

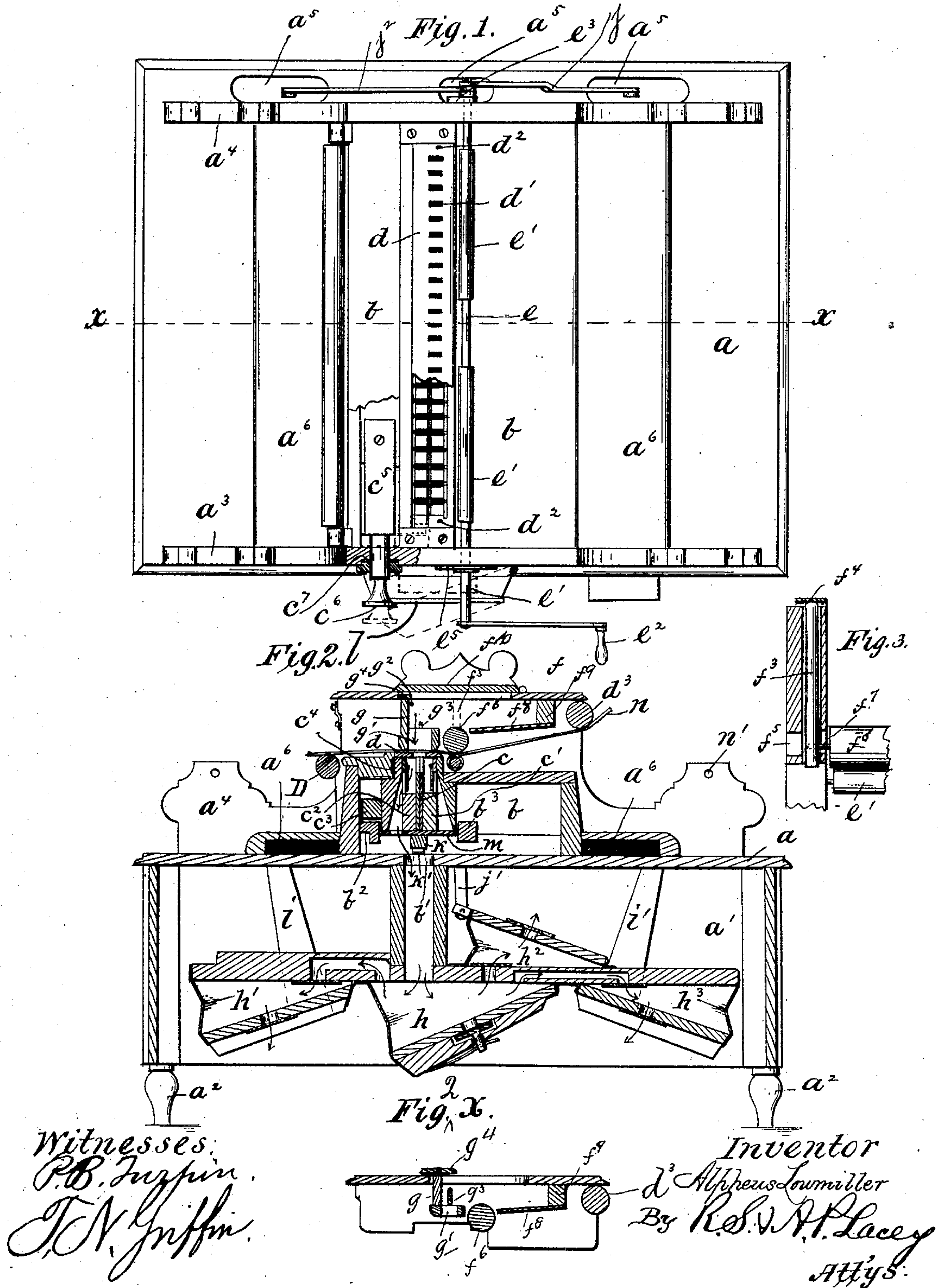
(No Model.)

4 Sheets—Sheet 1.

A. LOWMILLER.  
MUSICAL INSTRUMENT.

No. 376,443.

Patented Jan. 17, 1888.



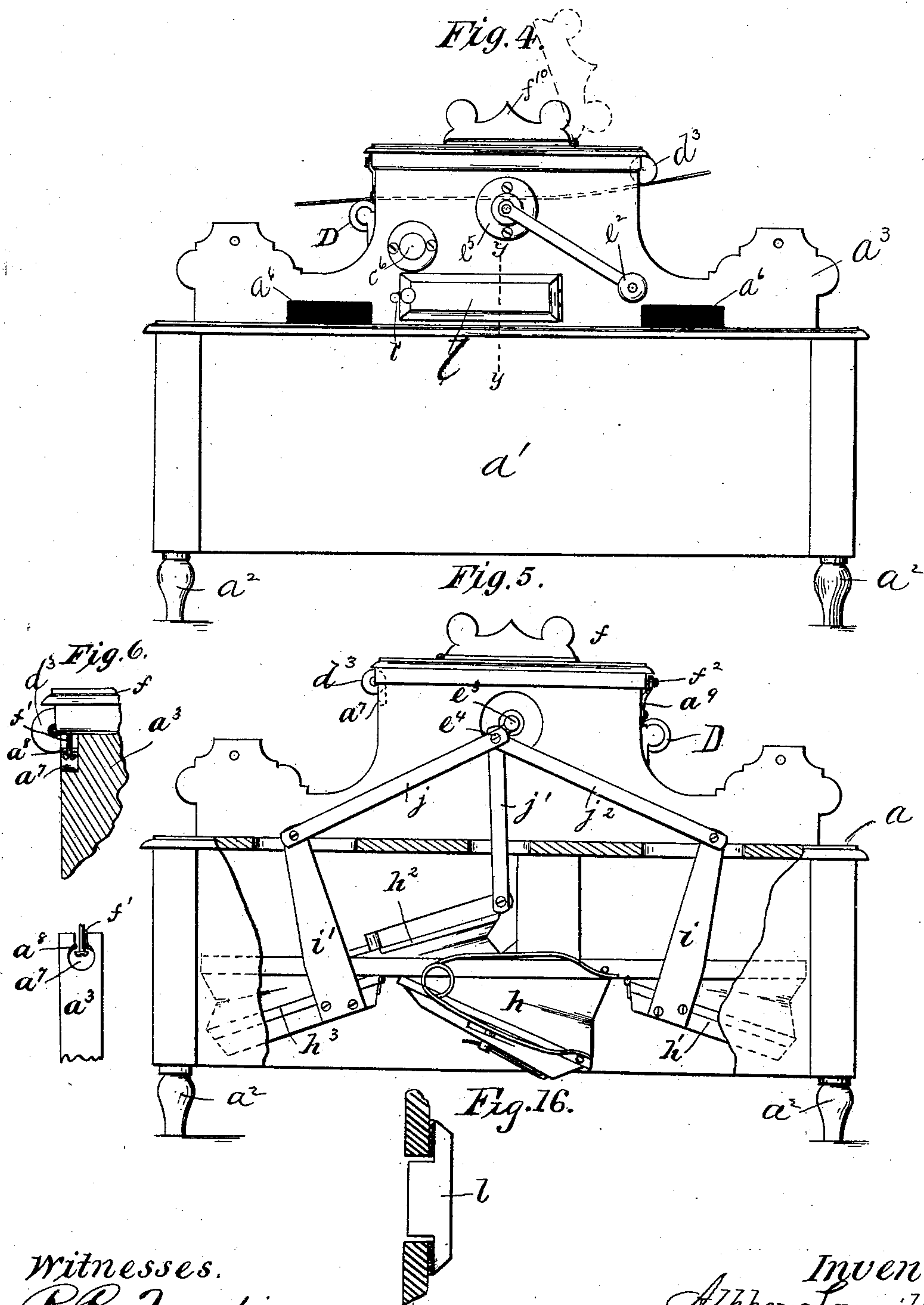
(No Model.)

