

F. Peabody

Musical Instrument.

N^o 40,573.

Patented Nov. 10, 1863.

Fig. 1.

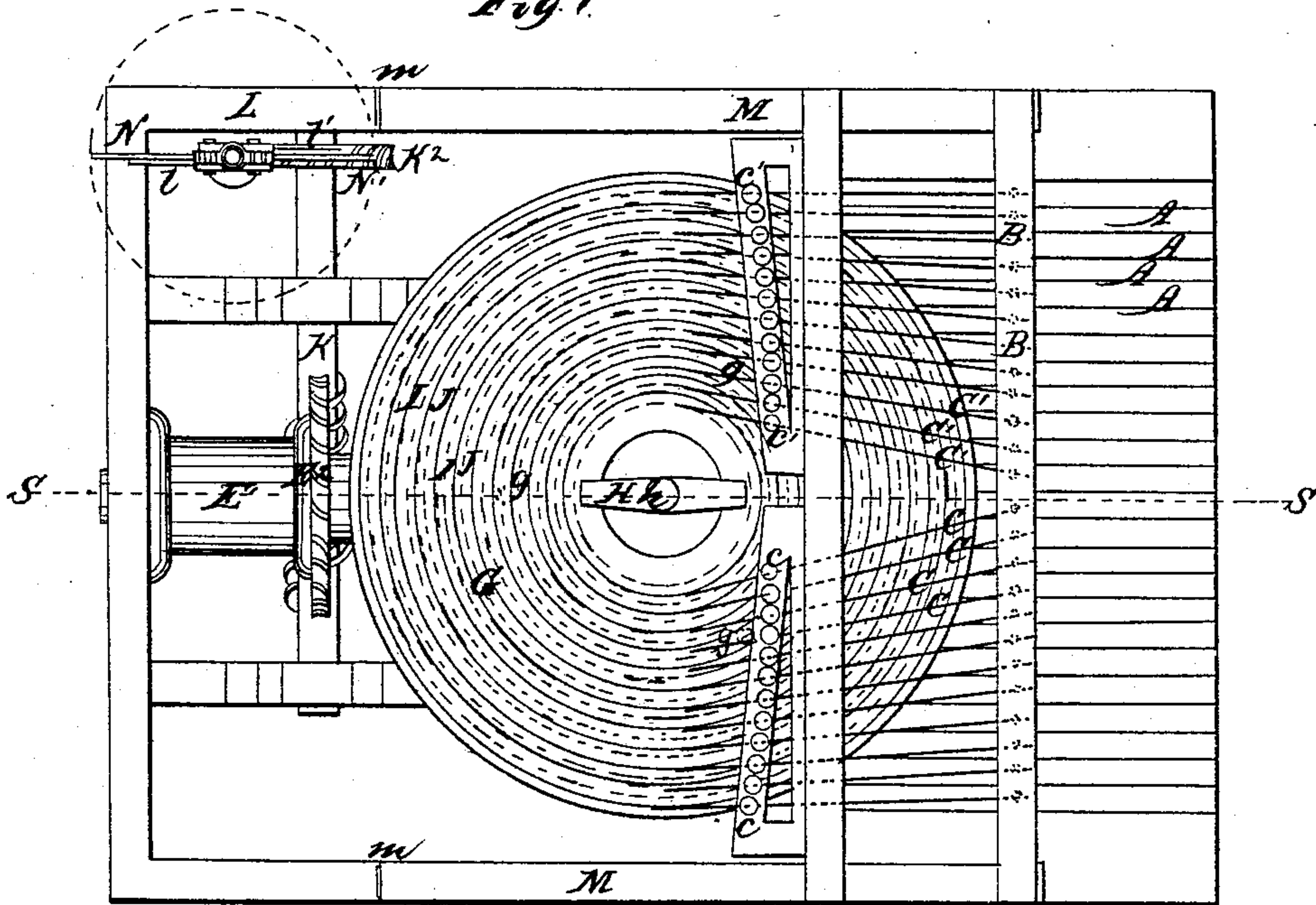
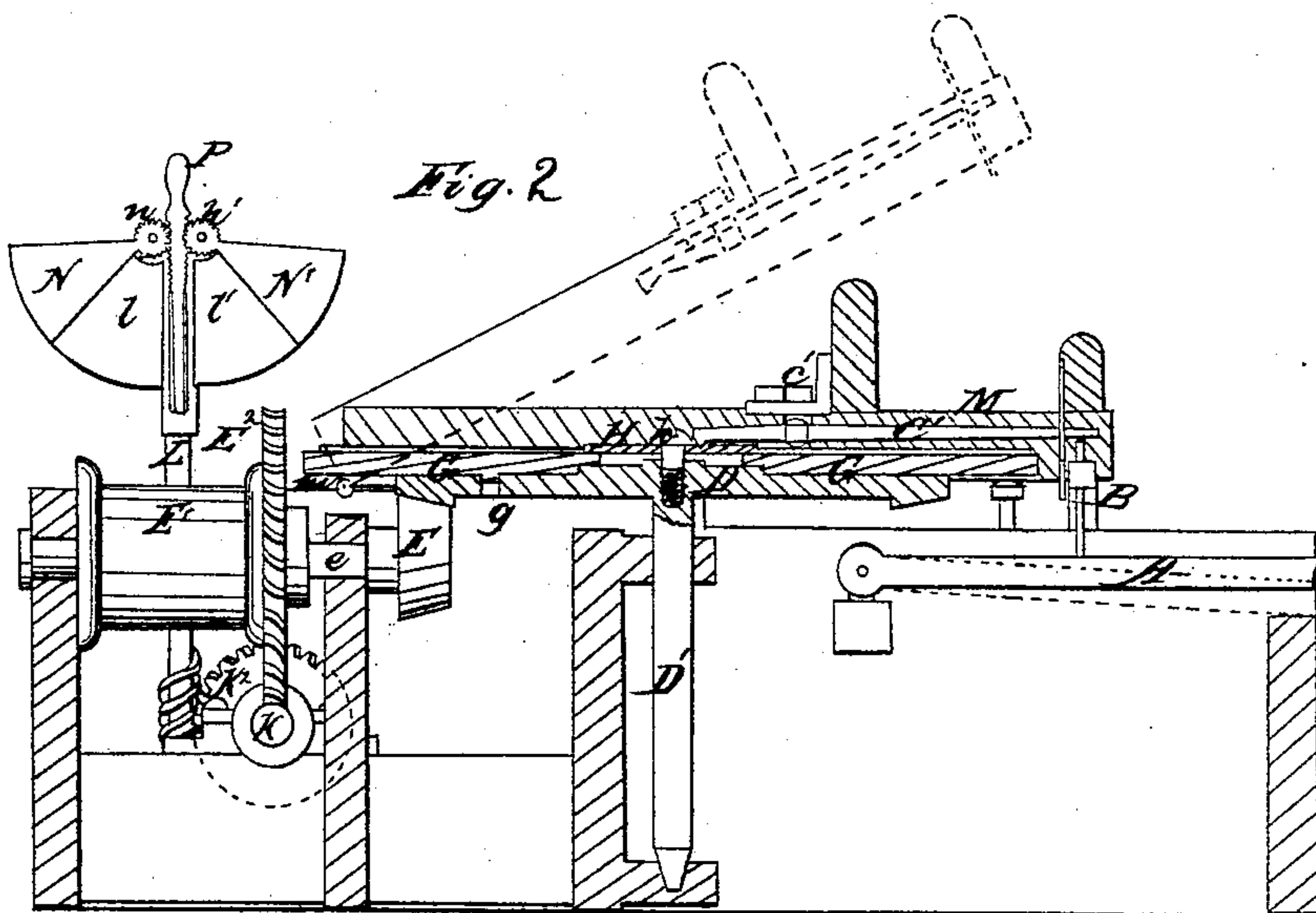


Fig. 2.



