

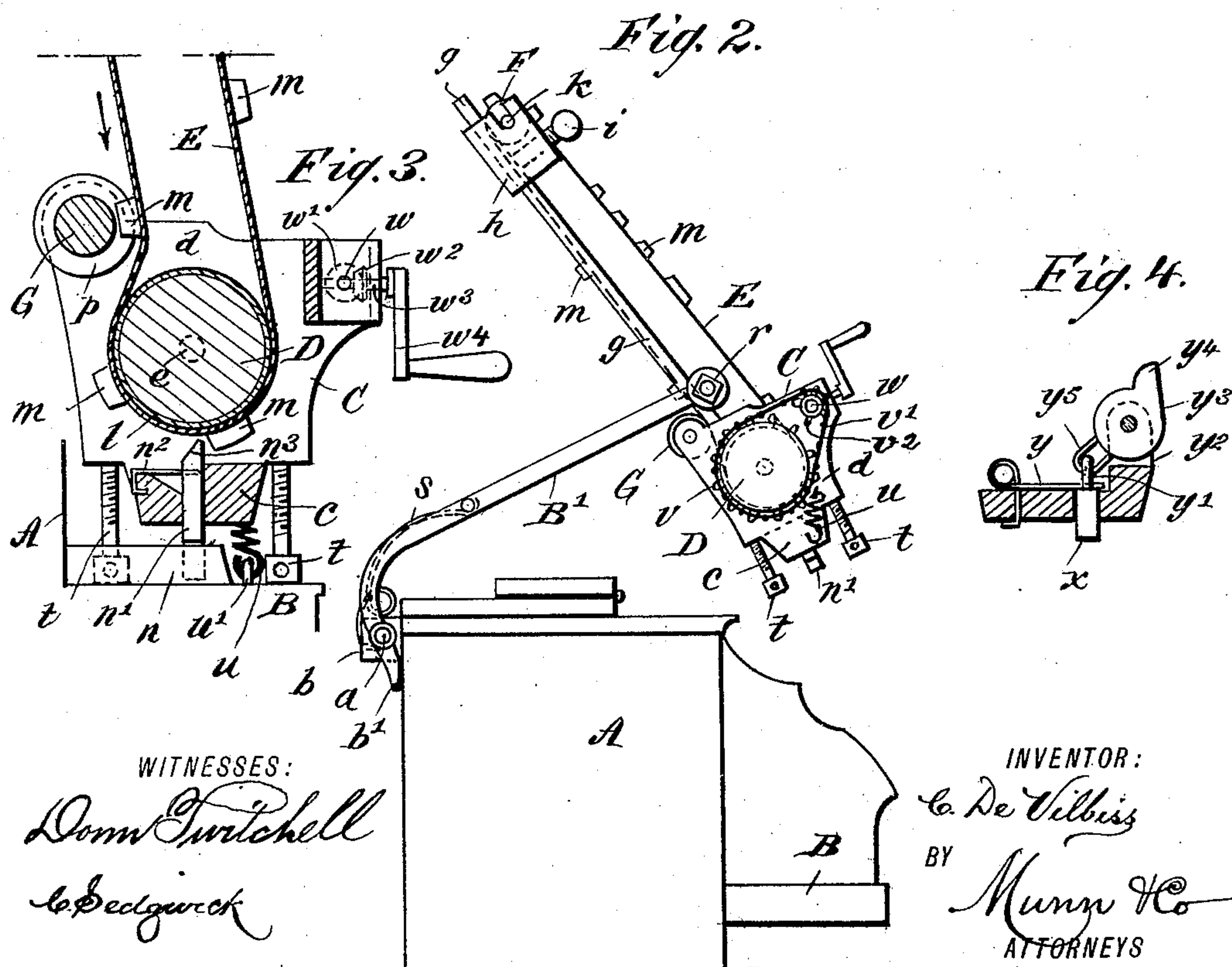