4 Sheets—Sheet 2.

A. LOWMILLER.  
MUSICAL INSTRUMENT.

No. 376,443.

Patented Jan. 17, 1888.



Witnesses.  
P. B. Turpin,  
J. N. Griffin

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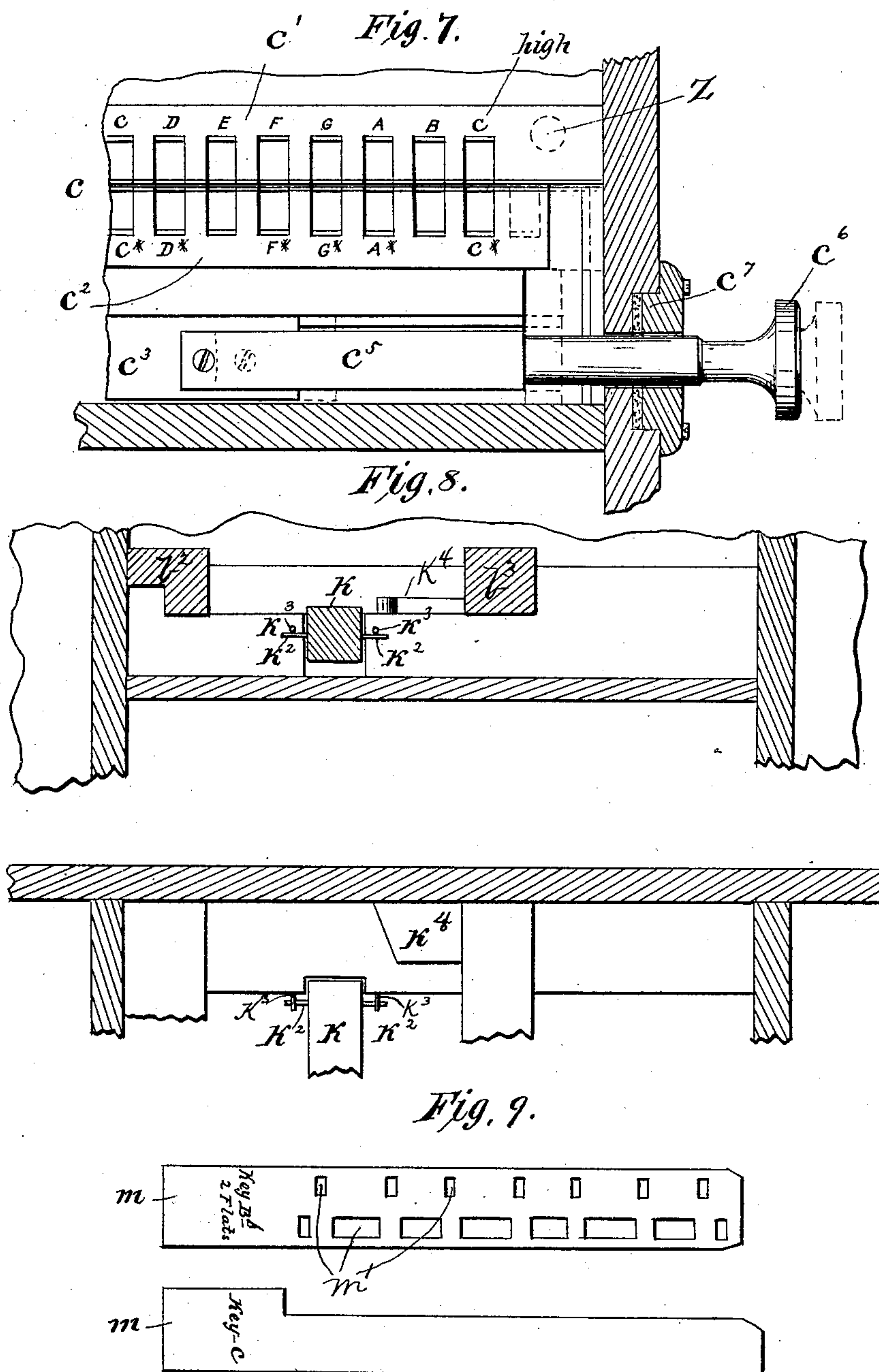
(No Model.)

4 Sheets—Sheet 3.

A. LOWMILLER.  
MUSICAL INSTRUMENT.

No. 376,443.

Patented Jan. 17, 1888.



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Inventor  
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(No Model.)

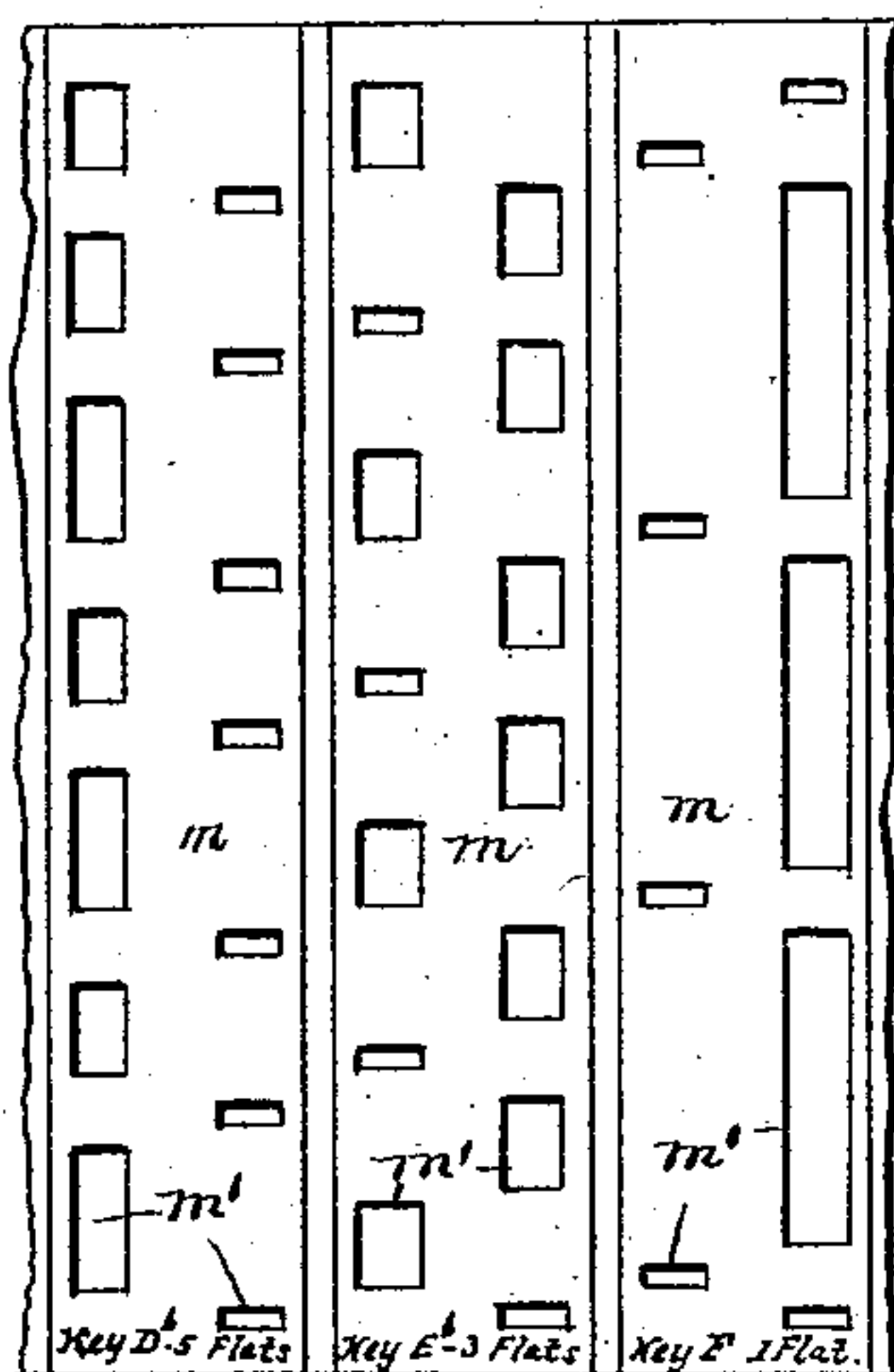
4 Sheets—Sheet 4.

