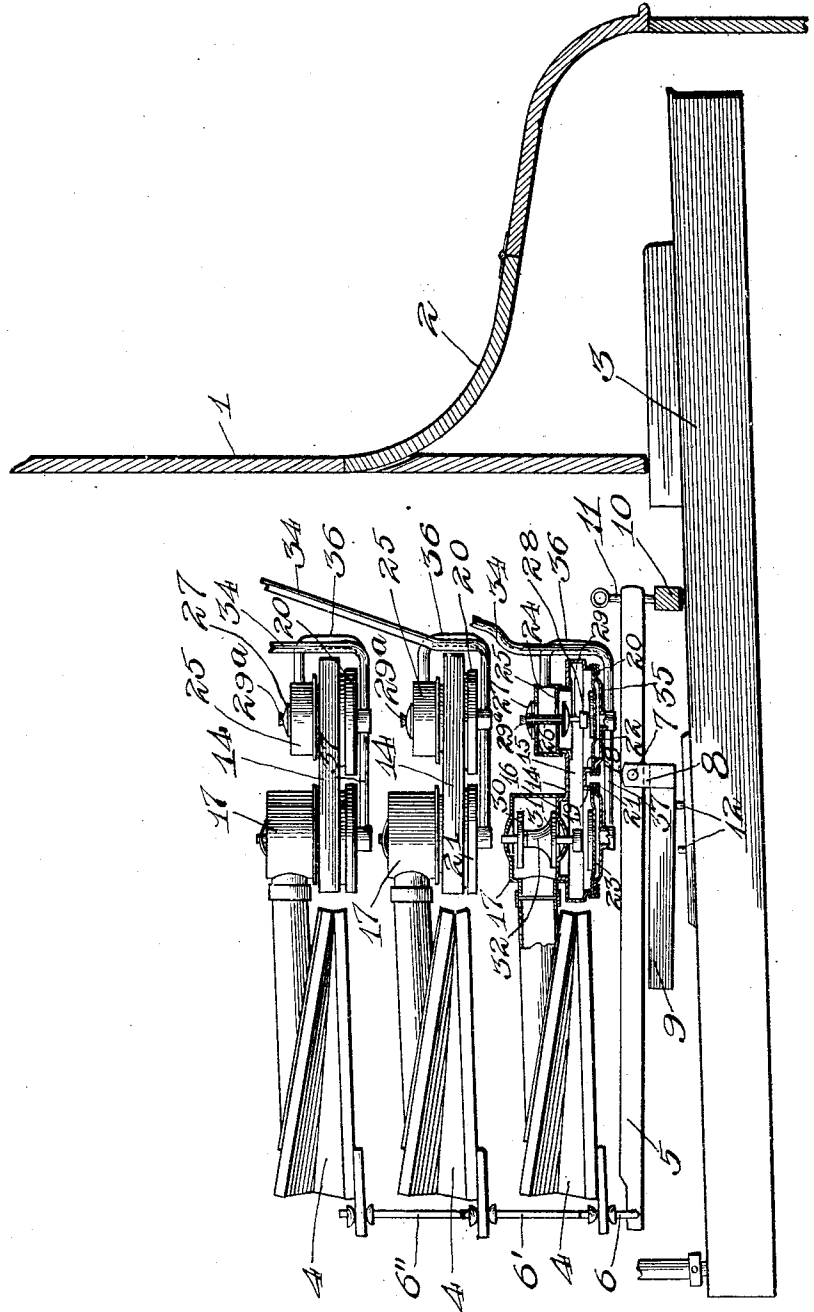


C. L. DAVIS.
 AUTOMATIC MUSICAL INSTRUMENT.
 APPLICATION FILED NOV. 27, 1905.

962,130.

Patented June 21, 1910.



Witnesses:
 C. V. Donamus,
 J. C. Lee

Inventor:
 Charles L. Davis
 by C. Miller Givels
 atty.

UNITED STATES PATENT OFFICE.

CHARLES L. DAVIS, OF DETROIT, MICHIGAN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO
A. MILLER BELFIELD AND JOHN P. MENTZER, TRUSTEES, OF CHICAGO, ILLINOIS.

AUTOMATIC MUSICAL INSTRUMENT.

962,130.

Specification of Letters Patent. Patented June 21, 1910.

Application filed November 27, 1905. Serial No. 289,148.

To all whom it may concern:

Be it known that I, CHARLES L. DAVIS, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented a certain new and useful Improvement in Automatic Musical Instruments, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to automatic musical instruments, especially to automatically operated pianos.

The principal object of the invention is to provide a simple, practical and effective construction of action to be placed inside of a piano to permit the same to be automatically operated by a traveling perforated music sheet.

In the accompanying drawings the figure is a cross sectional view of a portion of a piano and an action therein for operating the same, embodying my present invention.

