

UNITED STATES PATENT OFFICE.

LUTHER A. BARBER, OF GROTON, NEW YORK.

PIANO-ACTION.

SPECIFICATION forming part of Letters Patent No. 527,399, dated October 16, 1894.

Application filed January 26, 1893. Serial No. 459,635. (No model.)

To all whom it may concern:

Be it known that I, LUTHER A. BARBER, of Groton, in the county of Tompkins, in the State of New York, have invented new and useful Improvements in Piano-Actions, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to piano-fortes, and more particularly to the mechanisms and devices comprising the action, and which can be readily applied to either an upright, square or grand piano.

My object is to provide the action with a cam, operating to accelerate the movement, for ordinary, or soft pedal playing; to provide an improved means to actuate the damper; to provide the action with auxiliary levers interposed between the push rod and the jack, actuated by said rod, and bearing at all times against the jack lever, said jack lever, or the auxiliary ones, being provided with cam-shaped meeting faces, or one of them having a plane face and the other one a convex or cam face; said auxiliary levers being mounted in a carrier connected to and moved vertically by the soft pedal rod, and having their other ends connected to the push rods which are actuated vertically by the finger keys; and each push rod being pivotally connected to a bell-crank lever which is adapted to engage with the damper lever.

My invention consists in the several novel features of construction and operation hereinafter described and which are specifically set forth in the claims hereunto annexed. It is constructed as follows reference being had to the accompanying drawings, in which—

Figure 1, is a side elevation showing my invention applied to a "standard movement" to accelerate the action of the jack and also the damper, if desired. Fig. 2, shows the accelerating mechanism applied directly to the hammer, through the key-lever.

In the drawings, the action shown is that of an upright piano, but it will be apparent that my invention can be readily applied to the action of a square or a grand piano by any good mechanic.

The frame and usual end upright of the action, are not shown in the drawings, as of ordinary construction, said uprights carrying

the horizontal rail —s—, and the other parts in the usual manner.

The key levers —a— are mounted in the frame in the usual manner, and the push rod —b— is connected thereto, its lower end being connected to or in engagement with the cam lever *b'* when such a lever is used in conjunction with the cam-faced jack-lever, and its upper end being connected to the auxiliary lever —c—, the rear end of which is pivotally connected to the pedal rail —p— which is supported by the soft pedal rod —r— which is connected to it near its center, said rail being adapted to be moved vertically by the movement of the pedal rod.

The jack lever —d— is pivoted at one end to the rail —s— and is shown as having a cam face in contact with the plane face of the auxiliary lever, but it is evident that these faces can be transposed, and also that both may be cam faced. By cam-faced I do not wholly mean that they may be simply convex, but the face may be curved like unto a parabola. The jack —e— is mounted and connected to the jack lever and engages with the hammer butt in the usual manner. *h*— is the hammer stem, —*k*— the hammer and —*n*— the buffer. The damper —*m*— is mounted upon a lever —*m'*— pivotally connected to an extension of the rail —s— and its lower end is adapted to be engaged by the upper arm of the bell-crank lever —2— pivoted upon a rod —3— transverse to the frame, the horizontal arm of said lever being connected to the push-rod —b—. A rod —4— also connects the soft pedal rod —r—, or the pedal rail —p— to the buffer —*n*—. A cam lever or a cam-faced foot —*b''*— is connected or secured to the push-rod and engaged directly by the rear end of the key lever, or through a cam lever —*x*— interposed between the key and the foot of the push-rod and pivoted to the key and upon a rod transverse to the frame. A spring —5— engages either with the hammer butt —*h'*— or with the stem —*h*— to return the hammer or other parts to their normal positions when the key is released.

When a key is struck the movement of the push-rod, jack and hammer is accelerated by the single cam action of the auxiliary lever —c— and the jack lever —d—, or said lever

with the jack —*e*— directly, as in Fig. 2, or by the combination therewith of the acceleration created by the arm action of the key upon the lower end or foot of the push-rod; 5 so that the action is very much quickened and a sharper and more incisive blow is struck upon the string —*y*—. At the same time, through the action of the bell-crank —2— (cam-faced also if desired) upon the 10 damper, the latter is removed from the string much more quickly. Furthermore, the operation of this piano action is much easier, as it is relieved of a great deal of unnecessary frictional and other resistance.

15 When the soft pedal is operated the pedal rail is raised thereby and through the rod —4— the buffer —*n*— is thrown over, and through the lifting of the rear end of the auxiliary lever —*c*— the jack is rocked upon 20 its pivot, changing its point of bearing upon the lever —*c*—, and at the same time the hammer is thrown over closer to the string. In this manner, the raising of the pedal rod, directly changes the bearing of the jack, or 25 jack lever and also shifts the buffer and hammer, to the soft pedal action; and all of the jacks, jack-levers, buffers and hammers are uniformly shifted, without any rocking of 30 the rail —*s*—, and there is no slack or lost motion anywhere in the action, or at any time during its operation, and the touch and sensitiveness of the keys is secured, maintained, and made much more effective.

What I claim as my invention, and desire 35 to secure by Letters Patent, is—

1. The combination with the key, of the push-rod, the auxiliary jack lever and the pedal rail connected together, the jack lever, the jack and the hammer.
- 40 2. The combination with the key, of the push rod, the auxiliary jack-lever pivotally

mounted in the rear to the vertically movable pedal rail, the pedal rail and connections between it and the soft pedal, and the buffer, the jack lever, the jack, the hammer and the 45 buffer.

3. The combination with the key, of the push rod, the auxiliary jack-lever, pivotally mounted in the rear upon the vertically movable pedal rail, the pedal rail and connections 50 between it and the soft pedal, and the buffer, the cam-faced jack lever, the jack, the hammer, and the buffer.

4. The combination with the key and the push rod actuated thereby, of the bell-crank 55 lever having one arm connected to the push rod, and the other engaging with the damper stem, the damper upon said stem, the auxiliary jack lever connected to the push rod, and to the pedal rail, the cam-faced jack lever in engagement therewith, the jack, the 60 hammer and the buffer.

5. The combination with the key and the push-rod actuated thereby, and a cam interposed between them, of the bell crank lever 65 having one arm connected to the push rod and the other engaging with the damper stem, the damper upon said stem, the auxiliary jack lever connected to the push rod and to the pedal rail, the cam-faced jack lever, in 70 engagement with the auxiliary lever the jack, the hammer and the buffer.

6. The combination with the jack and the jack-lever, of the push-rod, the key and a cam between and engaging with both of them 75 to actuate the jack lever.

In witness whereof I have hereunto set my hand this 15th day of August, 1892.

LUTHER A. BARBER.

In presence of—

D. H. MARSH,

C. J. FLANAGAN.