A. LOWMILLER.  
MUSICAL INSTRUMENT.

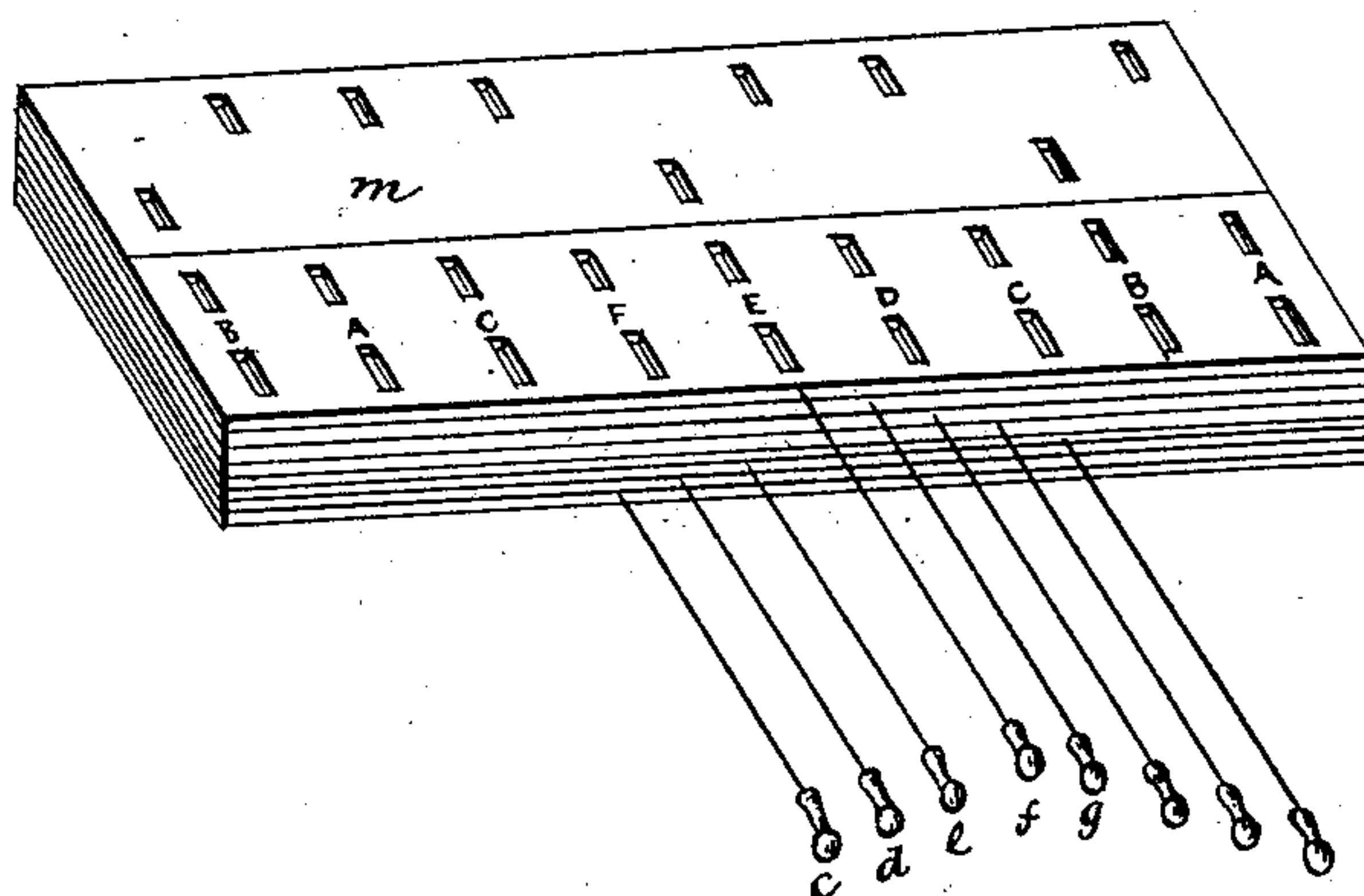
No. 376,443.

Patented Jan. 17, 1888.

