

UNITED STATES PATENT OFFICE.

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PIANO.

No. 824,224.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, GEORGE W. WESER, a citizen of the United States, residing in the borough of Manhattan, of the city of New York, in the State of New York, have invented certain new and useful Improvements in Pianos, of which the following is a specification, reference being had to the accompanying drawing, forming a part hereof.

When mechanism for mechanically playing a piano is attached to the inside of the piano-case, it is usually made to operate against the rear end of the keys, and such mechanism unless purely pneumatic generally includes a revolving member upon which a plurality of shoes, one for each of the keys, are adapted to be dropped, whereby the striker-rods, one of which is operatively connected with each shoe, may be actuated to raise the rear end of the keys and effect the proper actuation of the hammers. If the mechanism for raising and dropping the shoes upon the rotary member is not sufficiently positive and vigorous in its action, it often happens that a key, its striker-rod, and shoe become wedged after the shoe has been dropped, and the force of the lifting mechanism for the shoe is insufficient to raise it against the wedging effect. In order to overcome this difficulty, it is customary to allow a clearance of about one-eighth of an inch under the forward ends of the keys to permit the key to be raised slightly to relieve the wedging effect. This requires, however, the readjusting of the keys before the piano can properly be used for hand-playing after it is once adjusted for automatic playing, or vice versa. It is the object of this invention to provide a relief for the wedging of the parts referred to which will obviate the necessity for any adjustment whatsoever, whereby the instrument will at all times be adapted to be played either automatically or by hand. This is accomplished by providing a relief in the keys themselves, preferably at the rear ends thereof, against which the striker-rods usually operate.

The invention will be more fully described hereinafter, with reference to the accompanying drawing, in which it is illustrated in a practical and convenient embodiment. In said drawing a vertical section is represented taken through the attachment for automatically playing the piano and showing the parts of the attachment for operating a single

key, some of the parts being shown in elevation.

In the particular mechanism of the attachment illustrated in the present case the striker-rod *a* for the rear end of the key *b* is pivoted to one arm of a bell-crank lever *c*, while a shoe *d*, coöperating with a continuously-revolving cylinder *e* to effect the actuation of the striker-rod, is suspended from the other arm of the bell-crank lever, so that normally said shoe rests directly above the cylinder. The cylinder may be revolved by any well-known or usual means; but such means have been omitted from the drawing and are not necessary to be described herein. In order to raise and lower each shoe in the attachment, an arm *f* is provided for each shoe, and said arm may be pivoted at one end to a fixed part, as at *g*. At the other end the bell-crank lever *c* is pivoted thereto, and at a point between the ends an upright *h* is rigidly secured thereto, which is directly connected with the mechanism for supplying the proper motion to the arm *f*. In the present case the attachment is in part operated pneumatically, and the mechanism for supplying motion to the arm *f* is a bellows *i*, to the movable member *k* of which the upright *h* is operatively connected. The bellows may be secured to a fixed part of the attachment in any suitable manner, and the connection between the movable member thereof and the upright *h* may be effected by means of a thumb-screw *s*, extending through the upright and through an eye in an extension *l* upon the movable member, thumb-nuts *m* being provided on the screw, one on each side of the projection. In this way as the movable member of the bellows works in and out the projection travels along the screw in the upright until it strikes one of the nuts thereon, and thereby moves the arm *f* either up or down. The position of the screw in the upright may be adjusted by turning the same, and likewise the position of the nuts upon the screw may be adjusted.

In the drawing the parts are shown in their normal position—that is, the position in which they are held before the note is struck. When the note is to be struck, the bellows will succumb, the movable member causing the arm *f* to drop, whereby the shoe *d* will be brought down to the surface of the revolving cylinder and thrown forward by contact therewith, thereby causing the striker-rod to lift the rear end of the key. As

soon as the bellows fill again the arm *f* will be drawn up in order to bring the shoe *d* back into its original position suspended above the cylinder. The direct connection between
 5 upright *h* and the movable part of the bellows will serve to apply the force of the bellows in a very direct, vigorous, and positive manner to the arm *f*, as will be seen upon reference to the drawing. In order, however,
 10 to prevent the occurrence of the wedging of the key, striker-rod, and shoe, a relief, as before stated, is provided between the striker-rod and the key. This relief may comprise a spring *n*, contained within a recess *o*, formed
 15 in the rear end of the key, said spring being relatively weak, so as to allow the striker-rod to be raised slightly in order to break up the wedging effect, but stiff enough to effect the proper actuation of the hammer. In the
 20 construction shown, the spring is coiled around the stem *p* of a plunger *r*, preferably of hard felt, said plunger closing the lower end of the recess *o* and the stem extending through the upper end of the key. The
 25 plunger is interposed between the end of the striker-rod and the spring, the striker-rod operating against the head of the plunger. After the note has been struck and the parts tend to become wedged the arm *f* in operat-
 30 ing to draw up the bell-crank *c* will cause the striker-rod to be raised slightly against the action of the relatively weak spring *n*, whereby the wedging effect will be broken up and the parts returned to their normal position.
 35 When the relief is effected by means of a spring, the spring must be inclosed, as shown, for a spring stiff enough to properly operate the key would be too stiff to operate as a relief if interposed between the striker-rod and
 40 the lower end of the key.

This invention may be employed in attachments operated electrically and otherwise, as well as in attachments operated pneumatically. Furthermore, other forms of relief
 45 may be provided than that herein shown and described. The invention accordingly is not

limited to the precise construction illustrated and described herein.

I claim as my invention—

1. In a piano having an attachment for 50 playing the same, the combination with a key, a striker-rod for the rear end of the key, and means to operate the striker-rod, of a spring inclosed in the rear end of the key and interposed between the striker-rod and the 55 key, substantially as described.

2. In a piano having an attachment for playing the same, the combination with a key, a striker-rod for the rear end of the key and means to operate the striker-rod, of a 60 relatively weak spring inclosed in the rear end of the key and interposed between the striker-rod and the key, substantially as described.

3. In a piano having an attachment for 65 playing the same, the combination with a key, a striker-rod for the rear end of the key, and means to operate the striker-rod, of a coil-spring in the end of the key, and a plunger interposed between the spring and the 70 striker-rod against which the striker-rod normally bears, substantially as described.

4. In a piano having an attachment for playing the same, the combination with a key, a striker-rod for the rear end of the key, 75 and means to operate the striker-rod, of a coil-spring in the end of the key, and a plunger of hard felt interposed between the spring and the striker-rod against which the striker-rod normally bears, substantially as de- 80 scribed.

5. A piano provided with a relief in the rear end of each key, said relief comprising a spring inclosed within a recess in the rear end of each key, and a felt plunger in the mouth 85 of said recess, substantially as described.

This specification signed and witnessed this 30th day of August, A. D. 1904.

GEORGE W. WESER.

In presence of—

W. B. GREELEY,

M. A. BRAYLEY.