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P. WUEST, JR.

AUTOMATIC PLAYING MECHANISM IN PIANOS.

APPLICATION FILED MAY 19, 1904.

FIG. I.

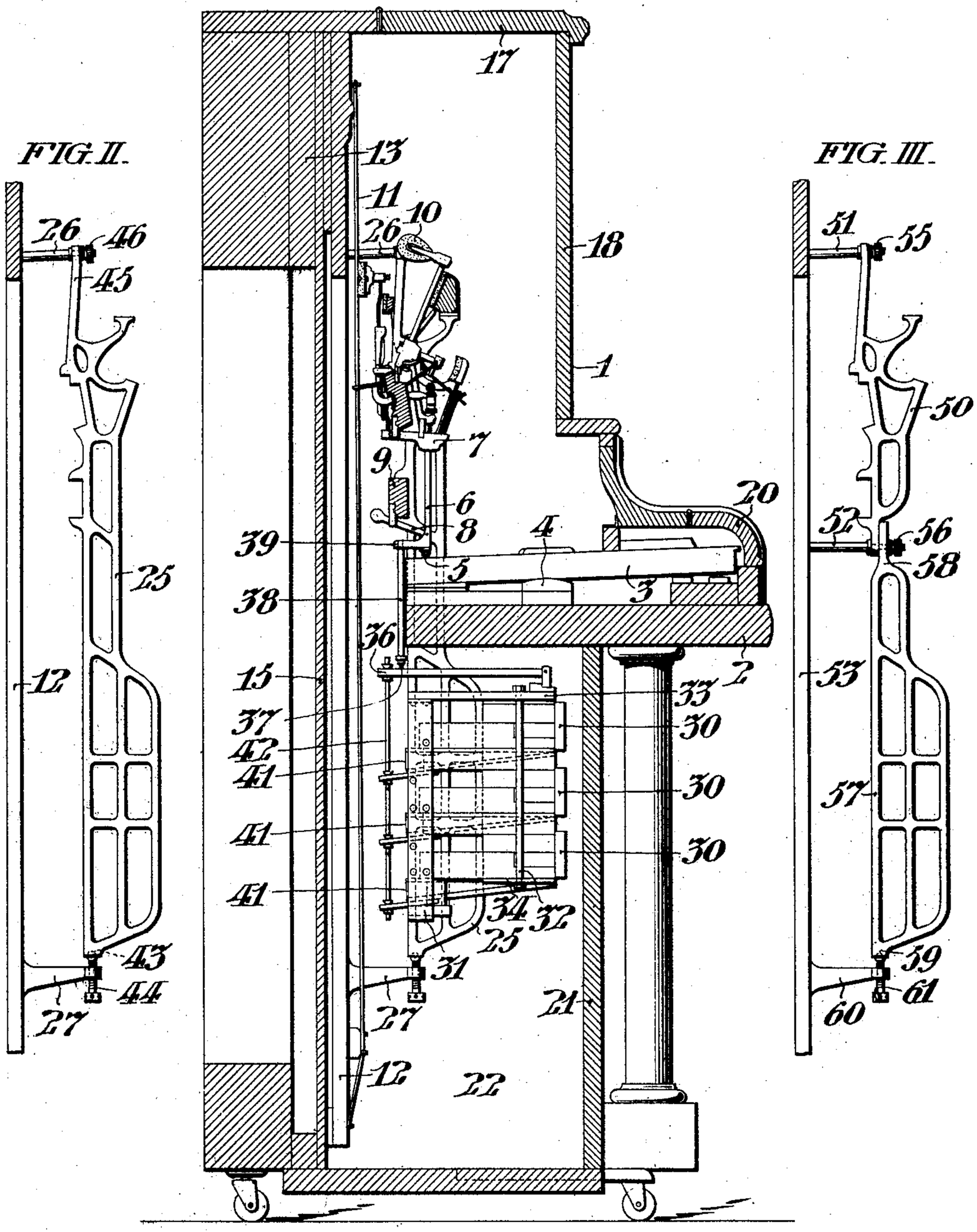
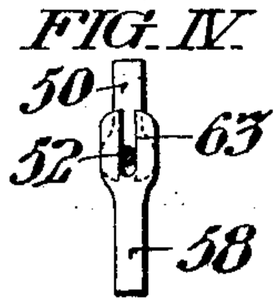


FIG. II.

FIG. III.

FIG. IV.



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AUTOMATIC PLAYING MECHANISM IN PIANOS.

No. 844,985. Specification of Letters Patent. Patented Feb. 19, 1907.

Application filed May 19, 1904. Serial No. 208,766.

To all whom it may concern:

Be it known that I, PHILIP WUEST, Jr., of Philadelphia, in the State of Pennsylvania, have invented certain new and useful Improvements in Automatic Playing Mechanism in Pianos, whereof the following is a specification, reference being had to the accompanying drawings.

