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DOORS IN MULTIPLE WITH CONTROL.

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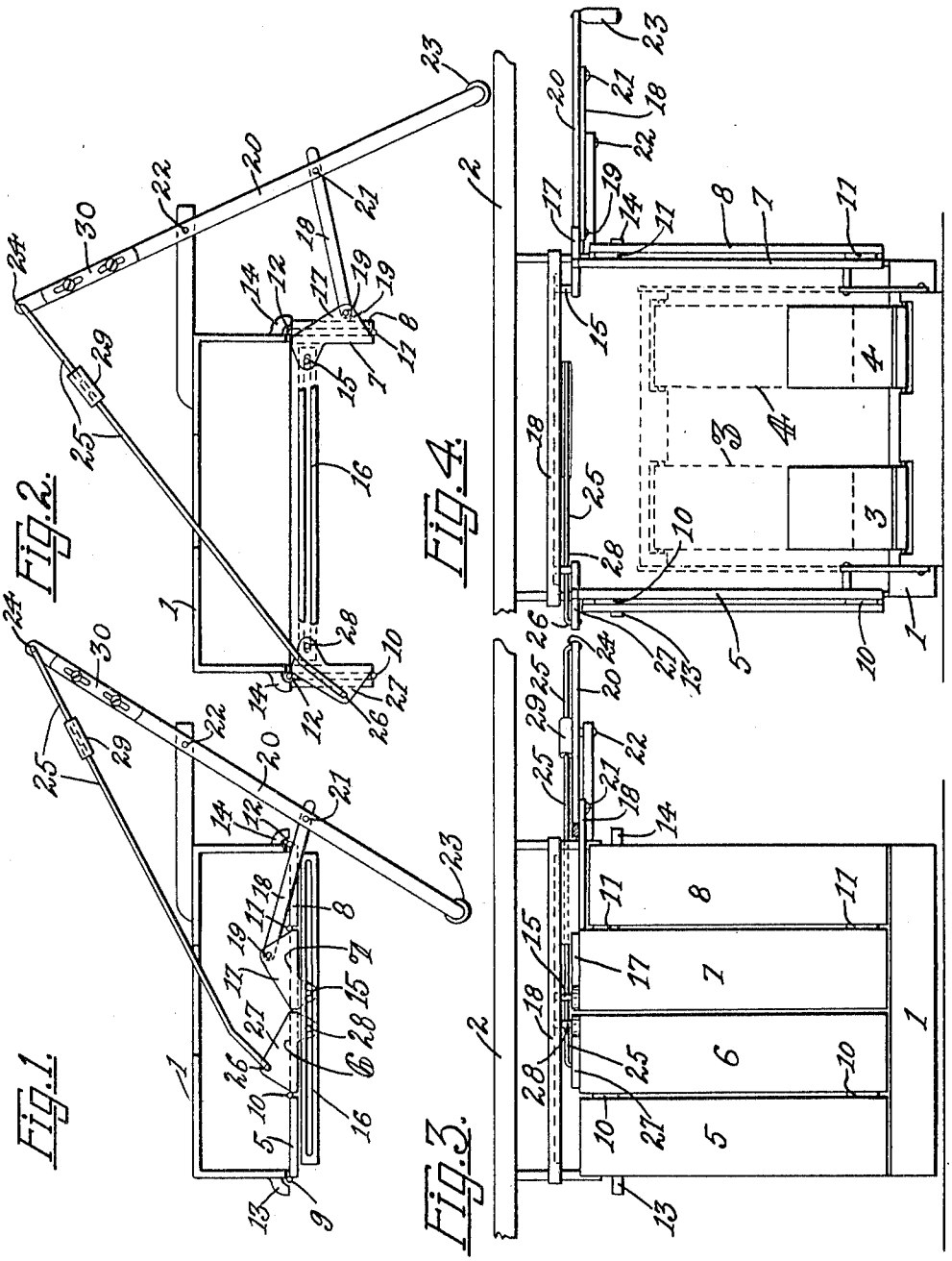

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Witnesses:

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DOORS IN MULTIPLE WITH CONTROL.

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To all whom it may concern:

Be it known that I, ROBERT A. GALLY, a citizen of the United States, residing at Cincinnati, in the county of Hamilton, State of Ohio, have invented certain new and useful Improvements in Doors in Multiple with Control, of which the following is a specification.

Former attempts at unitary control of a plurality of swinging or folding doors, have lacked the simplicity and convenience of the present invention.

The improved devices herein set forth are intended for use in any art or trade where such structures are useful, although particularly shown herein as applied to use in a musical instrument case, and the claims hereof are intended to cover all uses of the invention.

The closure means of a casing for pedals of pianos, organs and the like, particularly for the so-called pumper pedals of player pianos, have heretofore employed heavy slide panels, horizontally folding front covers, or large vertical doors directly operated by hand, each being either wasteful of space or the power to move it, and clumsy in appearance. The present invention employs several light, vertically swinging doors of neat appearance, small size and easy operation.

In the drawings, Figure 1 is a plan view of a pedal case of a piano with the new door device closed; Fig. 2 is the same with doors open; Fig. 3 a front view with doors closed; and Fig. 4 the same with doors open.

A pedal case 1 is shown in the usual and convenient position under the keybed 2 of a piano, which in this instance is of a horizontal form, although the novel door mechanism may be used with any other style of musical instrument case having pumper or other pedals or foot devices, pumper pedals 3 and 4 being here shown.