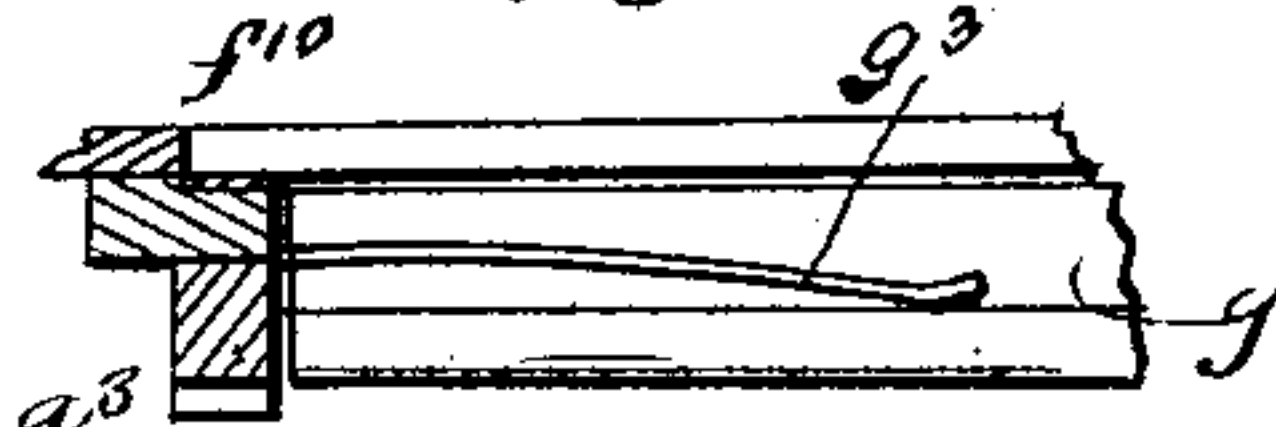
*Fig. 10.*



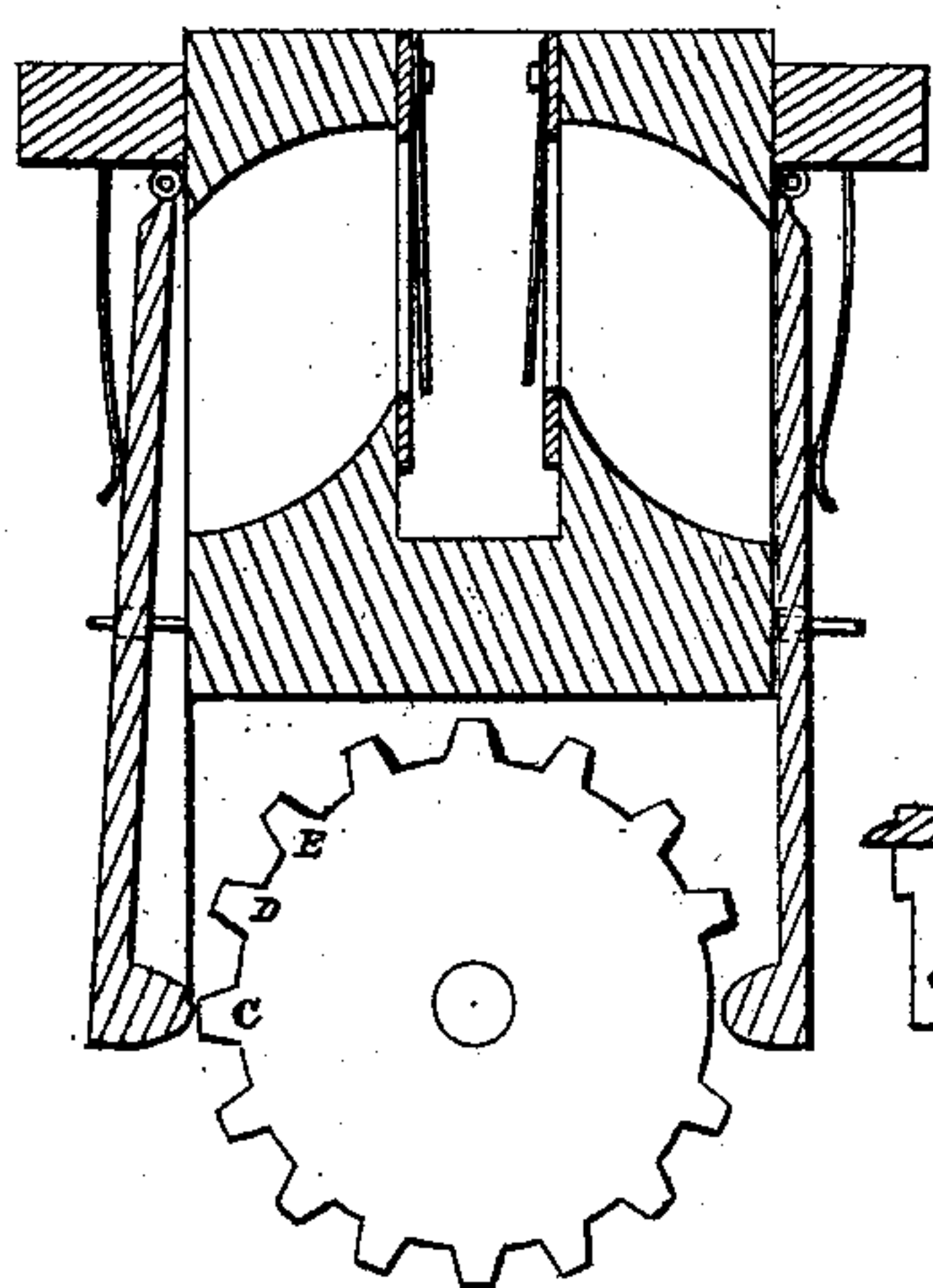
*Fig. 11.*



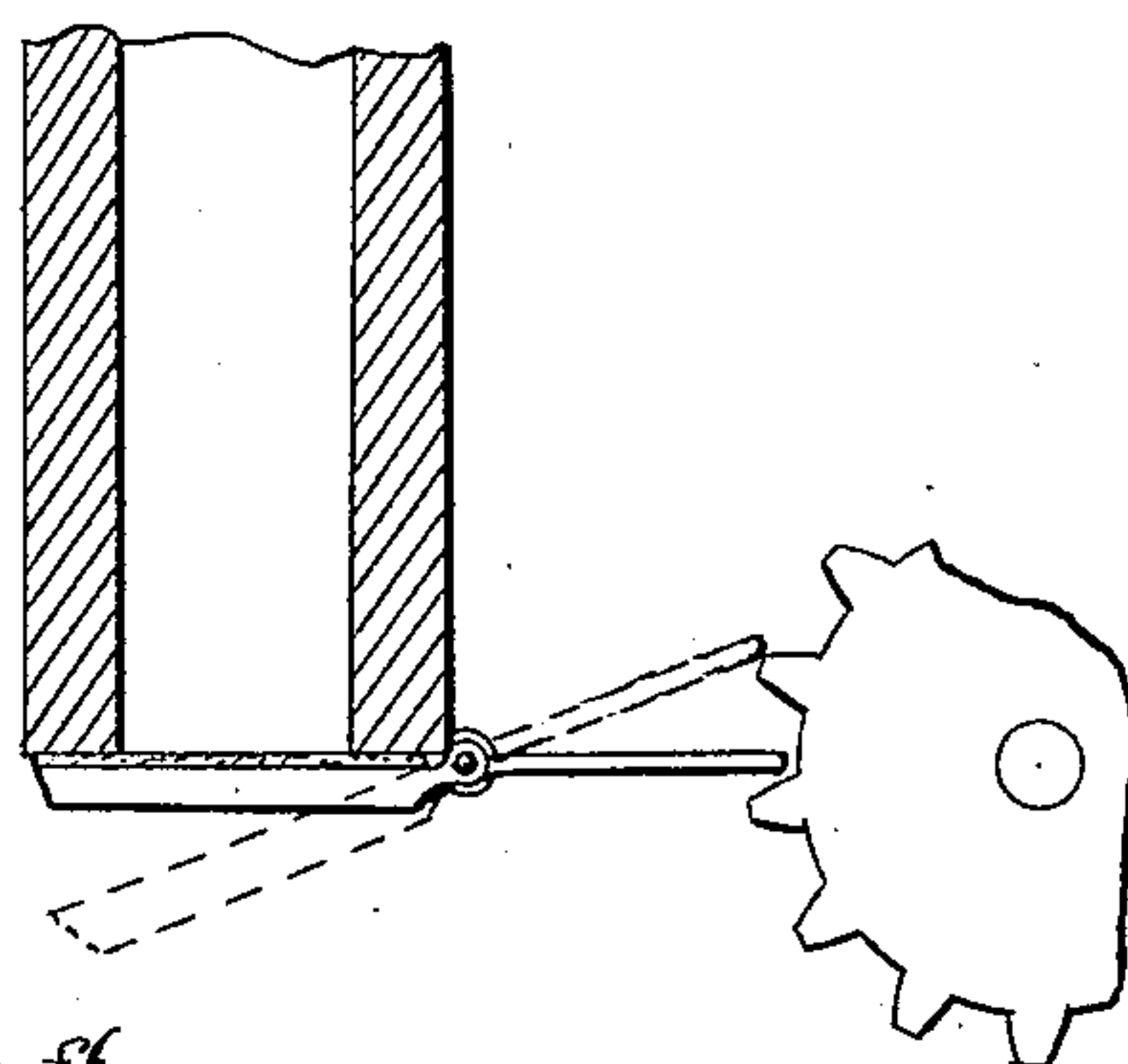
*Fig. 14.*



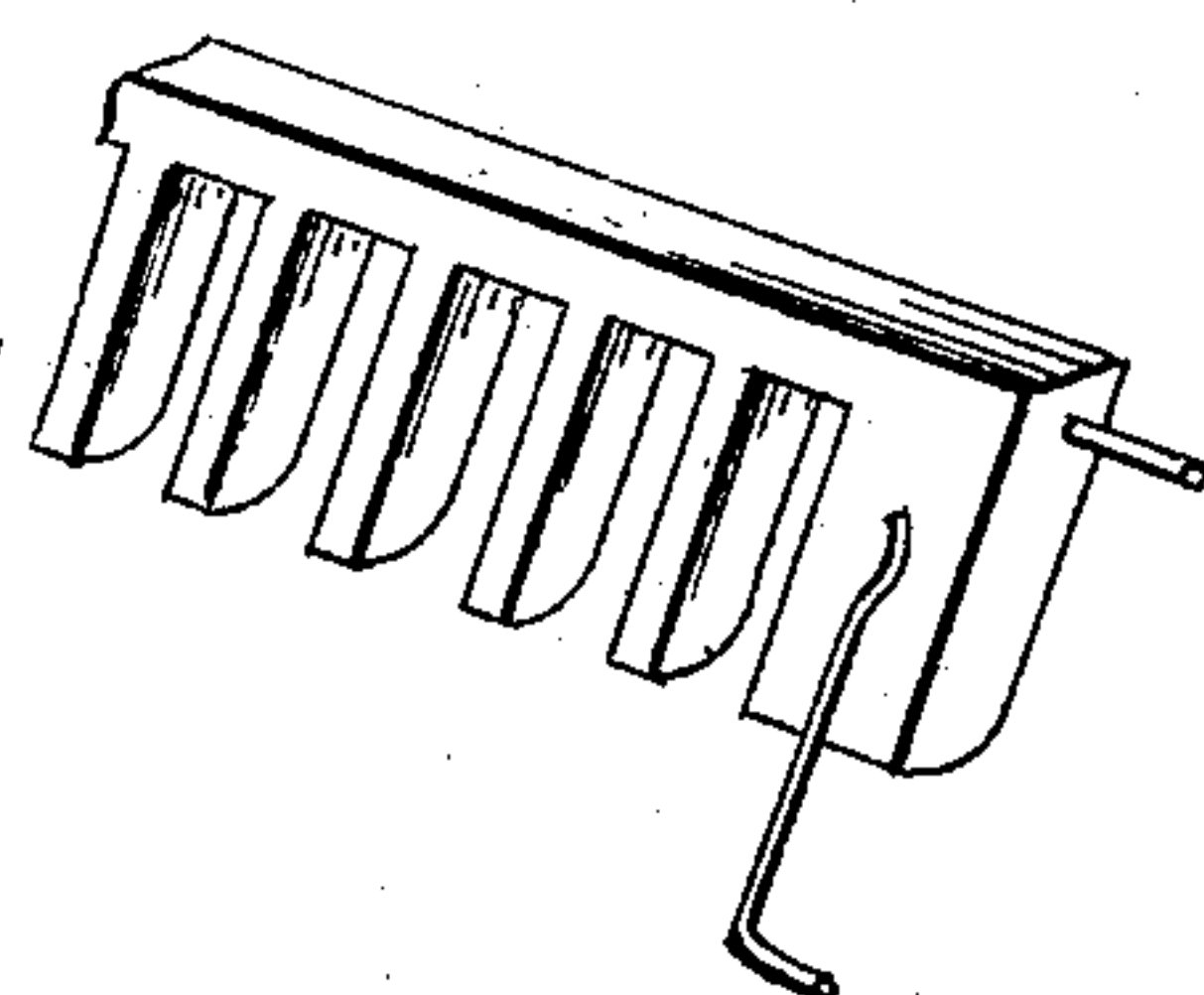
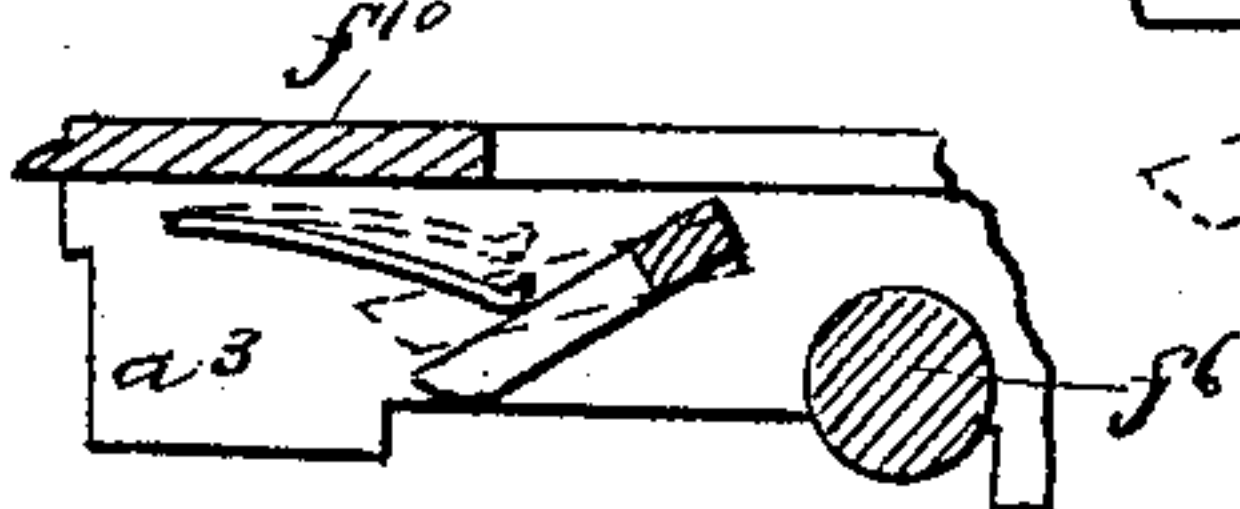
*Fig. 12.*



*Fig. 13.*



*Fig. 15.*



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Attys



# UNITED STATES PATENT OFFICE.

ALPHEUS LOWMILLER, OF JEWETT, OHIO.

## MUSICAL INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 376,443, dated January 17, 1888.

Application filed November 9, 1882. Serial No. 76,376. (No model.)

*To all whom it may concern:*

Be it known that I, ALPHEUS LOWMILLER, a citizen of the United States, residing at Jewett, in the county of Harrison and State of Ohio, have invented certain new and useful Improvements in Musical Instruments; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it ap-

10 pertains to make and use the same, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention has reference to improve-

15 ments in mechanical musical instruments. It consists in the novel construction, arrangement, and combinations of the parts, as more fully hereinafter set forth, and pointed out in the claims.

20 In the drawings, Figure 1 is a plan view of the instrument with the expression-box removed. Fig. 2 is a vertical section of the entire instrument on line  $xx$ , Fig. 1. Fig. 2<sup>x</sup> is a sectional detail of the expression-box, 25 showing the relative positions of the presser-bar and the presser and guide rollers. Fig. 3 is a detail view showing the bearing for the upper feed-roller. Fig. 4 is a side elevation of the instrument, and Fig. 5 is an elevation 30 on opposite side from Fig. 4 and having part of the casing broken away to show the bellows. Fig. 6 is a detail view showing the