Witnesses

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UNITED STATES PATENT OFFICE.

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KEYED INSTRUMENT OF MUSIC.

Specification forming part of Letters Patent No. 40,573, dated November 10, 1863.

To all whom it may concern:

Be it known that I, FRANCIS PEABODY, of Salem, in the county of Essex and State of Massachusetts, have invented a certain new and useful Improvement in Keyed Instruments of Music; and I do hereby declare that the following is a full and exact description of the same, which is prepared with a view to the obtaining of Letters Patent therefor.

The accompanying drawings form a portion of this specification.

Figure 1 is a plan view, and Fig. 2 is a vertical section on the line S S in Fig. 1.

Similar letters of reference indicate like parts in both the figures.

The tints are employed to aid in distinguishing parts. They do not indicate the materials of which the parts are composed.

My invention is applicable to all kinds of instruments which operate by means of keys; and it consists in certain means whereby the instrument may be made to execute tunes automatically without consuming but little space with the automatic mechanism, or but little time in changing the parts, so as to play any tune for which properly-arranged dents or points have been provided, without any limit to the number and variety of tunes which an instrument of ordinary size and appearance may be made to automatically perform, and without necessarily involving any serious expense in the construction of the instrument, the expense being incurred, if preferred, in small increments, during the use of the instruments, by the purchase of dents suitably fixed to execute tunes singly or in small quantities, according to the ability or taste of the purchaser, or according as new and desirable music shall be found to appear.

My invention further consists in certain means whereby the rate of speed at which automatic instrumental performances analogous to this shall be regulated. These means admit of a very ready and rapid adjustment, so as to vary the time of the music at will.

My invention does not interfere in the least with the use of the instrument in the ordinary manner in playing by the touch of the performer. It even allows additional parts to be played by hand at the same time that the principal parts are being performed automatically.

To enable others skilled in the art to make and use my invention, I will proceed to de-

scribe its construction and operation by the aid of the drawings, and of the letters of reference marked thereon.

A A, &c., are the keys adapted to be operated by the fingers of a performer, and connected in the ordinary manner to the works of the instrument (not represented.) B B, &c., are trackers, and C C', &c., are levers adapted to depress the several corresponding keys, A A, through the medium of the corresponding trackers, B B. The centers of the motions of the several levers, C C', are indicated by *cc'*, &c., and the arrangement is such that an elevation of the back end of either of the levers C C' induces a depression of the corresponding key at the front of the instrument, and of course a corresponding emission of sound from the instrument; but so long as these levers C C' are not operated, the keys may remain at rest, or may be operated by hand, according to the will of the operator. A stout circular plate, D, fixed in a horizontal plane on the top of the vertical shaft D', is adapted to receive a slow rotating motion from the pinion or small bevel gear-wheel E, which is fixed on the shaft *e*, and receives motion through the aid of the windlass E' from a cord and weight or other suitable means of communicating power. (Not represented.) The upper face of the horizontal plate D is perfectly plane, excepting near its center, and receives and carries around in its slow rotation a plate, G, of metal, wood, or any other suitable material, which performs the function of operating the levers C C' by means of cams, pins, or dents fixed in its upper surface, in concentric circles, as indicated by I and J. Instead of cams, pins, or dents, holes may be pierced in the plate G, and by exchanging the levers C C', substituting therefor compound levers properly mounted, the holes will allow the levers to move and cause the keys to operate as the plate G rotates. In such case I arrange the holes in concentric circles, in a manner similar to the dents represented, so that the holes serve as equivalents for the dents. I use the dents in preference to the holes. This plate G forms a very important feature of my invention and is the only portion that is changed in adapting any given instrument to perform an indefinite number of pieces of music. I have, from motives of economy, constructed this plate G of wood,

and have been successful in producing a sufficiently rigid and apparently very durable plate by gluing thin pieces with the grain of one layer crossing the grain of the next layer, but I prefer to make them, by wholesale, of metal.

