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PEDAL CLAVIER FOR MUSICAL INSTRUMENTS

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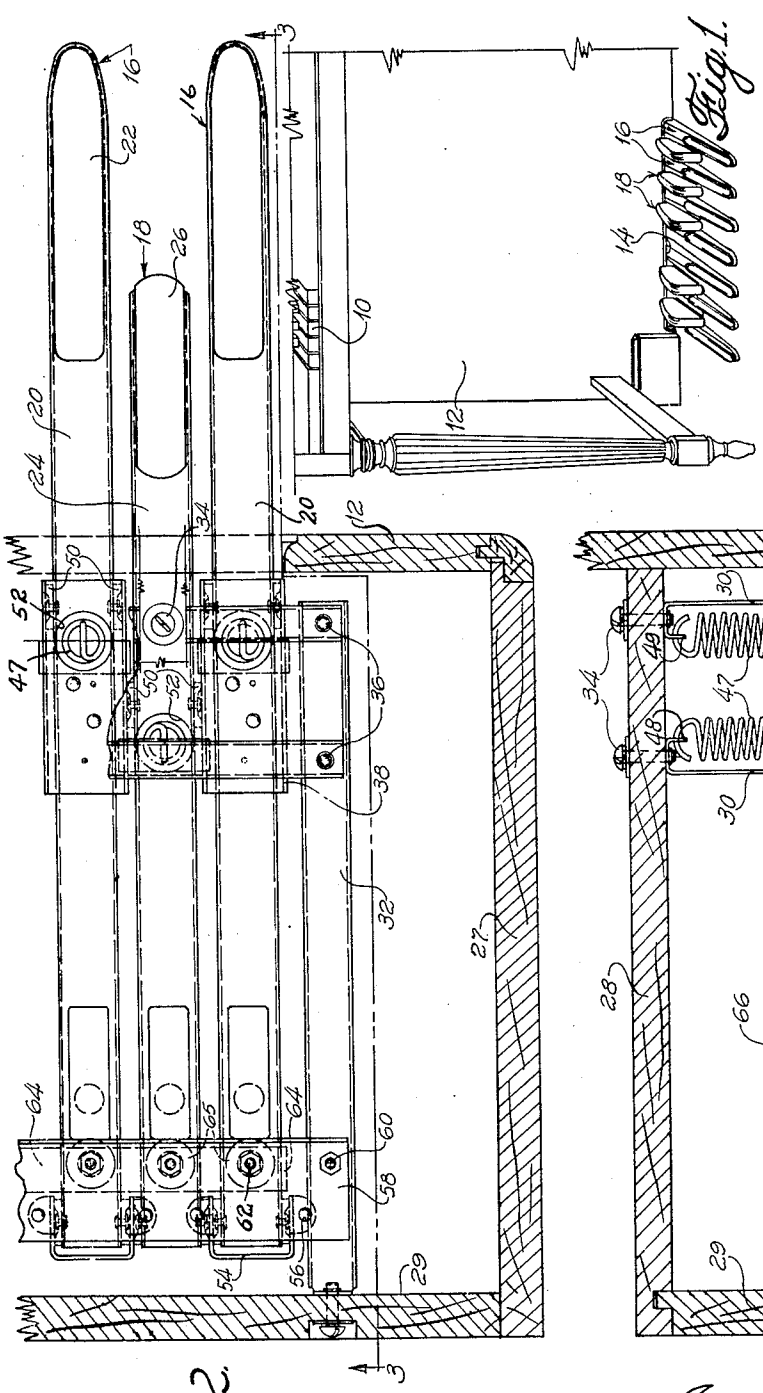


Fig. 1.

Fig. 2.