The pedal case 1 has four doors 5, 6, 7 and 8, mounted to swing on vertical axis hinges 9, 10, 11 and 12. The four doors are disposed in a row across the front of the opening of the case which contains the pedals 3 and 4 when out of use, said pedals being mounted in any suitable manner to be moved into operating position partly or wholly outside such case. The end or main doors 5 and 8 of the row are hinged at their outer edges at the sides of the case opening by hinges 9 and 12, the secondary door 6 being hinged to the right edge of the main door 5, by hinges 10, and the secondary door 7 being hinged to the left edge of main door 8 by hinges 11. Hinges 9 and 12 are so hung as to allow the main doors 5 and 8 to swing outwardly to right angles to the front of the case. Hinges 10 and 11 are so hung as to allow the secondary doors 6 and 7 to swing against the inner faces of the main doors 5 and 8 when the latter are in open positions at right angles to the front of the case. Stops 13 and 14 prevent the main doors 5 and 8 from going beyond their desired position, and the secondary or middle doors thereby failing to make their full outward motion. To enable these doors to be worked conveniently by hand, the following mechanism is provided to operate each pair of doors together, as 5 and 6, and 7 and 8, and if desired, to have both pairs work at once from a single control, although the mechanism herein is claimed in single pair features as well as when compounded of several pairs. For convenience of description, the single pair will be described first, being 7 and 8 at the right of case 1. To guide the secondary door 7 to correct position of its unhinged edge, a guide-pin or follower 15 is fixed at the top of said door near to its unhinged edge, and projecting above said door, and engaging in a groove or guide-means 16 lying lengthwise of the front of the opening of the case, and continuing near to the hinge axis of the main door 8 to case 1, and preferably somewhat forward of the line of the two hinges 9 and 12, to assist the return start of the secondary door 7. The follower 15 is correspondingly set forward on the secondary door 7, at the same distance from the adjacent edge of door 7 as the groove of the guide means 16 is forward of said edge when the secondary door 7 is open against the main door 8 when door 8 is at its right angle open position.

An arm or crank 17 is extended from the top of secondary door 7 away from the line of the two hinges 10 and 12 to enable the combined folding and opening of the doors 7 and 8 from a place at a distance therefrom, as by a pitman 18 attached to the arm or crank 17 by a pin or joint 19. For guidance of the pitman 18 in proper line of motion, and for convenience of hand operation, a lever 20 is connected to the pitman 18 by a

pin or joint 21, the lever 20 lying in the same plane with the crank 17 and the pitman 18. This lever 20 is preferably pivoted by a pin or joint 22, at a distance rearward from its bearing 21 to the pitman 18. The front end of lever 20 may be brought as far forward of bearing 21 as is desirable for easy reach and leverage of power, a knob or handle 23 being provided at the front end of the lever 20 for operation by the hand. When two pairs of doors are used, they may be operated by the one lever 20 and knob or handle 23, by an extension of the lever 20 at its rear beyond its pivot bearing 22, having a joint 24 to which a rod or pitman 25 leads across to the joint 26 of crank 27 of door 6 of the other pair of doors 5 and 6. The reverse direction of motion of pitman 25 to that of pitman 18, acts on the crank 27 from the rear of the general line of hinging instead of from the front of said line as does pitman 18, the motion of joint 26 of crank 27 thus being in accord with that of the pitman 25 for simultaneous opening and closing of both pairs of doors, 5 and 6, and 7 and 8. The secondary door 6 has a guide-pin or follower 28 engaging in the groove of guide-means 16 in similar manner as does the guide-pin 15 of secondary door 7.

To secure the exactly even opening and closing of the two pairs of doors, a threaded union or adjuster 29 is provided on pitman 25 to adjust its length and the consequent relation of termination of motion of the two pairs of doors. Means for such adjustment may be introduced at any other point on the connection system between the two pairs of doors, as on the pitman 18 or elsewhere, but is most convenient on the pitman 25 as shown, as it is then adjacent to the adjuster 30 of lever 20 which changes the proportions of its leverage at front and rear and thus varies the extent of throw of one pair of doors compared to the other pair, the two adjusters 29 and 30 thus controlling the exactly equal termination of throw of both pairs of doors at each end of their motion.

Various modifications of hinges, connections and handles may be made and yet be subject to what I claim as my invention.

Claims:

1. A support means, a main door hinged at one vertical edge to said support means, a secondary door hinged to the other vertical edge of the main door, said two doors standing in one line when closed, guiding means combined with said secondary door, an arm or crank extended from said secondary door, a pivoted horizontal lever, an actuating connection from said lever to said arm or crank of said secondary door, said arm or crank standing at one side of said line when said doors are closed, and at the other side of said line when said doors are open.

2. A support means, a main door hinged at one vertical edge to said support means, a secondary door hinged to the other vertical edge of the main door, a second pair of doors comprising a main door hinged to the support means and a secondary door hinged to said main door, the said second pair of doors being in reverse order of hinging to that of the first pair but in the same general line when all are closed, guiding means in similar alinement with said general line, means engaging both said secondary doors with said guide means, an arm or crank on each said secondary door, said cranks standing at the same side of said general line as the doors when said doors are open, but standing at the other side of said general line when said doors are closed.

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Witnesses:
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