I believe cast-iron plates *G* may be formed with the skill now attained in the manufacture of sharp castings, which, with a little touching by hand, may be considered completely adapted to perform a given tune on any properly-adapted instrument, and I propose that such plates shall be carefully and rapidly prepared by the aid of elaborate machinery for cutting and finishing delicately if necessary, and that such shall be kept for sale by music dealers in the same manner as sheets of music are kept and sold, thus establishing a new branch of manufacture and commerce. The form of the plate allows a great number to be stored in a little space, and they may be very readily packed and transported. These holes *g g g* are bored in the plate *D* at the points indicated, and corresponding pins or projections are formed on the under face of the plate *G*, which fit therein and compel the two to rotate together. It is evident that it is practicable and may, on some accounts, be preferable, to make the projections on *D* and the recesses on the under side of *G*, in order that a lot of plates, *G*, may be better packed together; but I do not confine myself to either of these specific arrangements, the purpose being simply to compel one to rotate with the other so long as they are in contact, and allow of a ready separation and reunion at will. A button, *H*, adapted to turn on the central post, *h*, serves to secure and release *G* by a very simple operation, the plate being provided with a large hole in its center of a proper form to allow of its slipping over the button *H* when in one position relatively thereto, and of being very firmly retained thereby when the button is afterward turned partly around on its post *h*.

I divide the levers *C C'* into two sets in the manner represented.

The concentric circles *I* (denoted in black lines) indicate the lines on which those dents must be fixed which are to operate the baser keys through the medium of one set of the levers, *C*, and the concentric circles *J* (denoted in red lines) indicate the lines on which those dents must be fixed which are to operate the higher keys through the medium of the other set of levers, *C'*. This division is important to be understood by the parties who lay out and prepare the mechanism, and will be readily understood by artists of proper skill. It affords great advantages in the room which it makes available both in the arrangement of the levers *C C'* and the dents *I J*, but, except in case of an occasional repair or readjustment of some part, it is not necessary that the operator shall understand either this or the other nice points about the mechanism, it being only necessary to the successful use of my invention

that the operator possess sufficient mechanical skill to simply remove and substitute a plate, *G*, when a new one is supplied him, and to wind up or otherwise prepare and set in operation the mechanism which impels the rotation of the plate *D*. The levers *C C'*, it will be observed, are hung on the movable frame *M*, which is arranged to turn on the hinges *m*, so that the obstructing parts may be readily elevated out of the way whenever it is desired to remove or introduce the plate *G*. The additional mechanism represented contributes to control the rate of speed at which the plate *G* is allowed to work. The shaft *e* carries a large wheel, *E*², with skewed teeth. A cross-shaft, *K*, lying directly below this, carries a worm or screw having a very great pitch or angle in the position of its threads relatively to its axis, and adapted to be acted on by the skewed teeth of the wheel *E*², so as to compel a quick motion in the shaft *K*, the same being received from the slow motion of *E*² in a manner which (though not often employed, on account of the friction it induces) will be readily understood by mechanics. The wheel *K*² on the part of *k* opposite to the upright shaft *L* communicates a quick motion to the latter by means of similar skewed teeth on *K*² and a similar quick turn on the shaft *L*, so that the result is a rotatory motion of the upright shaft *L*, which is actuated by the same original agent as the plate *G*, but is many hundred or thousand fold quicker in its rate of revolution. The upper end of the shaft *L* is hollow and carries one set of fixed and another movable rings adapted to resist the revolution of the same at a too high velocity by reason of the action of the air. The fixed wings or surfaces are denoted by *l l'*. The movable wings are denoted by *N* and *N'*. They are formed and arranged as represented on the centers *n n'*, so that they serve practically to extend the area of the surfaces *l l'* to a greater or less extent, according as they are elevated and extended or depressed and contracted. A double rack is formed on a sliding piece, *P*, mounted within the hollow shaft *L*, and this meshes into corresponding gearing on the hubs or centers of the movable wings *N N'*, so that by elevating and depressing *P* the wings are simultaneously turned on their respective centers *n n'* and extended or contracted, so as to cause the resistance offered by the air to the rotation of *L* to be increased or diminished, and consequently to compel the entire mechanism to be correspondingly restrained or released from restraint. Elevating the rod *P* contracts the wings *N N'* and allows the music to be performed quicker, while a lowering of *P* extends the wings *N N'* and by acting on more air and striking it at a higher velocity by the larger circle in which the wings travel, it creates a greater resistance to the motion and compels the mechanism to turn more slowly, and consequently, insures a slower performance of the music. I find that the motion can be controlled very satisfactorily and noise-