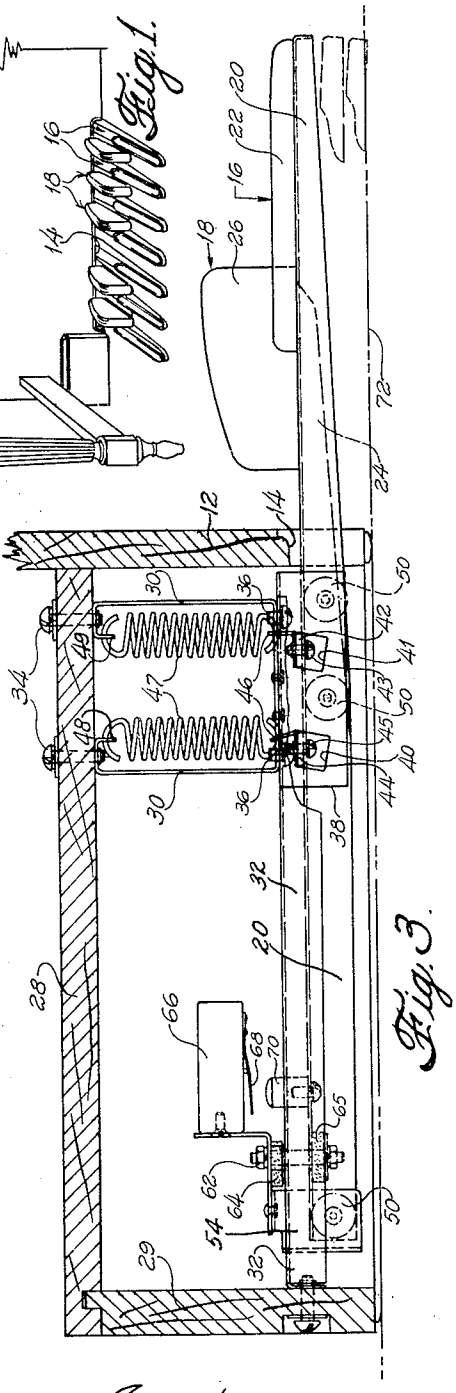


Fig. 3.

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PEDAL CLAVIER FOR MUSICAL INSTRUMENTS

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8 Claims. (Cl. 84—426)

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Our invention relates generally to pedal claviers for musical instruments and more particularly to claviers adapted to be mounted partially within the console of the instrument.

It is an object of our invention, to provide an improved pedal clavier for musical instruments, particularly those having pedals operating switches to control the sounding of the tones, in which the pedals are mounted for pivotal movement and in which the pivotal mounting is such as to prevent damage to the pedals or parts operated thereby even though the pedals are subjected to unusual stresses, as may occur, for example, when the player stands upon them.

The further object is to provide an improved pedal clavier for musical instruments which is of rugged construction and thus will be very durable, and which may be economically manufactured. Other objects will appear from the following description, reference being had to the accompanying drawings, in which:

Fig. 1 is a fragmentary perspective view of the console of a musical instrument showing the improved pedal clavier associated therewith;

Fig. 2 is a fragmentary plan sectional view of a portion of the pedal clavier assembly; and

Fig. 3 is a vertical sectional view taken on the line 3—3 Fig. 2.

The invention is illustrated in Fig. 1 as forming part of the console of a musical instrument, such as a piano or organ, having a keyboard 10 of conventional construction and having a fallboard 12. The lower edge of the fallboard 12 is provided with an elongated notch or recess 14 through which natural pedals 16 and sharp pedals 18 project. Each of the natural pedals 16, comprises an elongated sheet metal channel 20 to which is secured a foot contact piece 22. Each of the sharp pedals 18 comprises a channel 24, similar to the channels 20, but of shorter length, and is provided with an elevated foot contact piece 26.

The pedals project through the recess 14 in the fallboard 12 and the inner ends thereof are partially enclosed by the side 27 of the piano or organ case, a top 28, and a back 29, these parts being suitably mortised and rigidly secured together.

A supporting frame comprises a pair of sheet metal channels 32 (only one of which is shown), the rearward ends of which are bolted to the back 29 and the forward ends of which are secured to the topboard 28 by a U-shaped channel 30, which has inwardly turned flanges 48 and 49 secured to the top 28 by screws 34 and has the

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central lower portion secured to the channels 32 by screws 36. The transverse sheet metal channel 30 supports a plurality of inverted channels 38 which are in alinement with and embrace alternate pedal channels 20, 24. The downwardly extending side walls of the channels 38 are provided with pairs of aligned openings 40, 41. The upper edges of these openings 40, 41 are slightly rounded to serve as rocking fulcrums for transverse bearing bars 42 secured by screws 43 to the pedal channels 20. Similar transverse bearing bars 44 are secured by screws 45 to the sharp pedal channels 24. Screws 43 and 45 also secure spring anchor brackets 46 to their respective pedal channels 20, 24. Tension springs 47 each have one end hooked to one of the brackets 46 and have their upper ends hooked into the inwardly turned flanges 48 and 49. The springs 47 extend through suitably located holes 52 in the bottom of channel 30 registering with similar holes in the channels 38. The key channels 20, 24 have circular felt pads 50 riveted to the sides thereof for spacing and guiding them, these pads engaging the inner and the outer surfaces of the vertical walls of channels 38.

