engagement with each other, one of said valves being provided with a passage which is controlled by the other valve, and means for operating said valves independently.

3. Tempo regulating devices for mechanical musical instruments, including a motor, a wind-chest communicating with said motor by an air passage, and two slide-valves in said passage, each of which is movable independently of the other; one slide-valve being positively adjustable to control speed of the motor to assure standard tempo of the music, and the other slide-valve being adjustable relatively to the first named slide-valve to obtain tempo changes during rendering of the music; said other slide-valve being arranged for operation by or from a connected stop independently and mechanically connected therewith.

4. Tempo regulating devices for mechanical musical instruments, including a motor, a wind-chest communicating with said motor by an air passage, and two relatively adjustable slide-valves working one upon the other in said passage; one of said slide-valves being positively adjustable to control speed of the motor to assure standard tempo of the music, and the other slide-valve being adjustable relatively to the first named slide-valve to obtain tempo changes during rendering of the music.

5. Tempo regulating devices for mechanical musical instruments, including a motor, a wind-chest communicating with said motor by an air passage, two valves arranged in said passage in engagement with each other, and means for actuating said valves independently.

6. Tempo regulating devices for mechanical musical instruments, including a motor, a wind-chest communicating with said motor by an air passage, two relatively movable valves arranged in said passage adjacent to each other and controlling the same opening thereof, independent mechanism for actuating each of said valves, and mechanism connected with one of the valves to restore it automatically to a predetermined normal position.

7. Tempo regulating devices for mechanical musical instruments, including a motor, a wind-chest communicating with said motor by an air passage, two relatively movable valves arranged in said passage in contact with each other, one of the valves having a passage which is controlled by the other valve, means for actuating the last-named valve, and independent means for yieldingly holding the first-named valve in a balanced position.



8. Tempo regulating devices for mechanical musical instruments, including a motor, a wind-chest communicating with said motor by an air passage, two slide valves mounted to move adjacent to each other and controlling the same opening of said passage, means for adjusting each slide valve independently of the other, and elastic means having a tendency to restore one of said valves to a predetermined normal position.

9. Tempo regulating devices for mechanical musical instruments, including a motor, a wind-chest communicating with said motor by an air passage, a slide valve movable in said passage and controlling an opening thereof, said slide valve being itself provided with a through passage, another slide valve mounted to move in engagement with the first mentioned valve and controlling the passage thereof, independent means for adjusting each of said valves, and a yielding device having a tendency to restore the apertured valve to a predetermined normal position.

10. Tempo regulating devices for mechanical musical instruments, including a motor, a wind-chest communicating with said motor by an air passage, two valves in said passage each of which is movable independently of the other; one valve being positively adjustable to control speed of the motor to assure standard tempo of the music, means actuating said positively adjustable valve, a lever mechanically connected for actuating the other valve without interposition of devices influenced by the wind current to obtain tempo changes during rendering of the music, and push-buttons actuating said tempo-changing lever.

11. Tempo regulating devices for mechanical musical instruments, including a motor, a wind-chest communicating with said motor by an air passage, two valves in said passage each of which is movable independently of the other; one valve being positively adjustable to control speed of the motor to assure standard tempo of the music, a tempo lever freely actuating said positively adjustable valve, a second lever actuating the other valve independently of the first named lever without interposition of devices influenced by the wind current to obtain tempo changes during rendering of the music, means yieldingly holding said second lever and its valve in balanced positions; and push-buttons actuating the second lever and its valve.

12. Tempo regulating devices for mechanical musical instruments, including a motor, a wind-chest, a valve chest interposed between said motor and wind-chest, two relatively adjustable slide-valves in said chest; one valve being positively adjustable to control speed of the motor to assure standard tempo of the music, the other valve being

adjustable relatively to the first named valve to obtain tempo changes during rendering of the music, pressure devices holding one of said valves to its seat and including blocks having opposed wedging surfaces, means holding the other valve to its seat, and devices operating said valves.

13. In tempo regulating devices for mechanical musical instruments, the combination with a tempo-controlling valve, and a lever coupled to actuate it, of stops at opposite sides of the lever fulcrum, and springs bearing on the stops and on the lever and readjusting the lever and valve to normal balanced positions after being adjusted either way from said positions.

