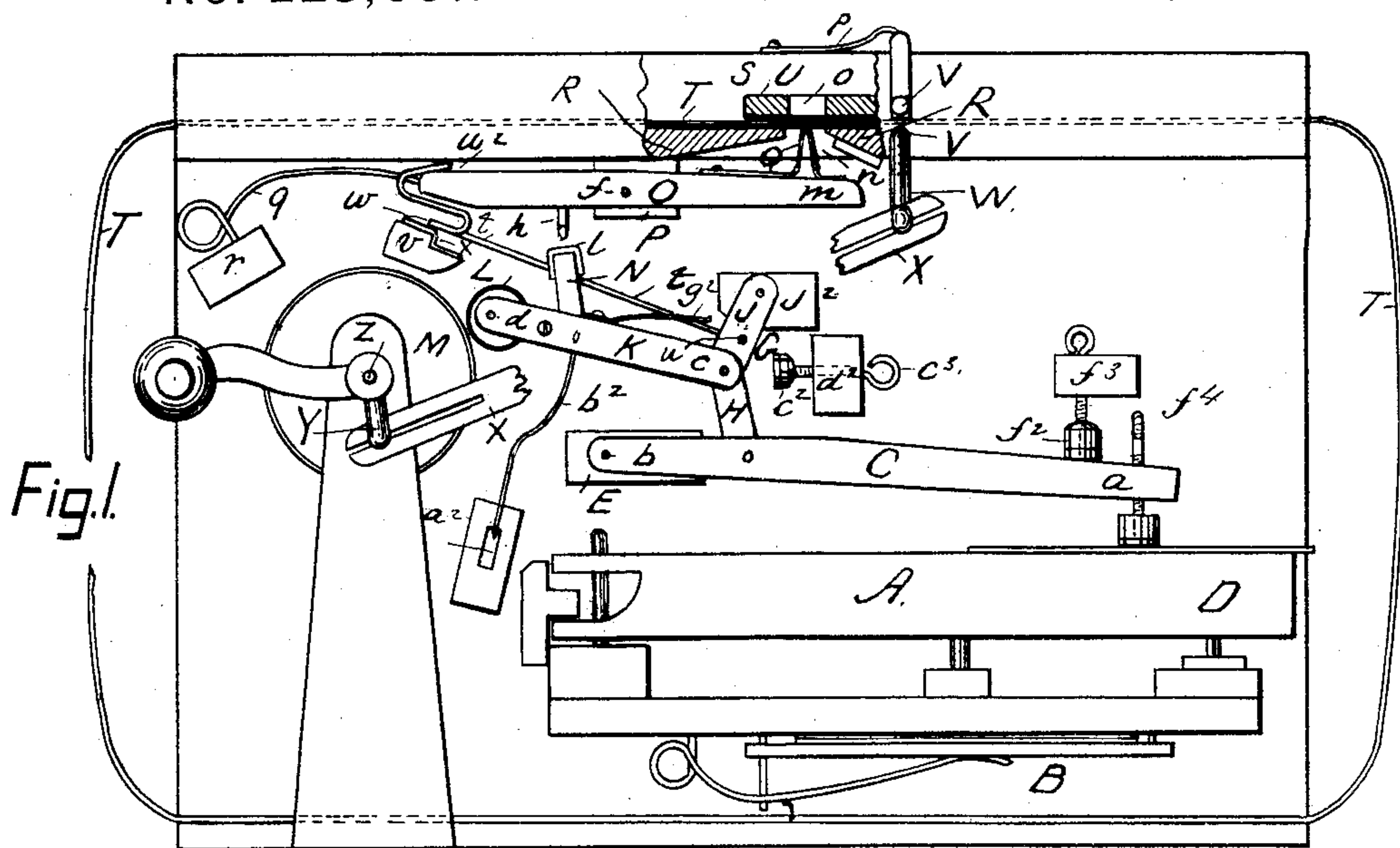


O. H. ARNO.
 Mechanical Musical Instrument.
 No. 223,091. Patented Dec. 30, 1879.



UNITED STATES PATENT OFFICE.

OLIVER H. ARNO, OF WILMINGTON, MASSACHUSETTS, ASSIGNOR TO JAMES MORGAN, OF BROOKLYN, NEW YORK.

IMPROVEMENT IN MECHANICAL MUSICAL INSTRUMENTS.

Specification forming part of Letters Patent No. **223,091**, dated December 30, 1879; application filed September 9, 1879.

To all whom it may concern:

Be it known that I, OLIVER H. ARNO, of Wilmington, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Reed-Organ, of which the following is a full, clear, and exact description.

This improvement in reed-organs relates to mechanism for securing from the travel of a perforated strip of paper, or of other suitable material in proper relation thereto, an automatic opening and closing of the valves of a reed-organ in accordance with the arrangement of perforated and imperforated portions in said strip, and thereby, under a proper arrangement of such perforated and imperforated portions, the automatic playing of a tune by the organ to which such mechanism is applied.