The rearward ends of the pedal channels 20 and 24 are also provided with circular felt pads 50 riveted to the side walls of the channels and contacting the vertical side walls of generally U-shaped brackets 54 which are secured by rivets 56 to a transverse supporting angle 58, the latter being secured by bolts 60 to the frame channels 32. A shouldered bolt or stud 62 projects through a suitable opening formed in the horizontal portion of each of the pedal channels 20, 24 and serve as retaining supports for a felt strip 64 and annular felt washers 65 which act as cushioning stops to limit upward and downward motion respectively of the rearward end portions of the pedal channels 20, 24. A plurality of microswitches 66 are secured to the vertically extending leg of the angle 58, each of these switches having a leaf spring actuator 68 which is adapted to be engaged by a push pin 70 suitably secured to the associated pedal channel 20, 24.

In normal use of the pedal clavier, upon depression of any one of the pedals 16, its spring 47 maintains the crossbar 42 in contact with the rounded upper edges of the openings 41 in the channel 38. The pedal thus rocks on these rounded surfaces as a pivot, the push pin 70 engaging the actuator 68 to operate the switch 66. The parts are so proportioned that the switch 66 will be operated prior to the time that the rearward end portion of the pedal channel 20 engages the

up-stop felt strip 64. If the player rests his foot very heavily upon the pedal 16, the rearward end of the channel 20 will be prevented from further upward movement by the up-stop felt strip 64 and the spring 46 will therefore be stretched further, the opening 41 permitting the crossbar 42 to move downwardly away from the rounded edge pivot surface a sufficient distance that the forward end portion of the pedal channel 20 will engage the floor, indicated by the ground line 72. In a similar manner, the sharp pedals 18 are arranged to operate their respective switches 66, and if excessive pressure is applied to these pedals their crossbars 44 may similarly move downwardly in the openings 40 until the lower edges of the pedal channels 24 are arrested by the floor.

Thus it will be clear that even though the player stands upon the pedals the push pins 70 will not move upwardly a distance further than they are moved during normal operation of the pedals and the switches 66 will not be damaged. Instead, the pedal channels 20, 24 will be pressed downwardly against the floor without subjecting them to excessive stresses as would be the case if the pedals were mounted on fixed pivots and were provided with rigid limit stops. If the pedal clavier were constructed in the latter manner, the pedal channels 20, 24 and the supports and stops therefor would have to be made much stronger and heavier with consequent increase in overall weight and cost of the pedal clavier. Furthermore, the additional weight of the pedals would inherently slow up the operation, especially their return movement, unless stronger return springs were provided. Making the springs 47 stronger would make it more difficult and tiring to play the instrument.

It will be noted that in the construction disclosed herein, the springs 47, although relatively heavy, are mounted very close to the pivotal axis of the pedals so that they do not offer a substantial torque resistant to the depression of the pedals. Thus, the pedals, being relatively light in weight and subjected to a relatively small resilient return force, may be tapped lightly with the toe to operate the switches 66, and will, upon release of further pressure, return rapidly to normal position, while nevertheless the pedals may be subjected to the full weight of a player standing upon one or more of them without danger of damaging the pedal channels or any of the supports or other parts associated therewith.

While we have shown and described a particular embodiment of the invention, it will be apparent to those skilled in the art that numerous modifications and variations may be made in the form and construction thereof without departing from the more fundamental principles of the invention. We therefore desire, by the following claims, to include within the scope of our invention all such similar and modified forms of the apparatus disclosed, by which substantially the results of the invention may be obtained by substantially the same or equivalent means.

We claim:

1. In a pedal clavier for musical instruments, the combination of a plurality of relatively light weight pedals, each of the pedals having a fulcrum engaging part, fixed fulcrums positioned for engagement by said parts, said fulcrums presenting downwardly projecting bearing surfaces, fixed stop means limiting movement of the rearward ends of the pedals, and yieldable resilient means holding said parts upwardly against the fulcrum bearing surfaces and applying to the pedals a torque in a direction to move the forward ends of the pedals upwardly, said resilient means yielding to permit the fulcrum engaging parts to move downwardly away from the fulcrum bearing surfaces when excessive downwardly directed forces are applied to the forward ends of the pedals, whereby the latter may move downwardly and be arrested by the floor above which the pedal clavier is located.