lessly by this means, and propose to connect a suitable stop or other device to the rod P, so that it can be controlled by the hand of the attendant or operator while a piece of music is being performed, thus allowing the time of certain parts to be varied at will, in order to give expression to words accompanying the performance, or to humor any whim and accommodate the taste of the performer.

The form of the mechanism which controls and adjusts the position of the wings may be varied at pleasure. I have represented simply a set-screw for holding the parts in the position desired; but this may be replaced by other devices or dispensed with altogether and friction alone relied on if any extensive connection of parts is employed. So also the skewed teeth and worms employed to communicate motion between *e* and L may be replaced by more ordinary gearing or other well-known means of conveying power so long as it is conveyed so that the speed is greatly increased.

Some of the advantages due to separate features of my invention may be separately enumerated, as follows: First, by my employment of the plane or slightly conical or dish-shaped plate G, arranged to be readily mounted on and removed from the plate D by the raising of the frame M and the parts mounted thereon, and adapted to be stored and transported with convenience, I am able to adapt not only church-organs, but parlor-instruments, and the great majority, if not the whole, of the popular keyed instruments now in use, to the automatic performance of any music desired, to inaugurate a new branch of trade in supplying the concentrically, arranged dents to facilitate the learning of musical performance on keyed instruments by causing the learner to follow with his fingers the automatic depressions of the keys, and to facilitate the performance by a single skilled performer (adding the action of his hands to that of the automatic parts) of a before-impracticable number of parts on a common construction and style of instrument; second, by my division of the levers C C' into two series, arranged as represented, centering each on the center *e*, so that the lines of the back ends of the several levers stand in the positions represented, and correspondingly

arranging the several dents—that is to say, placing the dent to operate a given base-key not on the same side of the center of the plate G, as a dent to operate a given note and produce the chord desired, but on a part of the plate widely separated therefrom—I am able to render available more space for the levers C C', so as to mount their centers and their back ends much wider apart than would be allowable were all the levers to stand with their back ends in a single series on one side of the center of the plate G, and am able, in fact, to avoid most of the crowding of the dents, which would otherwise be experienced in making very full chords and quick passages, and can use much smaller plates G, and consequently can arrange the entire apparatus, so as to occupy less space, whether in or out of the instrument; third, by my employment in connection with an automatic mechanism, substantially as described, of the hollow shaft L, adjustable wings N N', and adjusting-rod P, arranged as described, I am able to control the time of the music cheaply and without noise and in a manner which allows of ready variation by suitable connections while the music is being performed.

Having now fully described my invention, what I claim as new therein, and desire to secure by Letters Patent, is as follows:

1. In keyed instruments, the use of concentric series of dents I J, or their equivalents, mounted on removable plates G, and arranged relatively to a removable series of levers, C, so as to operate therewith in the manner substantially as herein set forth.

2. The division of the levers into two independent sets, C C', operated on opposite or nearly opposite parts of the plate G, substantially as and for the purpose herein set forth.

3. The speed-regulator composed of the hollow shaft L, changeable wings N N', and adjusting-rod P, arranged to operate in connection with each other and with the automatic works of a keyed instrument, substantially as and for the purpose herein set forth.

FRANCIS PEABODY.

Witnesses:

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