slot and screw serving as a part of the fastening of the expression-box. Fig. 7 is a detail view showing 35 part of the combination reed-board. Fig. 8 is a detached vertical and a horizontal section showing the board and spring which hold the key-slip to its place under the reed-board. Fig. 9 shows, on a reduced scale, two 40 of my key-slips; and Figs. 10, 11, 12, and 13 are views of modifications of my transposition mechanism. Fig. 14 is a detached section on line  $yy$ , Fig. 2<sup>x</sup>. Fig. 15 is a detail view showing a modification of the presser, as will be 45 described. Fig. 16 is a section of a portion of the side provided with the key-slip opening, the cap closing said opening being shown in position.

50  $a$  designates the top board of my instrument, supported on the casing  $a'$ , which serves as a covering for the bellows, &c., and is mounted on legs  $a^2$ , as shown.

$a^3$   $a^4$  are the side rails extending up from the board  $a$ . The rail  $a^4$  is arranged slightly in from the edge of the board  $a'$  to leave space 55 for the holes  $a^5$ , through which the bellows-rods pass, as will be described.

$a^6$  are key-slip pockets formed on the board  $a$  and extended from side to side and provided with an opening through the rail  $a^3$ , through 60 which the ends of the slips project. These pockets are provided to receive the key-slips not in use and protect them from dust and dirt, and also to provide a convenient receptacle for the same, whence they may readily 65 be drawn when desired. These pockets are arranged one on each side of the reed-chamber  $b$ . This reed-chamber is mounted on the board  $a$  and connects with the bellows by an opening,  $b'$ , through the board  $a$ , which leads 70 into an air-passage which extends to the reservoir-bellows.