My invention relates to pianos, organs, and similar instruments comprising automatic playing mechanism permanently adjusted in operative relation with their sounding devices—for instance, mechanism of the class controlled by a web of perforated paper which is progressed with respect to a pneumatic tracker-bar provided with a series of apertures corresponding with a series of sounding devices in the instrument. In such instruments as ordinarily constructed the strike pneumatic motors of the automatic playing mechanism are designed to be supported by the key-bed, and their connection with the latter is necessary preceding the adjustment of the playing mechanism in relation to the hammer-action of the instrument. Such construction and arrangement is of further disadvantage in that whenever it is necessary to remove the key-bed the playing mechanism must be disconnected from the hammer-action, and readjustment of the same is necessitated upon reassembling the devices. Moreover, any disturbance of the relation of the piano casing or key-bed with respect to the piano-action—for instance, by expansion or contraction of the wooden parts—of course disturbs the adjustment of the automatic playing mechanism. Therefore it is an object of my invention to provide automatic playing mechanism of the class described so constructed and arranged that when adjusted in operative connection with the action of the instrument which it is to play it is so far independent of the instrument casing and key-bed that the latter may be removed to facilitate repairs, &c., without disturbing the adjustment of said mechanism.

A further object of my invention is to provide combined hammer-actions and automatic playing mechanisms which may be made and marketed independently of piano string-frames and casings and be inserted and removed with respect to the latter with the same facility as ordinary piano-actions.

The aforesaid objects are attained, as hereinafter described, by providing automatic playing mechanism which is arranged to be supported upon the metal string-frame of a piano independently of the wooden casing and key-bed, and preferably comprising metal frames which are either integrally connected with or secured to the metal frames of the piano-action, so as to be conveniently supported and adjusted with respect to the latter without regard to the key-bed. Such construction is advantageous, first, in that all of the necessary adjustments of the playing mechanism with respect to the hammer-action may be primarily effected before said devices are inserted in the piano-casing; second, the relative expansion and contraction of the casing and key-bed with respect to the piano-action does not affect the adjustment of the hammer-action with respect to the playing mechanism, and, third, any adjustments or repairs of the instrument requiring the removal of the key-bed do not disturb the playing mechanism.

My invention comprises the various novel features of construction and arrangement hereinafter more definitely specified.

In the accompanying drawings, Figure I is a vertical sectional view of a piano embodying my improvements. Fig. II shows one of the unitary side frames common to both the piano-action and the automatic playing mechanism shown in Fig. I. Fig. III shows a modified form of my invention wherein the side frames of the piano-action and playing mechanism are relatively independent, although provided with common supports extending from the metallic string-frame. Fig. IV is a fragmentary front elevation showing the adjustable connection between the action-frame and playing-mechanism frame shown in side elevation in Fig. III.

In said drawings the piano-casing 1 comprises the key-bed 2, on which the digitals 3 are supported by the balance-rail 4. Each of said digitals 3 is provided with an adjustable stud 5 in operative relation with an extension-rod 6, depending from the jack-whip 7 and pivoted to an extension-lever 8, fulcrumed on the small action-rail 9, in con-

nection with a hammer 10, arranged to strike the string 11 on the metallic string-frame 12, which latter is provided with the usual wooden back-supports 13 and sounding-board 15. Said casing 1 also comprises the usual upper lid 17, the removable front panel 18, inclosing the action, the hinged cover 20 for the manual comprising the digitals 3, and the removable front panel 21, inclosing the chamber 22 below the key-bed 2, in which chamber the main bellows, chest, &c., of the playing mechanism may be conveniently mounted. However, the last-named parts of the playing mechanism may be of ordinary construction, and therefore are omitted from the drawings.

Referring to Fig. I, the vertical metal frames 25 (of which there are two on opposite ends of the piano-action) are mounted on the studs or brackets 26 and 27, extending from the metal string-frame 12. Said frames 25 inclose and support the group of three pneumatic-valve shelves 30, which are also conveniently connected by the end strips 31 and bolts 32, the latter being engaged with the respectively upper and lower frame members 33 and 34. The frame member 33, conveniently supports a series of levers 36, corresponding with the series of digitals 3 and each provided with an adjustable stud 37, operatively connected by a rod 38 with an arm 39 on the hammer-action rod 6. Each of said shelves 30 is provided with a series of respectively independent strike pneumatic motors 41, and the individual motors of the three groups respectively local to said three shelves 30 are each connected by a rod 42 with one of the series of levers 36, so as to uplift it, and thus effect the operation of the hammer 10 connected therewith whenever its motor 41 is exhausted and collapsed. The means for effecting the above-described action of the motors 41 may, as aforesaid, include a pneumatic tracker-bar controlled by the traverse of a perforated paper web; but I have omitted such devices from the drawings, as it is to be understood that any suitable means may be employed to insure the operation of the playing mechanism.