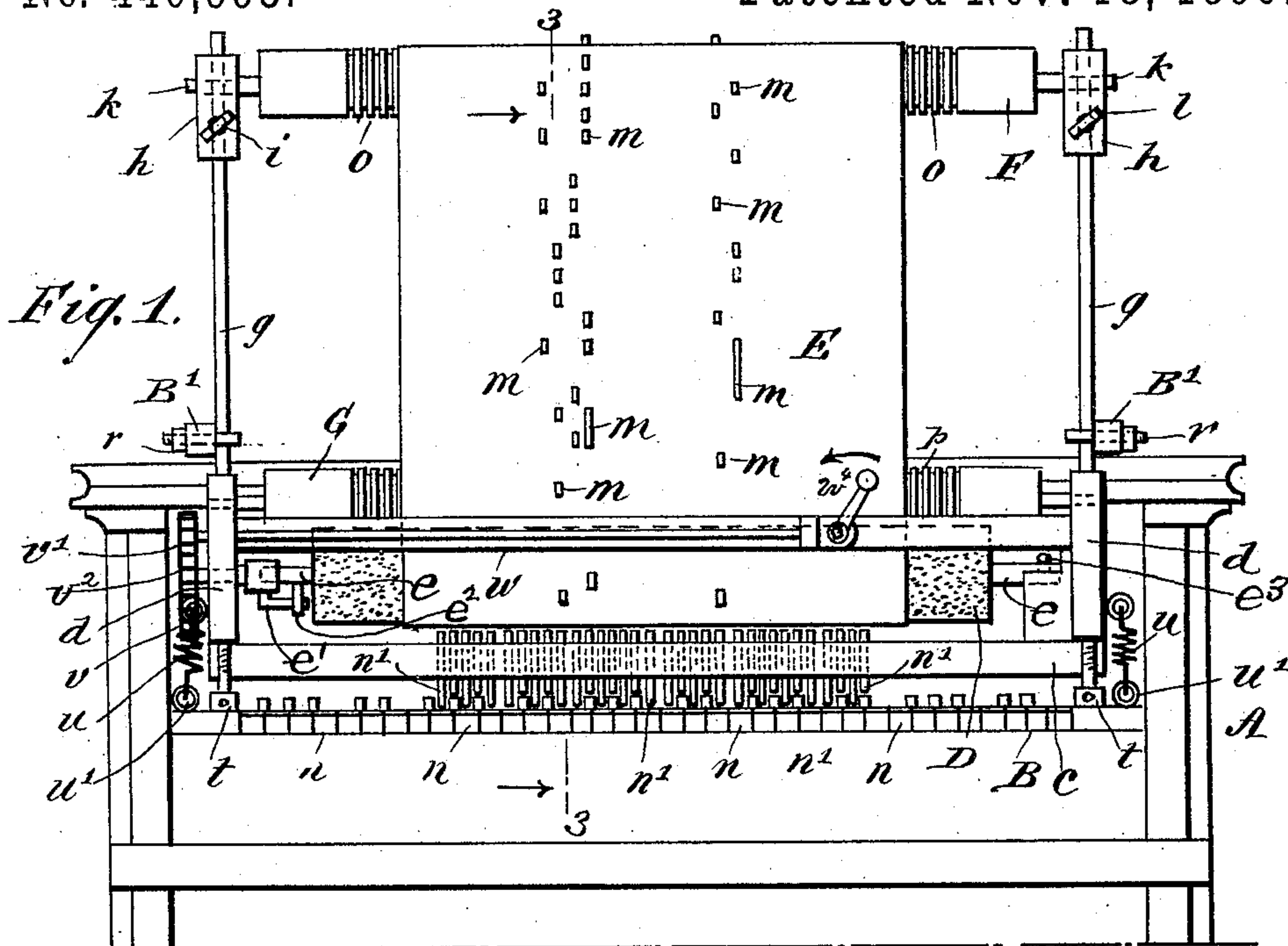
(No Model.)