$b^2$  is a rail projected inward from one of the side boards of the reed-chamber and adapted to support the sliding section of the combina- 75 tion reed-board, hereinafter described. This rail also serves as a guide for one side of the key-slip, hereinafter described.

$b^3$  is another bar arranged within the reed-chamber and at a distance from the rail  $b^2$  equal 80 to the width of the key-slip, hereinafter described, which slides between these bars  $b^2$   $b^3$  and is guided thereby into position.

$c$  is the combination reed-board. It is composed of the sections  $c'$   $c^2$ , which sections in 85 themselves are similar to the reed-board in common use. The section  $c'$  is immovably secured between the side rails,  $a^3$   $a^4$ . The sections are arranged close together, with the top reed-openings connected, as shown. The 90 lower reed-openings are separated a short distance, as shown in Fig. 2.

The section  $c^2$  is provided with a bar,  $c^3$ , projected from its outer side and resting and sliding on the rail  $b^2$ . The section  $c^2$  is held close 95 up against the section  $c'$  by a spring,  $c^4$ ; but where the parts are fitted closely this spring is not necessary. The reed-section  $c^2$  slides on the rail  $b^2$ , and its motion is limited to the width of one reed, so that no mistake will be 100 made in drawing it to the proper point in changing from sharps to flats, as will be described.

$c^5$  is a rod secured to bar  $c^3$  and extended



through a suitable opening in the side rail  $a^3$ , and provided with a stop-button,  $c^6$ , whereby it may be pulled out or pushed in. The opening through which the rod  $c^5$  passes is provided  
 5 with a suitable ring-packing,  $c^7$ , to prevent the escape of air from the reed-chamber. The section  $c'$  carries the reeds representing the diatonic or natural scale, as shown in Fig. 7. The section  $c^2$  is provided with the reeds necessary with those of the diatonic scale to form  
 10 the chromatic scale, and I therefore call it the "chromatic" section and the section  $c'$  the "diatonic" section.

When the stop  $c^6$  is pushed in, as shown in  
 15 full lines, Fig. 7, the reed-board is in position to play by sharps, it being seen that the sharp-reed is opposite its corresponding natural; but should the stop be pulled out, as indicated in dotted lines, it will draw the section up, so as to bring the sharp which before  
 20 was opposite its corresponding natural opposite the natural next higher than its correspondent, and it will then be flat to its opposite natural instead of sharp, as when the stop  
 25 is pushed in. This will be readily understood on reference to the drawings, Fig. 7, in which the reeds are lettered and the motion of the stop indicated.

I have shown the diatonic section as fixed  
 30 and the chromatic as movable, because it is necessary that the position of the diatonic section should always be fixed with reference to the music-paper. It will be understood, however, that the machine might be provided  
 35 with means whereby the music-sheet could be automatically adjusted as the reed-section is moved from side to side, and that then the diatonic section could be made movable and the chromatic fixed. This could be accom-  
 40 plished by projecting rods up from the diatonic section on either side of the music-sheet adapted to move the said sheet, as indicated by dotted lines Z in Fig. 7. I prefer, however, to use the construction shown and before de-  
 45 scribed. Instead of using the two sliding sections it would be advantageous in some cases to make the reed-board as though the two sections were all one piece. Then it would form a reed-board having reed-seats on oppo-  
 50 site sides of the air-openings. I would then place all the diatonic reeds on one side and the chromatic on the other side, with the chromatic reeds opposite their corresponding naturals, so the instrument will play by sharps.  
 55 When the chromatic reeds are thus arranged and it is desired to play a piece by flats, these chromatic reeds are removed by a reed-hook or other device, and each is moved one space higher, accomplishing the same result as with  
 60 the use of the sectional reed-board, and causing but little trouble to the player.

$d$  is a slip provided with perforations  $d'$ . The slip is placed over the reed-board and the openings  $d'$  are arranged immediately over the  
 65 openings leading into the two reed-sections, as shown. This slip is desirable in order to enable the music to be played in proper time, as when

the full reed-board openings are uncovered the music will be played too slowly and the chords will also be thrown out of time. This  
 70 slip is secured on the fixed reed-section by small pins  $d^2$ , projected therefrom through suitable openings near the ends of the slip. By varying the length of the holes  $d'$  the time of the tune may be changed, making the in-  
 75 strument play fast or slow, according as the holes are made short or long. It may be desirable in manufacturing this machine to furnish with each instrument a number of these  
 80 slips having holes of different lengths.

$D$  designates an anti-friction roller journaled on the reed-chamber  $b$  below the entrance-point of the music-sheet.

$d^3$  is an anti-friction roller journaled to the expression-box above the music-sheet exit, as  
 85 shown, and hereinafter more particularly described.

$e$  is the feed-shaft, journaled in the side rails,  $a^3 a^4$ , in the rear (with reference to the direction of motion of the music-sheet) of the reed-  
 90 board openings. It is provided with the rubber sleeves  $e'$ , covering a part of its surface, in order to give it grip, and is provided on one end with the hand-crank  $e^2$  and on its opposite end with the small crank  $e^3$ , having pin  $e^4$ , as  
 95 will be described.

The opening in rail  $a^3$  through which the shaft  $e$  is passed is made larger than the said shaft, so as to admit the larger sleeve,  $e'$ , to be inserted and removed. I therefore provide  
 100 the disk  $e^5$ , which I construct with a bearing for the shaft  $e$ , and secure this disk to the side rail  $a^3$  by screws or other means, so that it may readily be removed when it is desired to remove the shaft  $e$ , which is connected to the  
 105 cranks  $e^2 e^3$  by threaded joints.

$f$  is the expression-box. In order to secure the box on the rails  $a^3 a^4$ , I provide these rails with the slot  $a^7$ , as indicated in Fig. 6, in which is secured a slotted metallic plate. This slot  
 110 is made large enough to admit the shanks, though smaller than the heads of screws  $f'$ , which are secured on the end of the expression-box and fit down in the slot  $a^7$ . By turning these screws the box may be clamped tighter.  
 115 At the opposite end from screws  $f'$ , I fix hooks  $a^8$  on the rails  $a^3 a^4$ , which turn over the pins or screws  $f^2$  on the expression-box, and secure the said box so it may be easily removed.  
 120

$f^3$  are pins placed in suitable holes formed in the side bars of the expression box directly over the shaft  $e'$ .

$f^4$  are springs bearing on tops of the pins  $f^3$ .

$f^5$  is a hole through side bar of the expression-box, leading into the pin  $f^3$  at a point  
 125 where the roller gudgeon is journaled, in order to provide facilities for lubricating the bearing.

$f^6$  is a pressure-roller provided with gudgeons  $f^7$ , which are supported in bearings in the pins  $f^3$ , as shown in Fig. 3. This roller bears directly on the music-sheet and presses the same down on the feed shaft  $e$ , the said  
 130



roller  $f^6$  being yielding by reason of being journaled in the pins  $f^3$ , which are forced down by the spring  $f^4$ .

$f^8$  is a thin board extending from side to side of the expression-box and having one edge arranged close to the roller  $f^6$  and inclined upward, with its other edge connected to top of box  $f$  by board  $f^9$ , as shown. This forms a small chamber for the purpose of affecting the sound from the reeds. In the top of the expression-box I cut a large opening, which is closed, when desired, by the lid  $f^{10}$ , which is hinged on one side and may be raised, as indicated in dotted lines, Fig. 4.

$g$  is the pressure-bar, arranged within the expression-box above the slip  $d$ . It is provided with holes  $g'$ , coincident with holes  $d'$ , and is arranged to press on the music-sheet when passed between the slip  $d$  and the presser-bar. This bar has pins projected from its opposite ends near its bottom, which work in vertical guide-grooves formed on the inner side of the side boards of the expression-box, and its upper end is guided by pin  $g^2$ , as shown.

