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PIANO ACTION

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This invention relates to a new and improved direct blow piano action for an upright piano.

The object of the invention is to provide a simplified and more compact action than that of the conventional type which may be readily removed by lifting it upwardly out of place and wherein the individual piano keys may be removed without affecting the action. Said action is of the drop type which enables its convenient application to an extremely low piano. In this connection it may be noted that the wippen may be lengthened as may be desired for installation in a lower piano.

One feature of the invention resides in the compact form of the action, such as will permit the use of a direct blow or contact between the key and the action through a compensating cam comprising a definite and integral part of the action. This distinguishes from the conventional type of direct blow action wherein the lower end or bottom of the wippen is contacted by the capstan screw.

Another feature of the invention resides in the compensating cam and its relation to the capstan screw and key in such fashion as to give it a rolling and forward pitching action to thrust the wippen forwardly toward the strings and thereby directly push the fly against the hammer butt.

Other features of the invention reside in the form and arrangement of the fly and the adjustable back check associated therewith.

A further feature of the invention resides in the mounting of the damper lever and its angular form to accommodate it to the downwardly extending wippen.

The full nature of the invention will be understood from the accompanying drawing and the following description and claims:

Fig. 1 is a side elevation showing a unit of the action in normal position. Fig. 2 is the same as Fig. 1 showing it in actuated position.

In the drawing there is shown a keybed 10 upon which a piano key 11 is pivotally supported in the usual and well known manner. The key is provided with a capstan screw 12 positioned to engage the cushioned surface of a compensating cam 13. A wippen 14 has its free end pivotally connected to the upper portion of the cam 13, as indicated at 15. The wippen is fulcrumed at 16 near its lower end upon a flange 17 secured to a flange rail 18.

The flange rail 18 also carries a flange 19 to which a hammer butt 20 is pivotally connected at 21. The hammer butt carries the usual hammer

22 upon a hammer lever 23. Forwardly of the hammer and in a position to be struck thereby is a vertically disposed piano string 24 and rearwardly of the hammer extends the usual cushioned back rail 25.

The wippen carries near its upper end a flange 26 to which is pivoted a fly 27. Said fly extends substantially horizontal in line with the piano key with its forward end in engagement with the curved and cushioned portion of the hammer butt 20. Adjacent the pivoted end of the fly there is provided a head 28 having a compression spring 29 interposed between it and the wippen immediately above its pivotal mounting. Said head is cushioned in position to engage the regulating screw 30 adjustably mounted on a rail 31. The fly also carries a cushioned back check 32 in a position to engage a let-off bumper 33 mounted upon the hammer butt. Said hammer butt is also pressed rearwardly by a spring 34 extending downwardly from the rail 35.

The back check 32 is formed with its cushion portion spaced forwardly from the rigid supporting position to permit of relative movement therebetween for adjustment. Extending through the rigid portion there is provided an adjustable back-stop screw 32a so arranged that the cushion portion may be conveniently adjusted with respect to the let-off bumper 33.

A damper 36 is carried upon a curved rod 27 extending upwardly from an angularly-disposed damper lever 38 fulcrumed intermediate its ends upon a flange 39 mounted upon the flange rail 18. The cushioned lower end of said lever is positioned to be engaged by an actuating finger 40 secured to the lower end of the wippen.

With the key at rest, as shown in Fig. 1, the compensating cam 13 has two points of support, its rear support being in the form of a tail portion normally seating upon the capstan screw, and its forward support being in the form of a curved bottom portion engageable directly upon the key. It is maintained in this position by a compression spring 41. Upon actuating the key, as shown in Fig. 2, it is simultaneously elevated at the two points of support, but is restrained by its pivotal connection with the wippen, whereupon it tilts over, rolling upon its curved bottom portion or cam surface in bearing relation with the key and leaving the capstan screw. This forward rolling movement of the cam against the tension of the spring 41 swings the wippen forwardly about its fulcrum 16 and thereby pushes the fly forwardly against the hammer butt, causing the hammer to strike the

string and swinging the damper rearwardly free therefrom.

This movement causes the head 28 of the fly to engage the regulating screw, tilting the fly upwardly so that its actuating end slides free of the curved part of the hammer, permitting its retraction from the string to the dotted position shown in Fig. 2, where it is held by the let-off bumper and back check until the key is returned to its rest position, whereupon the compensating cam is permitted to roll back onto the capstan screw, carrying with it the wippen and associated parts so that the damper engages the string and the hammer again comes to rest upon the action rail.

The invention claimed is:

1. In a drop type upright piano action having actuating keys a series of corresponding vertically extending strings, a pivotally supported hammer positioned to strike one of said strings, a capstan screw extending upwardly from the actuating end of one of said keys, a compensating cam having a forwardly curved bottom portion bearing upon said key and a tail portion engageable by said screw, an action mechanism on said action operatively connected with said cam, said cam and mechanism being so related as to cause said cam to roll forwardly out of engagement with said screw upon being elevated by said key, and means associated with said mechanism movable horizontally by the forward movement of said cam to strike said hammer.