14. In tempo regulating devices for mechanical musical instruments, the combination of a motor, a wind-chest 9, a valve chest 11 interposed between the motor and chest 9, a valve 17 having a port 20 and movable in chest 11, means operating said valve 17 including devices holding it normally balanced and permitting its adjustment to obtain tempo changes during rendering of the music, a valve 18 adjustable in chest 11 relatively to the valve 17, and means operating said valve 18 for wholly controlling the tempo, or for assuring standard tempo while the valve 17 is adapted for changing the tempo of the music.

15. In tempo regulating devices for mechanical musical instruments, the combination of a motor, a wind-chest 9, a valve chest 11 interposed between the motor and chest 9, a valve 17 having a port 20 and movable in chest 11, a lever 38 operating said valve 17, springs holding said parts 17, 38 normally balanced and permitting adjustment of them to obtain tempo changes during rendering of the music, a valve 18 adjustable in chest 11 relatively to the valve 17, and means operating said valve 18 to assure standard tempo of the music.

16. In tempo regulating devices for mechanical musical instruments, the combination of a motor, a wind-chest 9, a valve chest 11 interposed between the motor and chest 9, a valve 17 having a port 20 and movable in chest 11, a lever 38 and connected push-buttons 46, 47 operating said valve 17, springs holding said parts 17, 38 normally balanced and permitting adjustment of them to obtain tempo changes during rendering of the music, a valve 18 adjustable in chest 11 relatively to the valve 17, and means operating said valve 18 to assure standard tempo of the music.

17. In tempo regulating devices for mechanical musical instruments, the combination of a motor, a wind chest 9, a valve chest 11 interposed between the motor and chest 9, a valve 17 having a port 20 and movable in chest 11, a lever 38 operating



said valve 17, springs holding said parts 17, 38 normally balanced and permitting adjustment of them to obtain tempo changes during rendering of the music, a valve 18 adjustable  
 5 in chest 11 relatively to the valve 17, and a freely movable tempo lever 33 coupled to the valve 18 and adapted to operate it for wholly controlling the tempo, or for assuring standard tempo while the valve 17 is  
 10 adapted for changing the tempo of the music.

18. In tempo regulating devices for mechanical musical instruments, the combination of a motor, a wind chest 9, a valve chest 11 interposed between the motor and chest  
 15 9, a valve 17 having a port 20 and movable in chest 11, a lever 38 and connected push-buttons 46, 47 operating said valve 17, springs holding said parts 17, 38 normally balanced and permitting adjustment of  
 20 them to obtain tempo changes during rendering of the music, a valve 18 adjustable in chest 11 relatively to the valve 17, and a freely movable tempo lever 33 coupled to the valve 18 and adapted to operate it for  
 25 wholly controlling the tempo, or for assuring standard tempo while the valve 17 is adapted for changing the tempo of the music.

19. In tempo regulating devices for mechanical musical instruments, the combination with a tempo controlling valve and its actuating lever, of stops 44, 45 and a spring 42 fixed intermediately and bearing by its opposite ends upon the stops and also bearing on the lever at opposite sides of its ful-  
 30 crum and balancing said lever and its tempo

valve while permitting movement of the valve in opposite directions by the lever.

20. In tempo regulating devices, the combination with the motor valve chest 11, and communicating wind-chest, of a valve 17 40 in said valve chest, bearing blocks 21, 21 resting on the valve 17, opposing pairs of wedge-blocks 22, 23, with springs 25 sustained on the blocks 21, screws 24 adjusting the wedge-block pressure on the valve 17, 45 and a valve 18 movable relatively to the valve 17 between the blocks 21, 21, substantially as described.

21. In a mechanical musical instrument player, the combination of a box having a 50 passage for air, a principal movable regulator plate having an opening therethrough, a supplemental movable regulator plate mounted and movable upon the first named plate, and means for independently adjust- 55 ing each of said plates, substantially as set forth.

22. In a mechanical musical instrument player, the combination with a box having a passage for air, of a regulator composed of 60 two independently movable regulator plates, of which one is mounted upon the other, a spring for holding the two plates in contact, and means for adjusting each of said plates, substantially as set forth.

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Witnesses:

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