April 4, 1939. P. M. ZEIDLER 2,153,226

PIANO

Filed March 10, 1936

Fig. 1.

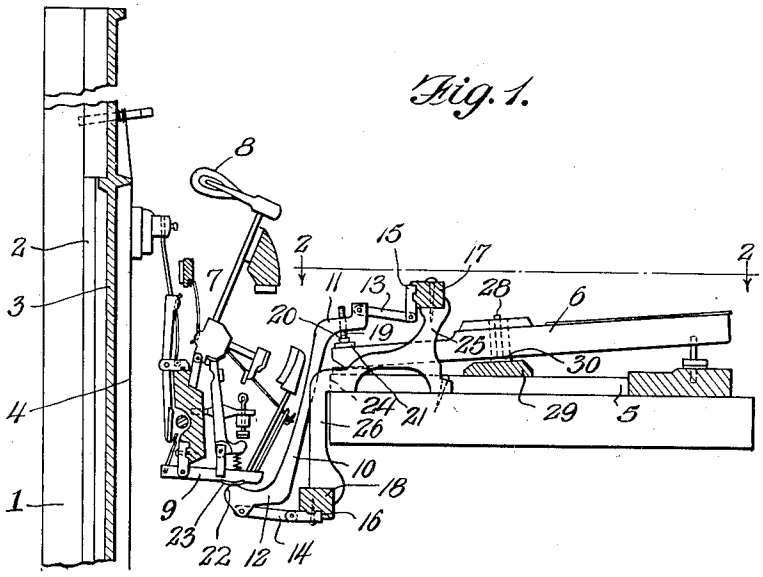
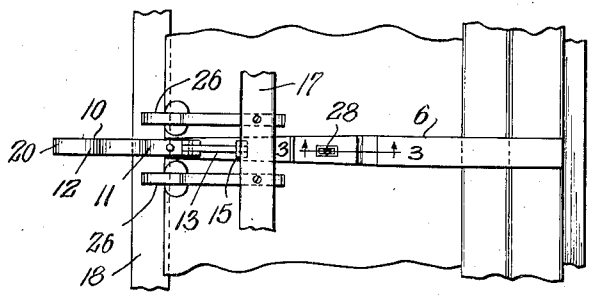


Fig. 2.



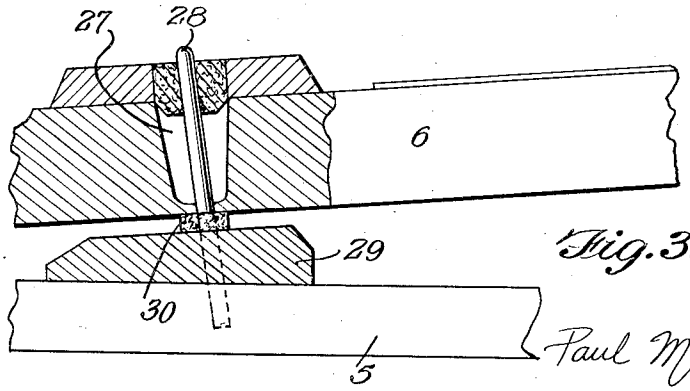


Fig. 3.

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Patented Apr. 4, 1939 2,153,226

UNITED STATES PATENT OFFICE

2,153,226

PIANO

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Application March 10, 1936, Serial No. 68,125

4 Claims. (Cl. 84—240)

This invention relates to improvements in upright pianos, and particularly to improvements in the playing actions of small or miniature upright pianos.

In pianos of this type the height of the piano casing is reduced as compared with the height of a piano of standard size, and because of this change in height and in order to enable the normal level of the keyboard to be maintained, it is necessary to lower the level of the hammer action. This lowering of the level of the hammer action is to a degree to bring the wippens or primary motion imparting members of the hammer action, which in a standard size piano are normally arranged above and directly operated by the keys of the keyboard, to a level below the level of the keys, necessitating the interposition between the key and wippen of added motion transmitting means for actuating the hammer mechanism from the key.

One object of my invention is to provide novel motion transmitting means for actuating the hammer mechanism from the key whereby the normal line of power transmitting motion between the key and wippen of the hammer mechanism may be maintained in the same manner as in an ordinary standard action in which the wippen of the hammer mechanism is directly actuated by the key, thus embodying in the action of a small or miniature upright piano a power transmitting action of a character equaling in efficiency that used in a standard size piano.