$g^3$  are spring-bars arranged to bear on the pressure-bar and hold the same tight down against the paper valve, as shown in Fig. 14. The upper end of the presser-bar extends within the opening through the top of the expression-box, and it has the button  $g^4$  pivoted on its top and arranged to be turned over the top of the expression-box and secure the pressure-bar up from the slip  $d$  when it is desired to insert the end of a music-sheet. It will be understood that instead of having the bar movable vertically a rod or other device could be pivoted within the expression-box and provided with fingers bearing on the music-sheet and given pressure by a suitable spring, as shown in Fig. 15, and also that devices could be employed for raising the fingers when it is desired to insert a music sheet. I prefer, however, the construction shown and before described.

The bellows I employ is of ordinary construction and composed, as shown, of the reservoir-bellows  $h$  and the feed-bellows  $h^1 h^2 h^3$ , which are all connected with the reservoir-bellows, as shown. This bellows, it will be understood, is of the suction variety, as is indicated by the arrows. The reservoir-bellows is connected through opening  $b'$  with the reed-chamber, as shown in Fig. 2.

$i i'$  are bars extending up from the bellows  $h^1 h^3$  through suitable openings,  $a^5$ , in the top  $a$ . These bars serve as levers in the operation of the bellows.

$j j' j^2$  are the connecting-arms, having one end pivoted on the wrist-pin  $e^4$  of crank  $e^3$ , and their opposite ends are connected, respectively, to the lever  $i'$ , the bellows  $h^2$ , and the lever  $i$ . By means of these connection-bars I am enabled to operate the bellows consecutively by the revolution of the crank-shaft, and the bellows are operated at even intervals, so that there will be no jar or irregular strain on the feed-shaft which operates the crank, and a regular force is applied to the bellows.

$k$  is the key-slip-supporting bar, arranged directly below the solid portions of the reed-board and between the reed-openings, as shown in Fig. 2. It is pressed upward by a spring,  $k'$ , arranged to bear against its underside, and it has pins  $k^2$  projected on opposite sides and arranged to engage under pins  $k^3$ , and thus prevent the slip supporting bar from rising up in the path of the key-slip, hereinafter described.

$k^4$  is a lug which guides the end of the C-key-slip when inserted.

Through the rail  $a^3$ , I form an opening corresponding in size to the key-slips, hereinafter described, with its bottom arranged flush with the top of the supporting-bar  $k$ , so that the key-slip may be inserted.

$l$  is a box-cap covering the key-slip opening. It is hinged at one side so it may be turned out to permit the insertion or removal of a key-slip, and it is provided on its other side with a fastening-latch,  $l'$ , so it may be secured, and this cap is provided on its inner edge with a suitable packing to prevent the escape of air from the reed-chamber.

$m$  are the key-transposing-slips. These slips are put through the key-slip opening and extend under the reed-board, against which they are pressed by the bars  $k$ , and the openings near the opposite edges of the key-slips come under the lower reed-openings of the chromatic and diatonic sections.

$m'$  are holes cut through the slips  $m$  and coinciding with the lower reed-openings of the reeds common to the key to be played. These slips can be prepared by any one familiar with the science of music, and I will therefore describe the manner of arranging the holes to aid to a full understanding thereof. The object is to open only the reeds playing the tones in the desired key. Take, for instance, the key of C. In this key all the diatonic and none of the chromatic reeds are used, and I therefore cut the slip, as shown in Fig. 9, with one (the diatonic) side cut away to open all the reeds on its side, and the other (the chromatic) side blank, so as to close all the chromatic reeds.

In the keys of F and G there would be only one chromatic opening for each octave in this instrument, and as the instrument shown has three octaves there would be three chromatic openings. In the key of B $\flat$ , of which I show a slip in Fig. 9, there will be two chromatic openings for each octave, amounting to six openings in all. Where adjacent reeds are to be played the opening may be continued to form both in one, and where desired the openings might be cut right in from the edge, though when the slip is made of wood they would be likely to break easily, but they could be constructed out of metal.

I need not show or describe slips for all the keys, because the construction thereof will be in accordance with the rule or principle before described, by the aid of which any one skilled in the art can make a slip for any de-



sired key. Several of the slips will, by reason of the relation between certain different keys, play one key when used with one side uppermost and another key when reversed, as will be apparent to one familiar with the relations of the intervals of the different keys.

In practice it is my purpose to mark each side of the slips with the key or keys the slip will play when such side is uppermost. I prefer to use this key-slip, because it is easily constructed, cheap, and simple of application. It will be understood, however, that other devices could be employed to accomplish the result aimed at—namely, the automatic transposition of the scale by means of devices which open the reeds common to the key desired to be played and close those which are not used.

In Figs. 10, 11, 12, and 13 I show different modes of accomplishing the transposition of the scale, which I regard as substantial modifications of the key-slip device above described.

In Fig. 10 I show a section of a belt which in operation should be wound on rollers arranged on opposite sides of and parallel to the reed-board, or might form the periphery of a barrel arranged to move flush against the lower side of the reed-board. This belt is divided into sections corresponding in size to the key-slips before described, and perforated with openings in like manner to the said slips, which openings on each division are arranged to open the reeds common to the key desired to be played thereby.

In Fig. 11 the transposition mechanism is composed of a bank of thin boards made twice as wide as the slips before described and having their forward half provided with openings coincident to all the reeds, both chromatic and diatonic, and their other half constructed just like the key-slips before described, and each board provided with stops extended to the outside of the casing or otherwise arranged so that the board representing the key desired to be played may be brought forward, so as to bring its rear half in line with the forward half of the other boards, as will be understood from the drawings.

In Fig. 12 I show a sectional view representing the reed-board having valves hinged to the upper side thereof and extended down, and with their lower ends arranged to be engaged by pins arranged on a barrel, as shown. These valves are held to and over the lower reed-opening by a spring when their lower ends are not engaged by pins, as shown on the right in Fig. 12, and the barrel is provided with rows of pins, which are arranged at proper distances apart, and the pins of each row are arranged at proper intervals to open the valves covering the reeds common to any given key. It will be understood that when the barrel is arranged as shown in Fig. 12 there will be required two rows for each key desired to be played, the pins of one row opening the diatonic reeds and the pins of the

other row arranged diametrically opposite and opening the chromatic reeds of the same key.

In Fig. 13 I show a reed-board having a valve arranged on its lower side, with one side hinged and provided with an extension or rod the outer end of which is in position to be engaged by pins arranged on a barrel, as shown, so as to open the reeds common to the key desired to be played.

The use of these modifications instead of the key-slip would involve some slight mechanical changes of arrangement of the several parts, which would suggest themselves at once to a person skilled in the manufacture of instruments of the class to which my invention belongs, and it does not seem necessary, therefore, for me to describe such mechanical changes here. The belt shown in Fig. 10 would be visible through a suitable glass-covered opening in the framing, and might be provided on each section with a character to represent the key of the section under the reed-board when the former section is visible through the glass-covered opening, and the shafts of the pin-barrels shown in Figs. 12 and 13 might be provided with an indicating-hand moving on a suitable dial, so that in each case the proper reeds might be opened, and in the use of the mechanism shown in Fig. 11 the stops would be lettered to represent the key played by the boards which they were connected to, as will be readily understood. These devices would attain the same end as my key-slips; but I prefer the use of the latter as more convenient and less complicated, and therefore not so liable to get out of repair.

The terms "valves" and "key-slips," being names for specific construction of transposing mechanism for accomplishing the same result, will be designated in the claims under the general term of "valve" or "valves" for the sake of convenience, as they are so allied and kindred in operation.