This invention consists, essentially, in the combination, with a lever arranged to open the valve of a reed-organ, of a lever arranged to operate on the first-named lever, and of itself to be operated by the rotation of an eccentric-roller in contact with a revolving drum; and the invention comprises other features, all of which will be fully hereinafter described.

In the accompanying plate of drawings, Figures 1 and 2 are views, in elevation, showing one organ-key and its valve with the present improved arrangement of mechanism applied thereto, Fig. 1 illustrating the same with the valve closed, and Fig. 2 with the valve opened; Fig. 3, a plan view of Fig. 2 on a reduced scale; and Fig. 4, a vertical cross-section on line *x x*, Fig. 2.

In the drawings, A represents a key, and B a valve, to a reed-organ, all as ordinarily; C, a lever. This lever C is arranged horizontally above the key A, and in the same direction therewith, and at one end through an adjustable block or button, *a*, it rests upon the finger-end D of the key A, and at the other end it is hung upon a fulcrum-pin, *b*, of a horizontal rail, E, which extends crosswise of the key, and is supported in any suitable frame-work. This lever C swings in a vertical plane coincident with the plane of movement of the key.

G is a toggle-lever. This toggle-lever G is

hung by one arm, H, to the horizontally-arranged lever C, and above said lever C it is hung by its other arm, J, to a horizontal rail, J², which extends crosswise of the key A and lever C, and at the junction of its two arms H and J it is connected to one end, *c*, of a horizontally-arranged arm, K, which arm K at its other end, *d*, carries a roller, L, eccentrically hung thereto, and in a position to bear by its periphery upon the periphery of a horizontal drum, M, arranged to be revolved and to turn in bearings of a suitable supporting framework. The toggle-lever G, arranged as aforesaid, occupies a vertical position.

N is an upright on the upper side of the carrier-arm K to the eccentric-roller L, and between said roller L and the connection of the arm K with the toggle-lever G.

Over the toggle-lever G and eccentric-roller L is a lever, O, which is arranged in a horizontal plane to turn on a fulcrum, *f*, which is intermediate of its two ends, and is supported by a horizontal rail, P, running transversely to said lever, which rail, in turn, is supported in any suitable frame-work. The lever O swings in a vertical plane, and it and the toggle-lever G and eccentric-roller L, with its carrier-arm K, are all in a vertical plane coincident with that of the key A and lever C, resting thereon, as aforesaid.

The lever O, near one end, *g*, and on its under side, has an adjustable pin, *h*, located so as to impinge against the upper end, *l*, of the upright N on the carrier-arm K for the eccentric-roller L, and at its other end, *m*, on its upper side, it has a V-shaped upright, Q, opposite to which, in the bed-piece R of a horizontal guideway, S, is an opening, *n*, for the admission of said V-upright of the lever.

T is a strip of paper, having perforations along its length and at points therein. This paper strip T lies in the guideway S, and said guideway at the opening *n* in it is provided with a block, U, which has an opening, *o*, through it, which is opposite to the opening *n* of the guideway, and the paper strip lies between this block U and the bottom of the guideway S.

V V, two horizontal feed-rollers, located at one side of the block. These rollers are ar-

ranged one above the other and transversely of the guideway S, and the bite between the two is in the same plane as the upper surface of the bed-piece R to the guideway S. The upper roller has springs p applied to it, to secure a yielding pressure of it on the lower roller, and at each end of the lower roller is a similar crank-arm, W, both of which arms are connected by pitmen-rods X X to similar crank-arms Y of a common shaft, Z—as, for instance, the shaft of the wheel or drum M, hereinbefore referred to.

The revolution of the feed-rollers V V carries the perforated paper strip along the bed-piece of the guideway S and between it and the block U, and as it is so carried the perforated parts and the imperforated parts in said paper strip pass along in a line with the opening n in the said bed-piece R for the V-upright of the horizontal lever O and in a line with the opening n in the said block U.

q is a bent spring, fixed at one end to a horizontal rail, r , of the supporting frame-work. This rail r is transverse to the length of the key A, and the said spring q , fixed to it as aforesaid, rests upon the upper side of the horizontal lever O, and serves to hold the upright of said lever against the paper, and by it to force such upright into the perforation of the strip as the same passes by it.

t is an arm, hung at one end, u , to the upper arm, J, of the toggle-lever G, from which it passes, at one side of the post N of the eccentric carrying-arm K to the end w^2 of the horizontal lever O, and there it is adapted for a contact between it and the upper side of said lever O, as shown at w^2 , and for a rest of it on a horizontal transverse rail, v , and for an abutment of its end w against the shoulder x along the upper face of said rail, as shown at x^2 , Fig. 2.

With the lever O at a bearing on an imperforated part of the paper strip the eccentric-roller L is out of contact with the periphery of the wheel M, and with the lever within a perforation of the paper strip the eccentric-roller is in contact with the periphery of the roller M.

The parts arranged as above described cause, by the travel of the perforated paper strip along the guideway, the depression of the key A, and thus the opening of the valve B. This depression of the key is effected by the straightening out of the toggle-lever G through the rotation of the eccentric-roller on the wheel or drum M, and this operation of the eccentric-roller is secured each and every time such roller is brought into contact with the wheel or drum M from the depression of the arm K, which carries it by the downward swing of the end w^2 of the horizontal lever O, on which end the bent spring q bears, which downward spring of the lever O takes place each and every time a perforation in the paper strip T, because of its feed by the feed-rollers along the guideway, comes to the V-upright of said lever.

