

(No Model.)

2 Sheets—Sheet 1.

S. JENKINS.

KEY BOARD ATTACHMENT FOR MUSICAL INSTRUMENTS.

No. 280,043.

Patented June 26, 1883.

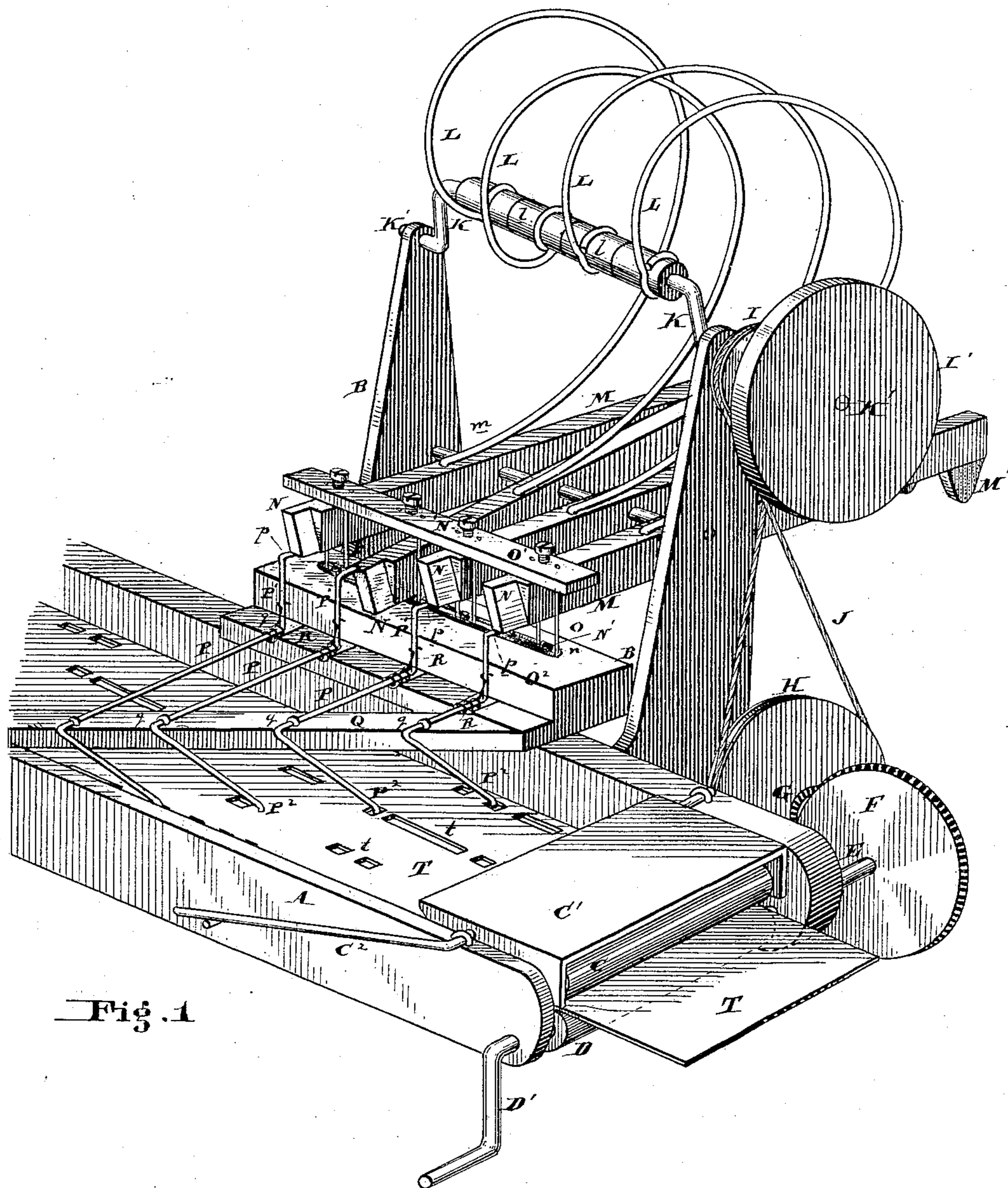


Fig. 1

Attest  
L. J. Malas.  
*[Signature]*

Inventor  
Sylvester Jenkins  
By his atty.  
*[Signature]*

(No Model.)