The hammer-action and playing mechanism being supported in the end frames 25, which are common to both devices, all of the relative adjustments of said devices required to render them coöperative may be effected before they are inserted in the piano-casing 1 in engagement with the brackets 26 and 27, and to facilitate the insertion, precise adjustment, and removal of said frames 25 they are conveniently provided with hemispherical sockets 43 at their lower ends, which are fitted upon vertically-adjustable studs 44, having correspondingly-shaped upper ends. The upper ends 45 of said frames 25 are conveniently bifurcated to embrace the screw-threaded ends of the brackets 26 and are secured thereon by the nuts 46. Although I find it convenient to employ said side frames 25, which are common to both the piano-action and the pneumatic playing mechanism, as above described, the playing mechanism may be supported directly from the metallic string-frame 12 without permanent relation to the hammer-action. For instance, the hammer-action may be provided with end frames 50, as shown in Fig. III, supported by brackets 51 and 52, projecting from the metal string-frame 53 and retained by nuts 55 and 56, and the playing mechanism may be provided with opposite end frames 57, whose bifurcated upper ends 58 are supported by the brackets 52 in engagement with said nuts 56 and whose socketed lower ends 59 are supported by the brackets 60 in engagement with the vertically-adjustable studs 61.

The construction last described is advantageous in that the adjustment between the hammer-action and the playing mechanism may not only be effected (like the other construction described) regardless of the key-bed 2, and, in fact, before either the action or the playing mechanism is inserted in the instrument, but also because either device may be afterward removed independently of the other and without disturbing their coöperative relation, which relation may be restored by replacing said frames in the adjusted relation shown in Fig. III, it being noted that the rods 38 of the hammer-action merely rest upon the studs 37 of the playing mechanism, so that said two devices may be readily separated. Moreover, in the arrangement shown in Fig. III the playing mechanism may be adjusted as a whole toward and away from the hammer-action as distinguished from the form shown in Fig. II, wherein they are permanently related, it being noted that the upper ends 58 of the frames 57 comprise elongated slots or notches 63 to receive the brackets 52, as shown in Fig. IV.

Although in the form of my invention chosen for illustration only three separable valve-shelves 30 are shown in the group supported on the string-frame 12, it is to be understood that other parts of the playing mechanism, such as the main bellows, &c., may be similarly supported; but of course it is not necessary to maintain such elements in precise relation with the hammer-action, like the strike-motors 41, and such elements may be conveniently supported upon the floor of the outer casing 1.

I do not desire to limit myself to the precise details of construction and arrangement herein set forth, as it is obvious that various modifications may be made therein without departing from the essential features of my invention.

I claim—

1. In a piano, the combination with a me-

tallic string-frame; of an automatic playing mechanism, supported by said string-frame independently of the key-bed, substantially as set forth.

2. In a piano, the combination with a metallic string-frame; of a bracket projecting from said frame; and, an automatic playing mechanism supported by said bracket, substantially as set forth.

3. In a piano, the combination with a metallic string-frame; of a bracket projecting from said string-frame; an automatic playing mechanism supported by said bracket; and, means adjustably connecting said bracket with said mechanism, substantially as set forth.

4. In a piano, the combination with a metallic string-frame; of a bracket projecting from said string-frame; an automatic playing mechanism supported by said bracket; and, means adjustably connecting said bracket with said mechanism, comprising an adjustable screw-stud, pivotally connected with said mechanism, substantially as set forth.

5. In a piano, the combination with a string-frame provided with brackets above and below the key-bed; of metallic side frames supported by said brackets; and, a hammer-action and automatic playing mechanism supported in coöperative relation in said side frames, substantially as set forth.

6. In a piano, the combination with a metallic string-frame; of a hammer-action; automatic playing mechanism operatively connected with said hammer-action; metallic side frames supporting said action and mechanism in coöperative relation; and, means on said string-frame supporting said side frames independently of the key-bed, substantially as set forth.

7. In a piano, the combination with a metallic string-frame; of a bracket projecting from said string-frame; a hammer-action provided with side frames; automatic playing mechanism provided with side frames; and, means common to the side frames of said action and playing mechanism, connecting them in relatively adjustable relation to said string-frame, substantially as set forth.

8. In a piano, the combination with a metallic string-frame; of a hammer-action; automatic pneumatic playing mechanism operatively connected with said hammer-action; metallic side frames supporting said action and mechanism in coöperative relation; and, means on said string-frame supporting said side frames independently of the key-bed, substantially as set forth.

9. In a piano, the combination with a metallic string-frame; of a bracket projecting from said string-frame; a hammer-action provided with side frames; automatic pneumatic playing mechanism provided with side frames; and, means common to the side frames of said action and playing mechanism, connecting them in relatively adjustable relation to said string-frame, substantially as set forth.

In testimony whereof I have hereunto signed my name, at Philadelphia, Pennsylvania, this 17th day of May, 1904.

PHILIP WUEST, JR.

Witnesses:
ARTHUR E. PAIGE,
ANNA F. GETZFREAD.