C. DE VILBISS.

# KEY BOARD ATTACHMENT FOR MUSICAL INSTRUMENTS.

No. 440,995.

Patented Nov. 18, 1890.





# UNITED STATES PATENT OFFICE.

CASPER DE VILBISS, OF SHELLSBURG, IOWA.

## KEY-BOARD ATTACHMENT FOR MUSICAL INSTRUMENTS.

SPECIFICATION forming part of Letters Patent No. 440,995, dated November 18, 1890.

Application filed August 5, 1890. Serial No. 361,093. (No model.)

*To all whom it may concern:*

Be it known that I, CASPER DE VILBISS, of Shellsburg, in the county of Benton and State of Iowa, have invented a new and useful Improvement in Key-Board Attachments for Musical Instruments, of which the following is a full, clear, and exact description.

The objects of this invention are to furnish a simple practical device which may be attached removably to any cabinet organ or piano, and furnish means for the mechanical execution of any tune the attachment is adapted to play by periodical movement of the keys of the musical instrument.

To these ends my invention consists in certain features of construction and combination of parts, as is hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a front elevation of the device in position on a key-board of an organ or piano. Fig. 2 is an end elevation of the device shown in Fig. 1, with the attachment removed from the key-board of the instrument. Fig. 3 is an enlarged transverse section of the lower portion of the attachment seated on a key-board, taken on the line 3 3 in Fig. 1; and Fig. 4 shows a modified form for one of the movable parts of the device.

A represents the upper portion of an organ, and B the key-board.

Upon the rear side of the case A of the musical instrument a rock-shaft *a* is journaled at its ends in bracket-boxes *b*, that are secured at an equal distance from the top board or cover of the instrument, so as to support the rock-shaft in a horizontal plane free to rock. At each end of the rock-shaft *a*, or near the sides of the organ-case A, the arms *B'* are secured to the shaft, said arms having short portions *b'* extended below the rock-shaft, the main portions of the arms curving upwardly and forwardly from the shaft a suitable length to support other parts above the key-board. An elongated roller-supporting frame C is provided, which consists, essentially, of a base-piece *c*, that is nearly equal in length to the length of the key-board B, and has erected on

each end similar bracket-blocks *d*. The roller frame C has journal-bearings formed at opposite points in or on the bracket-blocks *d* for the loose support of the lower roller D of the attachment, which roller is cylindrical, of a proper diameter, and a correct length to fit loosely between the blocks *d*.

Any suitable means may be employed to adapt the roller D for removal from connection with the blocks *d*, whereon the journal ends *e* of the roller are supported, so as to facilitate the location on the roller of an endless sheet E, that is movably retained in a substantially upright position by an upper roller F. As shown in Fig. 1, the preferred means for the support of the roller D consists of two studs or axlepins *e*, which are inserted in alignment in the ends of the roller, one journal-pin resting loosely in a groove in one bracket-block *d* and the other pin engaging the socket end of a driver *e'*, which has contact laterally with a lug *e''* on the pin *e*, so that the roller will be retained removably on the bracket-blocks free to rotate, a swinging keeper-bar *e'''* serving to hold the opposite journal end of the roller in the groove it rests within until a removal is required.

It is essential that the upper roller F should be made removable from its supports and adjustable for height also. To effect this there are upright standards *g*, oppositely secured to project from the top sides of the blocks D, parallel to each other. On the standards *g* sliding boxes *h* are mounted and adapted for vertical adjustment by the provision of set-screw bolts *i*, that engage the sides of the standards when a proper elevation is attained for the boxes. The journaled ends *k* of the upper roller F are revolvably engaged with the boxes *h*, which are slotted above the journal-bearings in them, so as to permit the roller F to be removed from the boxes when required. The lower roller D is preferably made larger in diameter than the upper roller F and has its periphery covered with a thin coating of powdered glass, emery, or similar material to roughen the surface and cause it to engage without slipping the surface of the endless sheet E. Said powdered material may be applied directly upon the roller, or a sheet of muslin or paper *e* thus coated may



be smoothly glued upon the roller-face. (See Figs. 1 and 3.)

Upon the outer side of the sheet E several series of projecting cam-knobs *m*, in longitudinal rows, are secured to project at proper intervals for their contact with devices which strike the keys on the key-board B, and thus produce harmonious tones that together constitute a tune or piece of music.

In the base-piece *c* of the roller-supporting frame C a series of spaced perforations are formed vertically, the distance of their lateral separation being equal to the spaces between the centers of the keys *n* on the key-board B. The position of the series of spaced apertures in the base-piece *c* is such that the axial center of the roller D will correspond with the vertical plane of these apertures, in which are loosely inserted the mallet-bars *n'*, which are normally retained in elevated adjustment within the guiding-apertures by finger-springs *n<sup>2</sup>*, the sloping side *n<sup>3</sup>*, formed on the upper end of each mallet-bar, being adapted to receive the pressure of the cam-knobs *m* as they are successively brought to bear upon the bars by a longitudinal movement of the endless sheet E in the direction of the arrow in Fig. 3.