A further object of the invention is to provide novel motion transmitting means between the key and wippen whereby undue angularity or stiffness of motion of the parts is prevented, as well as undue friction undesirably affecting the working motion of the parts.

A still further object of the invention is to provide a parallel type of motion transmitting means between the key and wippen whereby a desirable motion transmitting action of the character referred to is obtained.

A still further object of the invention is to provide a motion transmitting means between the key and wippen whereby proper adjustments are afforded to the same degree as in an action of standard type, to enable a high efficiency of working action to be at all times maintained.

A still further object of the invention is to provide a construction which allows proper working adjustment between the key and motion transmitting means and ready and convenient removal of a key for replacement, repairs or the application of wear compensating means.

A still further object of the invention is to generally simplify, improve and increase the working efficiency of piano actions of the stated character.

With these and other objects in view, as will appear in the course of the subjoined description, the invention consists of the features of construction, combination and arrangement of parts, hereinafter fully described and claimed, reference being had to the accompanying drawing, in which:

Fig. 1 is a fragmentary vertical section through a piano embodying my invention.

Fig. 2 is a sectional plan view on line 2—2 of Fig. 1.

Fig. 3 is a section on line 3—3 of Fig. 2.

Referring now more particularly to the drawing, 1 designates as a whole the frame or casing, 2 the soundboard, 3 the string plate, 4 the strings, 5 the keyboard, 6 the keys and 7 the hammer action of an upright piano embodying my invention. These parts may be of any ordinary or preferred construction. The hammer action 7 herein shown is one of conventional construction, including a hammer 8 and a primary motion transmitting member or wippen 9 for transmitting motion thereto. The arrangement shown is one employed in a small or miniature upright piano in which the level of the hammer action 7 is lowered with respect to that in a piano of standard height and to the level of the keyboard 5, such as to bring the wippen 9, which in a standard size piano is disposed immediately above and directly operated from the key, to a horizontal working level immediately below the level of the key 6. In order to compensate for this change of level and relative positions of the wippen and key, it is necessary to employ an interposed motion transmitting means between the key and wippen for transmitting motion from the former to the latter.

My invention is directed, as stated, to a novel and improved motion transmitting means for this purpose. This motion transmitting means is preferably one of parallel motion type interposed between each key and the wippen actuated thereby. It comprises a substantially Z-shaped motion transmitting link 10 arranged in a vertical position or at a slight angle to the vertical between the keyboard and hammer mechanism and having a horizontal upper end portion 11 disposed above or overhanging the power transmitting end of the key 6 and a lower horizontal end portion 12 extending under the free end of the wippen 9 and having an upturned contact surface engaging

the same. These ends 11 and 12 of the motion transmitting link 10 are respectively coupled by connecting and supporting links 13 and 14 to attaching members 15 and 16 mounted on upper and lower supporting rails 17 and 18, to which rails the attaching members 15 and 16 of the connecting and supporting links associated with the keys of the keyboard are attached. The end 11 of the link 10 is provided with a threaded opening in which is fitted a capstan screw 19 the arcuate or rounded head 20 of which bears against a wear plate 21 on the power end of the key 6, whereby in the operation of the key motion is transmitted to the link or lever 10. The end 12 of the link 10 is provided with a rounded or arcuate toe portion 22 bearing against an arcuately curved or rounded wear plate 23 on the wippen, whereby in the key actuated movements of the link 10 hammer operating movements are transmitted to the wippen.

The links 13 and 14 are so arranged and connected with the link 10 as to provide therewith a parallel motion transmitting mechanism for actuating the wippen 9 from the key 6, the arc or angle of motion between the power transmitting end of the key and the capstan screw 19 and between the portion 22 of the link 10 and the wippen 9 being of the same character and degree as that in a standard playing action in which the wippen is directly operated by a capstan screw carried by the key, this motion being transmitted from the key to the wippen through the link 10 and maintained by the parallel motion action of the links 13 and 14 so that the same range and degree of flexibility of motion is obtained as that in a key action of a standard piano, whereby undesirable angularity of motion of the parts and undue friction are avoided. In other words, the bridging link or connecting member 10 forms a direct connection between what may be termed the capstan points or portions 21 and 23, respectively, of the key and lever, which are those points or portions, properly related to the fulcrums of the key and wippen, between which, usually through the interposition of a capstan screw, motion is transmitted from the key to the wippen in the key action of a standard piano, whereby the key and wippen are adapted to function in the same manner as to range and angularity of motion as if the piano key were placed directly under the wippen and directly actuated by the key as in a standard piano action. The arrangement of these parts and their range of motion is also such as to allow of the use of standard parts such as employed in a standard size piano action, if so desired, so that a degree of playing action may be obtained in small or miniature pianos equal to that obtained in pianos of standard size.