2. In a pedal clavier for musical instruments, the combination of a plurality of generally horizontal pedals positioned near the bottom of the console a short distance above the floor, each of the pedals having a fulcrum engaging part, fixed fulcrums presenting downwardly projecting bearing surfaces positioned for engagement by said parts, fixed stop means limiting movement of the rearward ends of the pedals, and resilient means holding said parts upwardly against the fulcrum bearing surface and applying to the pedals a torque in a direction to move the forward ends of the pedals upwardly, said resilient means applying the torque close to the fulcrums and applying sufficient forces to the pedals to permit the fulcrum engaging parts to move downwardly away from the fulcrum bearing surface only when excessive downwardly directed forces are applied to the forward ends of the pedals, whereby the pedals may move downwardly and be arrested by the floor above which the pedal clavier is located when such excessive forces are applied thereto.

3. In a pedal clavier for musical instruments, the combination of a plurality of pedals, each comprising an inverted channel and each having a fulcrum engaging part intermediate its ends, fixed fulcrums positioned for engagement by said parts, said fulcrums presenting downwardly projecting convex bearing surfaces, fixed stop means limiting movement of the rearward ends of the pedals, and relatively powerful yieldable resilient means holding said parts upwardly against the fulcrum bearing surfaces and applying to the pedals a torque in a direction to move the forward ends of the pedals upwardly, said torque being applied to the pedals at a point closely adjacent to their fulcrums, said resilient means yielding to permit the fulcrum engaging parts to move downwardly away from the fulcrum bearing surfaces when excessive downwardly directed forces are applied to the forward ends of the pedals, whereby the latter may move downwardly and be arrested by the floor above which the pedal clavier is located.

4. In a pedal clavier for musical instruments, the combination of a plurality of generally horizontal pedals positioned near the bottom of the instrument console a short distance above the floor, each of the pedals having a fulcrum engaging part, fixed fulcrums presenting downwardly facing bearing surfaces positioned for engagement by said parts, fixed stop means limiting upward movement of the rearward ends of the pedals, and springs holding said parts upwardly against the fulcrum bearing surfaces and applying to the pedals a torque in a direction to move the forward ends of the pedals upwardly, each of the springs applying the torque close to the fulcrum and applying a sufficiently large upwardly directed force to the pedal to permit the fulcrum engaging part to move downwardly away from the fulcrum bearing surface only when an excessively large downwardly directed force is applied to the forward end of the pedal, whereby

the pedal may move downwardly and be arrested by the floor above which the pedal clavier is located when such excessive force is applied thereto.

5. In a pedal clavier for musical instruments, the combination of a supporting frame including a plurality of inverted channels having openings on the side walls thereof, said openings providing downwardly convex fulcrum edges, a plurality of pedals each having a foot contact surface at the forward end thereof, a pivot element secured to each of the pedals intermediate the ends thereof, the element having its ends extending through said openings, resilient means normally holding the ends of the pivot element against the fulcrum edges of the channel openings and yieldable to permit the ends of the pivot elements to move downwardly a substantial distance away from the fulcrum edges, and stop means to limit the extent of movement of the rearward ends of the pedals.

6. In a pedal clavier for musical instruments, the combination of a supporting frame including a plurality of pedal guides having vertical walls with openings therein, said openings providing downwardly facing fulcrums, a plurality of pedals each having a foot contact surface at the forward end thereof, a pivot element secured to each of the pedals intermediate the ends thereof, the element having its ends extending through said openings, resilient means normally holding the ends of the pivot element against the fulcrums and yieldable to permit the ends of the pivot

elements to move downwardly a substantial distance away from the fulcrum edges, and stop means to limit the extent of movement of the rearward ends of the pedals.

7. In a pedal clavier for musical instruments, the combination of a supporting frame including a plurality of downwardly facing fulcrums, a plurality of pedals each having a foot contact surface at the forward end thereof, a pivot part on each of the pedals intermediate the ends thereof, a spring normally holding the pivot part of each pedal upwardly against its fulcrum, said spring being yieldable to permit the pivot part to move downwardly a substantial distance away from the fulcrum, stop means to limit the extent of movement of the rearward ends of the pedals, and switches respectively operated by the pedals.

8. In a pedal clavier for musical instruments in which the clavier is placed close to the floor comprising, a plurality of pedals, each pedal having a forward end for engagement by the foot of the player, a stop to limit upward movement of the rearward end of the pedal, a downwardly facing fulcrum, yieldable resilient means to hold an intermediate part of the pedal upwardly against the fulcrum, and a musical tone controlling element operated by the pedal upon pivotal movement thereof as the result of stepping upon its forward end.

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No references cited.