2 Sheets—Sheet 2.

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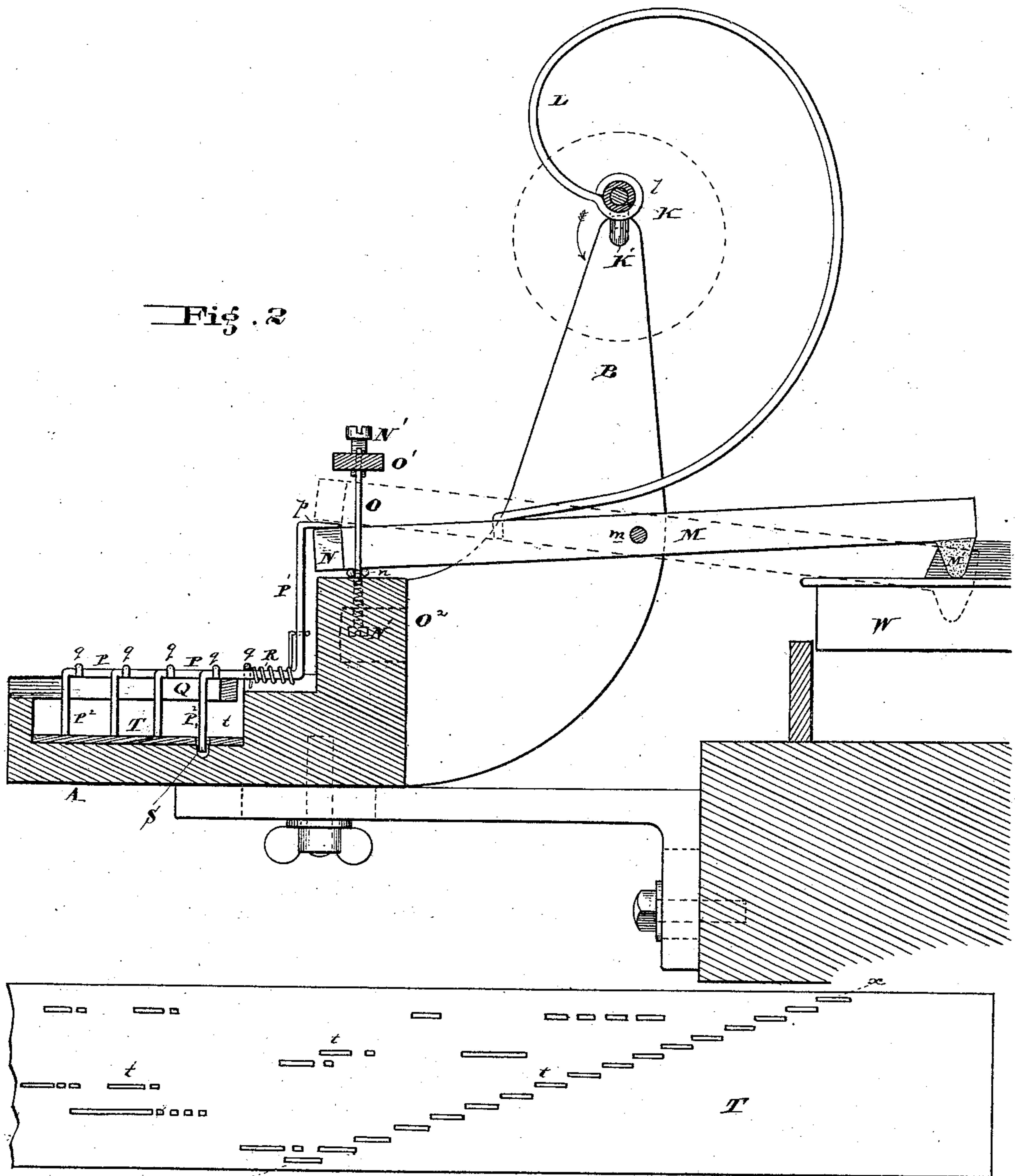


Fig. 3

Attest

*L. J. Mason*  
*[Signature]*

Inventor

*Sylvester Jenkins*  
By his atty.

*[Signature]*

# UNITED STATES PATENT OFFICE.

SYLVESTER JENKINS, OF NORRISTOWN, PENNSYLVANIA.

## KEY-BOARD ATTACHMENT FOR MUSICAL INSTRUMENTS.

SPECIFICATION forming part of Letters Patent No. 280,043, dated June 26, 1883.

Application filed August 26, 1882. (No model.)

*To all whom it may concern:*

Be it known that I, SYLVESTER JENKINS, of the city of Norristown, in the county of Montgomery and State of Pennsylvania, have invented an Improvement in Musical Instruments, of which the following is a specification.

My invention has reference to musical instruments which are adapted to be operated automatically; and it consists of a frame or table, which is attached to the piano, organ, or other keyed instrument, or supported upon the floor, and upon which and lengthwise with the key-board is caused to move, by feed-rollers, a sheet of perforated paper, which represents and produces the tune by permitting, as it passes along, small fingers to fall into and rise out of the perforations therein, thereby releasing or securing the ends of short arms or levers which extend to the keys of the piano, organ, or other keyed musical instrument, which arms or levers, when free, are rapidly vibrated or oscillated by suitable means; further, in the peculiar construction of the perforated paper, and in many details of construction, all of which are more fully set forth in the following specification, and shown in the accompanying drawings, which form part thereof.