Any suitable means for mounting the supporting rails 17 and 18 in position upon any suitable part of the keyboard or key frame or any other suitable part of the frame structure of the piano may be employed. In the present instance, the supporting means shown consists of spaced brackets 24, each preferably comprising an upright bracket portion 25 mounted on and secured to the keyboard base and supporting the rail 17 and a lower bracket portion 26 depending vertically between the keyboard and hammer mechanism and supporting the rail 18. It will be noted that the construction described provides for the mounting of the capstan screws 19 on the upper ends of the links or levers 10 so as to provide motion transmitting members in bearing contact with the keys which are adjustable to compensate for wear or to regulate the extent of motion transmitted to the link 10 from the key 6 to the exact extent required, the capstan screws also by being thus arranged permitting of motion of the same kind and degree of angularity between the key and link 10 being obtained as that obtained in a standard piano action in a direct motion transferred between the key and wippen. As shown, the power transmitting end of each key 6 projects forwardly between adjacent bracket elements 25 beneath the rail 17 and the key is provided with a passage 27 receiving a pin 28 whereby the pin is fulcrumed on its support 29. The key is detachable by upward movement from this pin for renewal, repairs or the application of shims or other wear compensating elements, when required, about the pin 28 between the key and support 29.

From the foregoing description, taken in connection with the drawing, the construction and mode of operation of my improved piano action will be readily understood, and it will be seen that novel motion transmitting means are provided whereby the stated objects and advantages sought are obtained in a simple, reliable and efficient manner. While the construction disclosed is preferred, it will, of course, be understood that changes in the form, construction, arrangement and proportion of the parts may be resorted to, within the scope of the appended claims, without departing from or sacrificing any of the advantages of the invention. Also it is to be understood that, while my invention is particularly designed and adapted for use in connection with small or miniature upright pianos, I do not limit its application thereto, as conceivably it may be employed for motion transmitting actions in all types of pianos.

What I claim is:

1. A motion transmitting means for use in a piano having a key and a hammer action including a motion transmitting member arranged below the level of the key, comprising a motion transmitting element bridging the space between the key and motion transmitting member, said element being engageable at its upper end by the key for receiving motion therefrom and engageable at its lower end with the wippen for transmitting motion thereto, upper and lower supporting elements disposed respectively above and below the level of the key, and parallel motion links connecting said motion transmitting element at its upper and lower ends respectively with said upper and lower supporting elements and mounting said motion transmitting element for movement when actuated by the key to transmit to said member a working movement of the same range and degree of angularity as that transmitted thereto by the key.

2. In a piano having a key, and a hammer action including a wippen arranged below the level of the key, a direct motion transmitting connection between the key and wippen comprising a substantially vertical portion extending between the key and wippen, an upper laterally extending portion overhanging and engaging the key at its capstan point, and a lower laterally extending portion underlying the wippen and engaging the wippen at its capstan point, and means in the piano mounting said member for movement in a path when actuated by the key to maintain said portions of the member in engagement with the key and wippen at their capstan points and to transmit to the wippen a working movement of the same range and degree of

angularity as that transmitted to said member from the key.

3. In a motion transmitting means for use in a piano having a key, and a hammer action including a wippen arranged below the level of the key, a motion transmitting element having a substantially vertical portion extending vertically between said levels and having laterally projecting upper and lower end portions respectively engaged with the key and wippen, supporting elements located respectively above and below the level of the key, and parallel motion links connecting the ends of said member to said supporting elements for guiding said member in its movements.

4. In a piano having a keyboard, a depressible key thereon, a substantially vertical plate disposed behind the keyboard, and having a string thereon, a hammer pivotally mounted to strike against the string, a vertically swinging wippen below the level of the key, rails disposed above and below the keyboard, and a motion transmitting mechanism arranged to be actuated by the key and to actuate the wippen, said mechanism comprising a link pivoted to the upper rail, a link pivoted to the lower rail, and a vertically movable motion transmitting member extending between and pivoted to the links and having an upper end portion engageable by the key and a lower end portion engageable with the wippen to actuate the wippen when the key is operated.

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