As it is important that the series of cam-knobs *m* be caused to vertically align with the mallet-bars *n'* and be so maintained while the device is being operated, provision has been made to effect such a result, which consists in radially grooving the upper roller F throughout a considerable portion of its length, thereby forming a series of radial ribs *o* on the roller, which ribs and alternate spaces cause the tightly-drawn endless sheet E to travel in a straight line.

As an auxiliary to the rollers D and F, a tension-roller G is revolvably mounted at the rear of the roller-frame C, so as to have an enforced contact with the moving endless sheet E, as shown plainly in Fig. 3, and it will there be seen that the series of cam-knobs *m* enter the radial aligning grooves *p*, that are produced in said roller, these grooves forming alternate ribs, which from their loose contact with the sides of the cam-knobs *m* prevent the sheet E from "creeping" laterally, while the pressure of the roller G takes up looseness and causes increased tension in the sheet E. At opposite points *r* on the standards *g* the forward ends of the arms B' are attached by bolts or other means, so that the entire device is supported to rock with the shaft *a* on the boxes *b*.

To enable the operator on a musical instrument having this attachment provided to use it at will and play the instrument directly by fingering the keys of the key-board or quickly adjust the attachment to perform a piece of music mechanically, the arms B' are provided with springs *s*, which are located at each end of the rock-shaft *a*, and have one end of each connected to the boxes *b* and the opposite

ends of the springs engaged with the arms some distance from the pivotal supports, so that the springs will afford support to the device and normally retain it elevated from the key-board, as shown in Fig. 2.

The spring-supports *s*, from their manner of connection with the arms B', allow the roller-frame C and the parts supported on it, to be depressed and be located vertically above the key-board B, and as the contact of the mallet-bars *n'* with the keys *n* of the key-board should be made adjustable, so that the pressure of the entire series of mallet-bars may be increased or diminished, as may be desired, the set-screws *t* are inserted in the lower surface of the bracket-blocks *d*, the heads of which bolts have bearing-contact with the case at each end of the key-board, so that the adjustment of the bolts will raise or lower the roller-frame C.

The preferred means for retaining the frame C and attached parts in a depressed position above the key-board B consists of two strong hooks *u*, which have spiral coils formed in their bodies, the upper ends of these hooks being attached to the vertical front of the instrument at each end of the key-board B, as shown in Fig. 1, while the lower hooked ends of the same are adapted to removably engage the staples or screw-eyes *u'*, which connection of parts will insure a close adjustment of the mallet-bars *n'* upon the keys *n*, and insure a positive depression of the keys at proper intervals of time to produce the desired effect.

As a means for rotating the driving-roller D, and thus causing a responsive movement of other parts of the device, there is a sprocket-wheel *v* secured on one end of the driver *e'*, that engages the journal *e* of the roller D, which wheel is connected by a chain *v'* to a pinion *v<sup>2</sup>*, that is secured on one end of a revolvable shaft *w*, which shaft has a bevel-wheel *w'* mounted on and secured to the other end of the same, said bevel-wheel having a meshing engagement with a bevel-pinion *w<sup>2</sup>* that is mounted on a short shaft *w<sup>3</sup>*, that is revolvably supported on the roller-frame C and rotated by the crank-handle *w<sup>4</sup>*, which, if moved in the direction of an adjacent curved arrow in Fig. 1, will properly actuate all the working parts of the device.

The construction of the mallet-bars *n'* and their attached spring-supports *n<sup>2</sup>* is intended for the operation of the keys on an organ, wherein a downward pressure more or less prolonged is necessary to provide proper effects. This must be slightly modified in construction to play a tune on a piano, as the keys on the latter-named instrument must be given a positive stroke of more or less vigor to vibrate the strings of the instrument properly and render a piece of music in a presentable manner.

The alteration in construction required to adapt this attachment for the rendition of



music on a piano is shown in Fig. 4. The view mentioned shows one mallet-bar of the series, also its manner of support and means to actuate it, and as a description of one set of mechanism will answer for the entire series the description of parts shown in Fig. 4 will indicate the construction of the entire series needed to mechanically play a piano. The base-piece *c* is furnished with spaced perforations, wherein the mallet-bars *x* are loosely inserted, these bars having their lower ends aligned above the keys of a key-board, are elastically supported to vibrate vertically by the bent spring *y*, that engages a hook *y'*, that is driven into the top end of the mallet-bar, and by its tension holds the mallet-bar normally depressed. A series of ears *y<sup>2</sup>* are formed on the upper surface of the base-piece *c*, and between each adjacent pair of these ears a cam-roller *y<sup>3</sup>* is pivoted, a toe *y<sup>4</sup>* on the face of said roller being so relatively located that the contact with it of a series of the cam-knobs *m* will be assured. The hook *y'* in the top of the mallet-bar *x* is connected loosely to the peripheral surface of the cam-roller *y<sup>3</sup>* by a staple *y<sup>5</sup>*, so that the periodical rocking movement and sudden release of the cam-blocks by cam-knobs *m* on the endless sheet *E* will forcibly elevate the springs *y*, which by their resilience resume a normal position and cause the mallet-bars to strike the piano-keys in proper order to render the piece of music for which the knobs of the sheet *E* have been arranged.