*n* represents the music-sheet, which operates as a valve in its passage over the reeds. I have shown this valve as movable over the reed-board. It will be understood, however, that the instrument could be constructed so that the valve could be passed under instead of over the reed-board, and that the slight changes necessary to such a variation would readily suggest themselves to one skilled in the art.

My music sheet or valve is perforated according to the tune to be played, and I secure the opposite ends together, forming an endless belt. It is in the use of this endless belt that the advantage of the rollers *D d*<sup>3</sup> is experienced, as the one is journaled below the entrance and the other above the exit of the music-sheet. I have shown one of these rollers supported in bearings on the under casing of the instrument and the other one on the expression-box. It will be understood, however, that they could both be supported on either the main casing or the expression-box, and arranged one above and the other below the music-sheet entrance,



and removable, so as to permit the sheet to be put in place. I prefer, however, the arrangement as shown, as thereby the rollers are fixed in their bearings.

5 In placing the sheet the expression-box is removed and the music-band is placed around it, and it is then secured on the instrument by the devices before described. When the music is in a strip, not a belt, it may be wound on  
10 rollers supported on bearings  $n'$ , and the rollers may be connected by belt to the operating-shaft, so as to be given the motion necessary to wind the music-valve. The music-sheet is placed in the instrument as described, and the  
15 key-slip of the key in which it is written is then inserted. If the piece is to be played by sharps, the stop  $c^b$  is pushed in, as shown in full lines, Figs. 1 and 7, and if the piece is to be played by flats the stop is pulled out, as  
20 shown in dotted lines, same figures, and the crank  $e^b$  is turned and the instrument plays.

It will be understood that the transposition mechanism herein described is not only applicable to mechanical organs, but that it could  
25 be applied to organs having a common keyboard, and in such cases it would obviate the necessity of the black keys, and that, also, my transposition mechanism could be applied to all instruments having a regular reed-board—  
30 such as accordions—and that the changes necessary to make the devices applicable thereto would be merely mechanical, and in my opinion would not involve invention.

In my instrument all the relative minor  
35 scales are rendered in regular chromatic order, this being accomplished by the order of the perforations in the paper valve.

From the rules and principles before described, the person skilled in the art will be  
40 able to properly make and manipulate the slips for any desired key.

The paper, it will be understood, is cut to the letter of a key, and this may be played in either the sharp or flat key of the said letter.

45 I have hereinbefore described my improvements as applicable to reed-instruments. In manufacturing, however, I will make some of the instruments with pipes instead of reeds. To do this I remove the reeds proper from the  
50 reed-board and connect the reed-openings by flexible tubing with the pipes, which would be arranged in diatonic and chromatic series similar to the arrangement of the reeds. The key-changing slip will be passed in below the reed-  
55 board and the music-paper will be passed between the key-changing slip and the bellows, which, when pipes are used, will be made a force instead of a suction bellows.

I do not claim as my invention a music-sheet  
60 card or tablet having two tunes arranged thereon side by side, or with intermediate notes arranged at the side of the tune first laid out, or having a repetition of a tune or part of tune arranged at the side of the first tune laid out and  
65 running in a reverse direction thereto, and a laterally-shifting reed or duct board arranged

in combination with a music sheet card or tablet of the character hereinbefore just described.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, 70 is—

1. In a musical instrument of the herein-described type, the combination, with the reed-board and a music-sheet having a tune written therein and fixed relative to the reed-board 75 as regards any side-to-side or lateral movement, of a transposing mechanism consisting of a valve or valves constructed to operate in the manner described, whereby all passages of the reed-board except those belonging to 80 the scale of a certain key are closed for playing said tune in any desired key, substantially as set forth.

2. A compound reed-board constructed with reed-chambers on opposite sides of its air- 85 spaces and having the intermediate partition cut away on the wind-entrance edge, whereby wind is admitted to the opposite air-chambers through a common opening, combined with a valve or series of valves arranged to operate 90 substantially as described, whereby all the passages of the reed-board except those belonging to the scale of a certain key may be closed, substantially as set forth.

3. A reed-board composed of two sections 95 arranged alongside of each other, each section provided with a set of reeds, the reeds of one set alternating in the order of the chromatic scale with the reeds of the other set, one of said sections being adjustable alongside of the 100 other, substantially as and for the purpose specified.

4. In a mechanical musical instrument, the combination, with the compound reed-board having one section fixed and the other adjust- 105 able, of an elastic support arranged to press against the outer side of the adjustable section and hold the same snugly against the fixed section, substantially as set forth.

5. In a musical instrument, the combina- 110 tion, with a reed-board, of independent interchangeable transposing key-slips placed over the wind exit or entrance to the reeds and provided with openings registering with the reed-chambers for closing all passage-ways there- 115 through except those belonging to a certain key, substantially as specified.

6. In a musical instrument, the combination, with the reed-board, of an independent interchangeable transposing key-slip over the 120 wind entrance or exit to the reeds to close the passage-ways therethrough except those arranged in the order of the intervals of a scale, substantially as shown and described.

7. The combination, with the casing pro- 125 vided with an opening to receive the key-slip, of a cap provided on its inner edge with a suitable packing and provided with means whereby it may be secured to the casing over and covering the key-slip, as set forth. 130

8. In a musical instrument, the combination of the reed-board, an independent inter-



changeable transposing key-slip, and a yielding support to hold the latter close against the reed-board, substantially as described, and for the purposes specified.

5 9. The combination, substantially as described, of the operating-shaft provided with crank  $e^3$ , having wrist-pin  $e^4$ , the bellows  $h^1 h^2 h^3$ , and the connecting-arms  $j j' j^2$ , all pivoted at one end on the wrist-pin  $e^5$ , and having their  
10 opposite ends connected relatively with and operating the bellows  $h^3 h^2 h^1$ , substantially as set forth.

10. The combination of the reed-board having reeds arranged on opposite sides thereof  
15 and having wide upper openings common to its opposite reed-chambers, the interchangeable slip  $d$ , provided with narrow openings registering with the wide common openings of the reed-chambers to regulate the time of the music, substantially as described, the music sheet,  
20 and a presser whereby said sheet is held firmly against the slip  $d$ , substantially as set forth.

11. In a mechanical musical instrument, the combination, substantially as set forth, of the  
25 casing provided with key-slip openings, the reed-board arranged within the casing with its lower edge flush with the upper wall of the key-slip opening, and the bar  $K$ , arranged within the casing with its end adjacent to the  
30 key-slip opening flush with the under side thereof, and the spring  $K'$ , bearing under the bar  $K$ , all arranged to operate in connection with the key-slip, substantially as and for the purposes set forth.

35 12. In a mechanical musical instrument, the

combination of the casing, the reed-board arranged therein and constructed with a fixed section,  $c^1$ , and an adjustable or movable section,  $c^2$ , and a slot and handle-rod,  $c^6$ , connected with the section  $c^2$  and extended through  
40 the casing, substantially as and for the purposes specified.

13. In a mechanical musical instrument, the combination of the reed-board having a double  
45 row of reeds alternately arranged in the order of the chromatic scale, wind access to said pairs of reeds being had through a common opening, and having individual wind-exits, and a valve or series of valves arranged, substantially as described, to close all the wind-exits  
50 of the reeds except those belonging to the scale of a common key, as and for the purpose specified.

14. In a mechanical musical instrument, the combination of the casing and the reed-board,  
55 the latter made in two sections arranged alongside of each other, the reeds comprised in the sections alternating in the order of the chromatic scale, one section being movable relative to the other, and both sections having the receiving ends of their opposite reed-chambers communicating one with the other, substantially as specified.

In testimony whereof I affix my signature in presence of two witnesses.

ALPHEUS LOWMILLER.

Witnesses:

P. B. TURPIN,  
T. N. GRIFFIN.