Referring to the drawing, 1 represents a portion of the front of a piano case, and 2 the fallboard thereof. A piano key of the usual construction is shown at 3. Above the key is arranged the action for operating the key, comprising a set or series of pneumatics, one for each key, with valve mechanisms for operating the same. These pneumatics 4, 4, are shown conveniently arranged in three rows, one above the other. Each pneumatic is connected with a lever 5 by rods 6, 6' and 6'', attached to the lower leaves of the pneumatics which are elevated by the actuation of the pneumatics, the pneumatics collapsing upwardly. The levers 5, 5, are pivoted at 7 upon clips or flanges 8 which are secured to a support 9 extending across the piano above the keys. The forward ends of the levers 5, 5, are provided with lugs 10, 10, on adjustable pins 11. Thus by the elevation of the rear end of a lever 5, its forward end is depressed, causing the lug 10 to strike the key 3 forward of its supporting pins 12, 12, and thereby depress the key and cause it to operate the action attached thereto.

The pneumatics 4, 4 are controlled by suitable valve mechanisms. I have shown herein for illustrating the invention, the action disclosed in an application for United States Letters Patent, filed by me July 27, 1905, Serial No. 271,408. This action com-

prises a metal duct or channel 14 which extends across the piano and is understood to be connected at its end with wind-inducing apparatus so that a vacuum is always maintained in the chamber 15. The top of the box 14 is provided with raised portions 16 for the secondary casings 17, and the bottom is provided with annular flanges 18 and 19 respectively, for holding caps 20 and 21 which support the primary and secondary diaphragms 22 and 23. The top of the box 14 is also provided with apertures in which are fitted caps 24 to which are screwed casings 25 for the primary valve 26. The latter comprises a poppet 27 and valve 28, the former being secured to a valve spindle through which is extended a threaded stem 29. The upper or outer end 29^a of this stem is flattened so as to permit it to be turned to adjust the valve 28 relatively to the diaphragm 22. The secondary comprises valves 30 and 31 on a stem 32 which extends down nearly to the diaphragm 23. Tubes 34 run from the pouch holders 35 below the primary diaphragms 22 to the tracker board which is understood to be located at some convenient point. From the primary valve casing 25, tubes 36 run to the secondary pouch holder. Thus wind entering tracker board tube 34 will actuate the primary valve and cause the same to open the outside air to the tube 36 so that this air will pass through the tube 37 and by actuating the secondary diaphragm 23, lift the valves 30 and 31 and cause the air to be exhausted from the pneumatic 4.

It will be seen that by the arrangement of the pneumatic with the intervening levers 5, 5 acting on the piano keys, a long leverage can be secured for the pneumatic action; that is to say, the pneumatic acts upon one end of the lever 5 and thus secures a strong leverage for the other end to act upon the piano key. The pivotal point being farther from the pneumatic connection than the point of striking the piano key, causes the blow to be struck the key to be very strong. By varying the point of pivotal support of the levers 5, the fulcrums of these levers will be varied and the leverage and strength of blows struck thereby will be varied accordingly. In this way a strong effect and otherwise advantageous operation of the piano is secured.

It will be understood that changes and

modifications can be made without departing from the spirit of the invention.

What I claim is:—

1. The combination with a piano key, of
5 a pneumatic collapsing upwardly, and a lever interposed between the pneumatic and key and arranged to strike the latter downwardly.
2. The combination with a piano key, of
10 a pneumatic arranged above the key and having its hinged end in front and a lever located between the pneumatic and key and arranged to strike the latter.
3. The combination with a piano key, of
15 a pneumatic arranged above the key and collapsing upwardly, and a lever located between the pneumatic and key and pivoted between its ends and having its forward end located above the piano key and arranged
20 to strike the same downwardly at a point forward of its point of pivotal support.
4. The combination with a piano key, of a lever positioned directly above said key and lengthwise thereof, said lever being
25 pivotally supported between its ends and having one end thereof arranged to directly strike the key at a point forward of its point of pivotal support, and a motor operatively connected to the other end of said
30 lever.
5. The combination with a piano key, of a lever pivotally supported intermediate its ends and arranged directly above the key and lengthwise of the same, one end of said
35 lever being arranged to directly strike the key at a point forward of its point of pivotal support, an upwardly collapsing pneumatic

positioned above said lever and a connection between said pneumatic and the other end of said lever.

6. The combination with a series of piano
40 keys, of a relatively flat tray forming a windway positioned above the keys, a series of levers positioned between said tray and keys, said levers extending lengthwise of
45 the keys and adapted to contact directly with the upper surfaces thereof, a series of pneumatic motors positioned at one side of said tray and communicating therewith, and connections between said motors and levers. 50
7. The combination with a series of piano
keys, of a relatively flat tray forming a windway positioned above said keys, a plurality of tubular members extending laterally from said windway, a plurality of
55 power pneumatics supported by and communicating with said tubular members, a plurality of levers interposed between said windway and pneumatic and extending lengthwise of the keys, said levers being
60 pivotally supported intermediate the ends thereof and having their forward ends arranged to directly engage the keys at points forward of their pivotal connections, and connections between the power pneumatics
65 and the other ends of said levers.

In witness whereof, I hereunto subscribe my name this 17th day of November A. D., 1905.

CHARLES L. DAVIS.

Witnesses:

M. T. WELLS,
F. C. DAVIS.