The object of my invention is the production of all possible music upon a piano, organ, or other keyed instrument by a cheap, simple, and purely mechanical attachment applied to the key-board of the musical instrument proper.

In the drawings, Figure 1 is a perspective view of a musical-instrument attachment embodying my invention. Fig. 2 is an end elevation of same with part in section, and Fig. 3 is a plan view of a portion of the perforated music-paper.

No paper could endure for any length of time the strain and chafing if the resistance of the keys were transmitted directly upon said paper; but by suitable devices the paper may be caused to throw into action a power sufficient to overcome the great resistance and give the required rapidity of movement to the operating parts. My apparatus for accomplishing this result may be described as follows: The arms or levers M are pivoted at *m* to the frame B, and during the operation of the instrument

they have a continual inclination for rapid vibration, which is produced by springs L and crank K. These springs L, which give to the arms their vibrating tendency, are preferably so constructed that they give a uniform resistance to the crank-shaft K' and the driving mechanism generally, and thereby avoid the necessity of a large and inconvenient fly-wheel. They should also be so constructed that the wearing of the bearings will cause no knocking or jarring while in rapid motion. Owing to the number of springs and the rapidity with which they move, they should also be constructed with a view to the least possible friction. These springs, as shown, are substantially of spiral construction, their focal ends being secured to sleeves *l* upon the crank K of the shaft K', which is supported in bearings in the frame B and carries on one end the band-wheel I and preferably a small fly-wheel, I', as shown. Their free or outer ends are secured to the pivoted arms M, a little to one side of their fulcrums *m*. When the ends of the levers or arms M are down, the eyes or focal ends of the springs L, in their spent or free positions, will be in a line with the crank-shaft K'. Now, when the eyes of the springs are placed upon the sleeves *l* on the crank K, it is readily seen that the tension of the spring is the same in every part of the revolution of the crank, there being an equal tendency to the center of motion. As all of the springs are continually in motion, there is no resistance to overcome, except the steady friction on the bearings of the sleeves *l* and shaft K'. It is evident that with this construction there will be no knocking from side to side, but that all of the journals will follow the peripheries of their boxes.

One end of the arms M is provided with a projection, M', preferably of yielding material, as rubber, extending downward to the keys W of the piano, organ, or other keyed instrument, and the other end of each of these arms is provided with an oblique extension, N, made flat on top and bottom, and they are further guided by rods O or their equivalent, regulated by screws N', and their motion arrested by cushions or cushion-cords *n*. These guides are held by frame O' and bar O'. These arms M may be arrested at either extreme position of their oscillation or vibration by suitable latch-levers, consisting of shaft P, carry-

ing on one end the vertical rod  $P'$ , provided with the latching-foot  $p$ , and on the other with a downwardly-projecting oblique arm,  $P^2$ , the shaft  $P$  being journaled on frame  $O^2$  and bar  $Q$  at  $q$ . They are each provided with a spring,  $R$ , which is adapted to throw the foot  $p$  above or over the extension when the same is depressed, the spring also keeping the arm  $P$  down upon the paper  $T$ . The arm  $P'$  has sufficient springing action to cause it to spring the foot  $p$  over and below the extension  $N$  when the same is raised, it being bent by the oblique face of the extension  $N$  in its upward movement.

To remove and replace the feet is the office of the perforated paper  $T$ , provided with the perforations  $t$  of various lengths. The paper  $T$  moves in a line parallel with the key-board of the instrument, and is guided and supported by the frame  $A$ , which is provided at one end with means to feed said music-paper, which means may consist of two feed-rollers,  $C$   $D$ , the former of which is supported in a frame,  $C'$ , which is pressed toward the roller  $D$  by spring or springs  $C^2$ . The roller  $D$  is supported in fixed bearings in the frame  $A$ , and its shaft  $E$  is provided on one end with a crank,  $D'$ , or other means by which it may be rotated, and on the other end with a bevel-gear wheel,  $F$ , which meshes with a bevel-pinion,  $G$ , secured to or rotating with a band-wheel,  $H$ , which in turn transmits motion to the wheel  $I$  on crank-shaft  $K'$  by band  $J$ .

The table or frame  $A$  may be provided with depressions  $S$ , into which the ends of arms  $P^2$  may fall when an aperture in the paper  $T$  admits thereof.