The straightening out of the toggle-lever G carries the arm t with it, and, as the lever is depressed as aforesaid, this carrying of the arm t secures its drop on the rail v and its coming to a bearing against the shoulder x of such rail v , and by this bearing the return of the toggle-lever to its original position is prevented until the arm t is released from such bearing x , which takes place when by the continued passage of the perforated strip an imperforated portion thereof comes to the V-upright of the lever O, which causes said lever O at its end having said V-upright to be depressed, raising the other end of the lever against its spring q , and the arm t from its said bearing on the shoulder x of the rail v , as also relieving the downward pressure on the carrier-arm to the eccentric-roller L, which leaves the action work of the key then free to throw back the toggle-lever and secure the closing of the valve.

The herein-described upward and downward movement of the eccentric-carrier K is limited by the length of a slot, a^2 , in which an arm, b^2 , attached to said carrier plays; c^2 , a button located on a horizontal rail, d^2 , to bear against the toggle-lever G as it is straightened out under the movement of the parts above described and attached to a screw-pin, e^3 , which screws through said rail d^2 , and thus adapted to be regulated or adapted in such bearing as may be desired; f^2 , a button located on a horizontal rail, f^3 , in position to bear upon the upper side of the lever O, through which the key is depressed, as hereinbefore described. This button is carried by a screw-stem, f^4 , screwing through said rail, and by turning this stem the said bearing of said button can be adjusted or regulated as desired. g^2 is a bent spring attached at one end to the eccentric-carrier K, and at the other end resting on the arm t , connected to the toggle-lever, and disposed between it and the one end g of the lever O, through which the perforated paper strip directly acts, as aforesaid. This bent spring serves to lift the eccentric from its bearing on the wheel M, when the pressure of the lever O on the eccentric-carrier is released.

From the above it is obvious that the depression of the key is secured by the wheel M, eccentric L, toggle-lever G, and lever O, and that this action of such parts occurs on contact between the wheel M and eccentric L, made by the tilt of the lever O in the one direction; and, furthermore, it is obvious that such depression of the key is entirely independent of the perforated strip T of paper, which has simply to release its pressure on the eccentric-carrier K against the bent spring q bearing on such lever, the force of which spring is slight compared with the resistance to be overcome in the depression of the key, and is only required to be of such a degree as to insure contact between the eccentric-roller L and wheel M as a perforation in the paper strip comes opposite to the V-upright of the lever.

The upright Q on lever O, of V-shape, as

herein described, has the apex or angle of its legs uppermost, the legs being attached by their open end to the lever.

In the drawings, the perforated paper strip is shown as endless, but obviously this is not necessary; and, again, the mechanism which has been described is shown as arranged at and above the rear portion of the key, but obviously it may be, in lieu thereof, arranged to the front of the key, and it is my intention to so arrange it, and in so arranging it to place the same in a supporting-frame suitable to place the said mechanism into and out of position on the key, as may be desired.

Again, the mechanism hereinabove described is to be duplicated, except, as is obvious, a single guideway of the width of the series of keys and a single perforated paper strip of the proper width are all that are necessary as to such parts.

Again, the lever which presses upon the valve through the key might operate directly upon the valve, and the invention is applicable as well to pipe-organs as to reed-organs.

Fig. 5 shows a modification in form of the lever G, which is operated upon, by the eccentric-roller L, to depress, through the lever C, the key A.

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

1. The combination, with a lever arranged to open the valve of a reed-organ, of a lever arranged to operate on such lever and of itself to be operated by the rotation of an ec-

centric-roller in contact with a revolving drum, substantially as and for the purpose specified.

2. A lever, C, arranged to open the valve of a reed-organ, and a lever arranged to operate said lever C through the rotation of an eccentric-roller, in contact with a revolving drum, in combination with a lever arranged to place such eccentric-roller in contact with said drum, and to allow such contact to be broken by the feed of a perforated strip of paper, all substantially as and for the purpose described.

3. The combination of a tilting lever, arranged in relation to a perforated strip of paper, with a rotating wheel or drum, an eccentrically-pivoted roller connected by intermediate devices with a swinging lever, which is adapted to actuate an organ-valve, substantially as and for the purpose described.

4. The combination of a lever, O, arranged to be operated by and through the feed of a perforated sheet of paper, of an arm, *t*, which, at one end, is adapted to rest on said lever O and to catch in the shoulder X of a rail, *v*, and at the other end is affixed to a lever arranged to act upon the valve of an organ, all substantially as and for the purpose described.

5. The arm *b*², arranged in a slot, *a*², in combination with an arm, K, carrying an eccentric-roller, L, and a lever arranged to operate upon the valve of an organ by means of the rotation of a wheel or drum, substantially as described.

OLIVER H. ARNO.

Witnesses:

EDWIN W. BROWN,
W. S. BELLOWS.