2. In a drop type upright piano action having actuating keys, a series of corresponding vertically extending strings, a hammer positioned to be moved into striking engagement with one of said strings, a horizontally extending and movable fly adapted to strike said hammer, a flange rail, a wippen extending downwardly from said keys pivotally supported upon said rail adjacent its lower end and operably connected with said fly, and an actuating member operatively connected to the upper end of said wippen engageable by one of said keys, the relation of said member to said wippen and key being such as to impart a forward swinging movement to said wippen upon being raised by said key to thereby move said fly horizontally to striking position.

3. In a drop type upright piano action having actuating keys, a series of corresponding vertically-extending strings, an upwardly extending capstan screw on each of said keys, to a pivotally supported hammer positioned to be moved into striking engagement with one of said strings, a horizontally movable fly adapted to strike said hammer, a flange rail, a wippen pivotally supported upon said rail adjacent its lower end and pivotally connected with said fly, and a compensating cam operatively connected to the upper end of said wippen, said cam having a forward bearing surface on one of said keys and a tail portion engageable by the capstan screw on said key, whereby upon actuation of said key said cam will be caused to tilt forwardly thereon to move said wippen and fly horizontally into striking engagement with said hammer.

4. In a drop type piano action having actuating keys a series of corresponding vertically extending strings, a hammer positioned to be moved into striking engagement with one of said strings, a horizontally extending and movable fly adapted to strike said hammer, a flange

rail, a wippen extending downwardly from above one of said keys and pivotally supported adjacent its lower end on said rail, means for pivotally connecting said wippen intermediate its ends to one end of said fly with the other end of said fly engageable with said hammer, and a forward thrusting actuating member operatively connected to the upper end of said wippen operable upon actuation of one of said keys to move said wippen and fly horizontally into hammer striking position.

5. In a drop type piano action having actuating keys a series of corresponding vertically extending strings, a hammer positioned to be moved into striking engagement with one of said strings, a horizontally movable fly adapted to strike said hammer, a flange rail, a wippen extending downwardly from above one of said keys and pivotally supported adjacent its lower end on said rail, means for pivotally connecting said wippen intermediate its ends to one end of said fly with the other end of said fly engageable with said hammer, a forward thrusting actuating member operatively connected to the upper end of said wippen operable upon actuation of said key to move said wippen and fly horizontally into hammer striking position, a back check member depending from said horizontally movable fly, and a let-off bumper on said hammer engageable by said back check upon the horizontal striking movement of said fly.

6. In a drop type piano action having actuating keys a series of corresponding vertically extending strings, a hammer positioned to be moved into striking engagement with one of said strings, a horizontally movable fly adapted to strike said hammer, a flange rail, a wippen extending downwardly from above one of said keys and pivotally supported adjacent its lower end on said rail, means for pivotally connecting said wippen intermediate its ends to one end of said fly with the other end of said fly engageable with said hammer, a forward thrusting actuating member connected to the upper end of said wippen operable upon actuation of said key to move said wippen and fly horizontally into hammer striking position, a regulating screw mounted on said action, and a forwardly extending head on said fly engageable with said screw upon said fly being moved horizontally for swinging it to hammer supporting position following its striking action.

7. In a drop type upright piano action having actuating keys a series of corresponding vertically extending strings, a hammer movable to strike one of said strings, a horizontally extending and movable fly having one end engageable with said hammer to exert a horizontally directed striking force thereon in the direction of the string, a wippen extending downwardly from said keys and pivotally supported against bodily movement at its lower end and pivotally connected with said fly intermediate its ends, and an actuating member engageable by the actuating end of one of said keys operatively connected to the upper end of said wippen, the relation of said member and wippen being such that upon elevation of said member by said key said wippen will be thereby swung forwardly and horizontally about its pivotal mounting to impart horizontal striking movement to said fly.

8. In a drop type upright piano action having an actuating key a series of corresponding vertically extending strings, a hammer movable to strike one of said strings and including a let-off bumper, a fly movable into engagement with said hammer to exert a striking force thereon in the

direction of the string, a wippen operably associated with said key and fly adapted to transmit movement therebetween, a back check on said fly adapted to be engaged by said let-off bumper, and an adjusting member on said back check for adjusting the effective portion thereof relative to said fly and hammer.

9. In a drop type upright piano action having an actuating key a series of corresponding vertically extending strings, a hammer movable to strike one of said strings and including a let-off bumper, a fly movable into engagement with said hammer to exert a striking force thereon in the direction of the string, a wippen operably associated with said key and fly adapted to transmit movement therebetween, and a back check on said fly engageable by said let-off bumper, said back check comprising a flexible striking cushion and a rigid projection spaced therefrom having an adjustable screw mounted therein with its head in engagement with the flexible cushion to

permit adjustment of the cushion with respect to said fly and hammer.

10. In a drop type upright piano action, a hammer actuating fly, a rigid back check member secured thereto, a flexible cushion member secured to said rigid member and spaced therefrom, and an adjusting screw mounted upon said rigid member extending into engagement with said flexible cushion member for adjusting the relative position therebetween.

11. In a drop type upright piano action having actuating keys, a pivotally supported hammer mounted on said action positioned to strike an upright string, a compensating cam engageable by one of said keys and mounted on said action to roll forwardly toward said hammer in a generally horizontal direction upon being actuated, and action mechanism operatively associated with said cam and hammer adapted to transmit the forward motion of said cam to said hammer.

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