When the device is to be temporarily thrown out of service, the hooks *u* are detached from the screw-eyes *u'* and the frame *C* allowed to rise, as before stated, the upward movement being determined by the contact of the depending end pieces *b'* of the arms *B'* with the rear side of the case *A*.

There being facility afforded for the interchange of a number of endless sheets *E*, which are each constructed to play a different air, the rendition of a number of pieces of music on an organ or piano is provided for in this attachment, whether the performer is skilled in music or otherwise.

I am aware that parts of the device herein presented are not broadly new, some being shown in a device for the same purpose for which a patent was allowed to me on the 14th of July, 1890. Hence I do not desire to claim these features broadly.

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

1. The combination, with the case of a musical instrument having a key-board, of two spring-supported arms pivoted to the rear of the case and a roller-supporting frame connected to the arms, substantially as set forth.

2. The combination, with the case of a musical instrument having a key-board, of two spring-supported arms pivoted to the rear of

the case, a roller-supporting frame connected to the arms, an endless sheet having cam-knobs on its surface and supported on rollers on the frame, and a series of mallet-bars loosely held in the frame and moved by the cam-knobs, substantially as set forth.

3. The combination, with the case of a musical instrument having a key-board, of a roller-frame, which is spring-supported and adapted to vibrate vertically, two parallel rollers on the frame, an endless sheet on the rollers having series of cam-knobs on it, a series of vertically-movable mallet-bars in the frame, which are spring-supported to receive the pressure of the cam-knobs, and means to move the rollers and endless sheet, substantially as set forth.

4. The combination, with the roller-frame, which is elastically supported to rock vertically on an organ or piano case, of a lower roller that is pivotally supported on the frame and has its periphery rough-coated, a revoluble upper roller that is radially grooved and is vertically movable on standards of the frame, and an endless sheet having cam-knobs on its outer surface that is longitudinally moved by the rough-coated roller when said roller is revolved, substantially as set forth.

5. The combination, with a musical instrument case having a key-board, of a rock-shaft revolvably supported on the case at its rear, two arms secured on the rock-shaft and projecting forwardly, and two springs that are adapted to sustain the arms and parts engaged by the arms, of a roller-frame, standards on the frame, an upper radially-grooved revoluble roller adjustably supported on the standards, a lower driving-roller having its surface rough-coated, an endless flexible sheet on these rollers, an auxiliary roller having its body radially grooved, a series of mallet-bars, finger-springs for the mallet-bars, a device which will revolve the lower roller, and a device which will removably retain the mallet-bars in contact with the keys of the instrument, substantially as set forth.

6. The combination, with a spring-supported roller-frame, standards on the frame, two spaced rollers on the frame and standards, an endless sheet on these rollers having series of cam-knobs on its outer surface, a series of vertically-movable spring-supported mallet-bars in the frame below the sheet, and a device which will afford means to revolve the rollers and move the endless sheet longitudinally, of a revoluble tension-roller having its body radially grooved and which has enforced contact with the endless sheet near the lower driving-roller, the grooves of this roller loosely receiving the cam-knobs of the sheet to prevent lateral displacement of said sheet, substantially as set forth.

7. The combination, with a musical instrument having a key-board, of a vertically-adjustable spring-supported roller-frame, rollers revoluble on the frame, an endless sheet on



the rollers having series of cam-knobs on its outer surface, and means to rotate the rollers and move the sheet, of a grooved tension-roller which engages the sheet and its knobs,  
5 a series of mallet-bars below the endless sheet, springs which engage the mallet-bars, and cam-rollers connected to the mallet-bars

and actuated by the cam-knobs of the sheet, substantially as set forth.

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Witnesses:

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E. I. JONES.