The paper is perforated in an oblique line across its surface, as shown in Fig. 3 at  $x$   $x$ , which may be considered the starting-line from which all future notes are laid off. As I prefer to construct my instrument, this oblique line would be equal to and parallel with the line formed by the ends of the arms  $P^2$ , and extends over a length of paper equal to the length of the machine, or so much of it as is covered with the arms  $M$ . All other papers have heretofore been perforated in lines at right angles to their length; but to use such paper it would be necessary to complicate the mechanism generally, and hence is not desirable. I therefore consider the obliquely-perforated paper of great importance, and as a decided improvement upon all perforated music-papers heretofore manufactured.

While in the drawings I have only shown four arms corresponding to four keys, nevertheless it is evident that there may be any desired number.

Various kinds of vibrating springs may be used, and the latching devices may be greatly modified, as I do not limit my invention to the specific devices shown. After the paper  $T$  has been placed in position and the machine set in motion, the crank is rapidly rotated, giving motion to the springs  $L$ , and causing the arms  $M$  to vibrate rapidly when freed from

the latching-feet  $p$ . As the paper is fed through the rollers  $C$   $D$  the arms  $P^2$  are raised or lowered sufficient to latch or unlatch the arms  $M$  and enable them to operate the musical-instrument keys in accordance with the perforations of the paper. By suitable connections one or more of the arms may be also made to operate the organ-stops or the pedals.

This invention is particularly valuable for pianos, as it is capable of rapidity of action, so necessary to produce the required effects.

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

1. In an automatic key-board attachment for pianos, organs, &c., a series of arms or levers corresponding with the keys placed above and in contact with the same, and arranged to vibrate to directly operate said keys, in combination with spring mechanism directly and rapidly acting upon said levers to force them alternately up and down, and latching mechanism to free or hold said levers up or down in opposition to the spring mechanism, and thereby control the time and duration of their vibration, substantially as and for the purpose specified.

2. In an automatic key-board attachment for pianos, organs, &c., a series of arms or levers corresponding with the keys placed above and in contact with the same, and arranged to vibrate to directly operate said keys, in combination with springs which are constantly changing their direction of tension and continually tending to vibrate said levers, means to change the tension of said springs, latching mechanism to free or arrest said vibrating arms, and means to control said latching mechanism in accordance with the music to be played, substantially as and for the purpose specified.

3. In an automatic key-board attachment for pianos, organs, &c., a series of arms or levers corresponding with the keys and arranged to vibrate, in combination with springs to vibrate said arms, latch mechanism to free or arrest said vibrating arms, and a traveling perforated paper to control said latch mechanism, substantially as and for the purposes specified.

4. In an automatic key-board attachment for pianos, organs, &c., a series of arms or levers corresponding with the keys, placed above and in contact with the same, and arranged to vibrate, and spring mechanism continually tending to vibrate said arms, in combination with a traveling perforated music-paper arranged parallel with the keys, and adapted to control their action, substantially as and for the purpose specified.

5. In an automatic key-board attachment for pianos, organs, &c., the vibrating arms or levers, in combination with a crank and springs connecting said crank with said arms, the said springs being constructed, substantially as shown, so that they offer the same or substantially the same resistance to said crank during

its entire revolution, substantially as and for the purpose specified.

6. In an automatic key-board attachment for pianos, organs, &c., the combination, with  
5 crank K and springs L, of arms or levers M, provided with extensions N, means to govern the extent of their vibration, latching-feet *p*, means to operate said feet, and perforated music-paper T, substantially as and for the  
10 purpose specified.

7. In an automatic key-board attachment, the combination of crank K, springs L, pivoted arms M, provided on the end with oblique pro-  
15 jections N, means to guide and govern the extent of their vibration, shafts P, carrying arms P' P<sup>2</sup>, and latch-feet *p*, springs R, perforated paper T, and means to feed said paper, substantially as and for the purpose specified.

8. The combination of shaft K', provided  
20 with crank K, springs L, pivoted arms or levers M, provided on their ends with oblique extensions N, shafts P, carrying arms P' P<sup>2</sup>, and feet *p*, springs R, perforated paper T, feed-

rollers C D, and means connecting said feed-rollers with the crank K, whereby both may  
25 be revolved at the proper relative velocities, substantially as and for the purpose specified.

9. The perforated sheet-music in which the perforations are arranged in an order from a  
line diagonally across the paper, whereby it  
30 may operate laterally to a direct action through its mechanism to the keys, substantially as and for the purpose specified.

10. A music-sheet for a mechanical musical instrument, having the means which effect the  
35 operation of the sound-producing devices in any desired chord or combination simultaneously, arranged in rows which extend obliquely to its length.

In testimony of which invention I hereunto  
40 set hand.

SYLVESTER JENKINS.

Witnesses:

CHAS. S. JENKINS,  
O. M. EVANS.