

COMPONENT FOR MUSICAL INSTRUMENT, AND MUSICAL INSTRUMENT
PROVIDED WITH SUCH COMPONENT.

FIELD OF THE INVENTION

5 The instant invention relates to components for musical instruments, and to musical instruments provided with such components.

BACKGROUND OF THE INVENTION

10 In musical instruments such as grand pianos, strings are stroke by hammers actuated by keys played by the pianist. In addition, dampers are used which either rest on the string for attenuating its vibrations, or are lifted off the string to enable these vibrations. Dampers can be activated in different ways, depending on commands
15 (usually, pedals) actuated by the pianist, so as to obtain different sound effects.

 In WO96/24,125, such a grand piano is disclosed. The dampers are displaced by damper support elements which themselves can be actuated either by a resonance bar, a
20 harmonic bar, or directly by a corresponding key.

 With no pedal pressed, a damper is lifted off the string corresponding to a depressed key, and is moved back to the string when the key is released.

 When the resonance bar is activated, all the
25 dampers are lifted off the strings. They remain in this position when the keys are played, and return back to the strings only when the resonance bar is released.

 When the harmonic bar is activated, all the dampers are lifted off the strings, with the effect that, when a
30 particular key is played while the harmonic bar is activated, its associated damper returns back to the string when the key is released.

 Accordingly, this prior art document describes a component for a musical instrument comprising:

35 - a support to be fixed to a musical instrument

body,

- a harmonic bar mounted on the support, and movable relative to the support between a rest position and a remanence position,

5 - a plurality of damper arm elements each adapted to cooperate with a respective damper, each damper arm element being mounted on the support and movable relative to the support between a rest position and a remanence position,

10 - an escapement nose being mounted on each damper arm element and being movable relative to the arm between a rest position and an escapement position,

each damper arm element, in the rest position of the escapement nose, cooperating with the harmonic bar so
15 that movement of the harmonic bar from its rest position to the remanence position causes the displacement of the damper arm element from its rest position to its remanence position,

each escapement nose being actuatable by a
20 respective key of the musical instrument to be displaced to its escapement position, whereby key actuation of the escapement nose when the damper arm element is in its remanence position enables the movement of the damper arm element from its remanence position to its rest position,

25 whereby the harmonic bar, when in its remanence position, maintains the damper arm elements in the remanence position, where the respective damper does not dampen vibrations of the respective strings, if the corresponding key is not played, and

30 the harmonic bar allows a damper arm element to return to its rest position, where the respective damper dampens vibrations of the respective string, when the corresponding key is released, while maintaining other not-key-actuated arm elements in their remanence position,

35 - a resonance bar mounted on the support, and

movable relative to the support between a rest position and a resonance position, the resonance bar cooperating with the damper arm elements so that a displacement of the resonance bar from its rest position to its resonance position displaces all damper arm elements to a resonance position, the remanence position of the damper arm elements being intermediate between their rest position and their resonance position along one degree of freedom, a damper not dampening the vibrations of a respective string in the resonance position, regardless of the position of the escapement nose relative to the respective arm.

Although such a mechanism is globally satisfactory, there remains a need for providing a component for a musical instrument which could be easily installed and adapted to any suitable musical instrument.

The instant invention has notably for object to satisfy this need.

SUMMARY OF THE INVENTION

To this aim, according to the invention, it is provided a component for a musical instrument comprising:

- a support to be fixed to a musical instrument body,
- a harmonic bar mounted on the support, and movable relative to the support between a rest position and a remanence position,
- a plurality of damper arm elements each adapted to cooperate with a respective damper, each damper arm element being mounted on the harmonic bar and movable relative to the harmonic bar between a rest position and a remanence position,
- an escapement nose mounted on each damper arm element and being movable relative to the arm between a rest position and an escapement position,

each damper arm element, in the rest position of the escapement nose, cooperating with the harmonic bar so

that movement of the harmonic bar from its rest position to its remanence position causes the displacement of the damper arm element from its rest position to its remanence position,

5 each escapement nose being actuatable by a respective key of the musical instrument to be displaced into its escapement position, whereby key actuation of the escapement nose when the damper arm element is in its remanence position enables the movement of the damper arm
10 element from its remanence position to its rest position,

 whereby the harmonic bar, when in its remanence position, maintains the damper arm elements in the remanence position, where the respective damper does not dampen vibrations of the respective strings, if the
15 corresponding key is not played, and

 the harmonic bar allows a damper arm element to return to its rest position, where the respective damper dampens vibrations of the respective string, when the corresponding key is released, while maintaining other not-
20 key-actuated arm elements in their remanence position,

 - a resonance bar mounted on the support, and movable relative to the support between a rest position and a resonance position, the resonance bar cooperating with the damper arm elements so that a displacement of the
25 resonance bar from its rest position to its resonance position displaces all damper arm elements to a resonance position, the remanence position of the damper arm elements being intermediate between the rest position and their resonance position along one degree of freedom, a damper
30 not dampening the vibrations of a respective string in the resonance position, regardless of the position of the escapement nose relative to the respective arm,

 wherein the harmonic bar is shaped as a profiled sheet plate shaped to define a cavity, and having a
35 harmonic portion for cooperation with the damper arm

elements and an activation portion adapted to cooperate with a harmonic command of the user for displacing the harmonic bar from its rest position to its remanence position,

5 and wherein the resonance bar extends inside said cavity.

With these features, the component can be easily manufactured and be integrated on any musical instrument provided the dimensions of the instrument are provided.

10 In some embodiments, one might also use one or more of the features as defined in the dependent claims.

Further, according to the invention, it is provided a component for a musical instrument comprising a damper abutment adapted to cooperate with at least a damper arm
15 element to limit a stroke of at least one damper arm element relative to the support,

wherein the damper abutment is mounted on the resonance bar.

Further, according to the invention, it is provided
20 a component for a musical instrument comprising at least an activation device comprising a first end adapted to cooperate with an activation portion of one of the resonance bar and the harmonic bar, and a second end adapted to cooperate with a pedal of the musical
25 instrument, wherein said second end comprises a threaded adjustment device for adjusting the position of the second end relative to the first end.

Further, according to the invention, it is provided a system comprising :

30 - a pilote adapted to be adjustably mounted on a piano element, by rotation of the pilote about an adjustment axis,

 - a tool comprising a body and an adjustment portion rotatable with respect to the body about a setting
35 axis,

wherein the tool is adapted to cooperate with the pilote to adjust the position of the pilote with respect to the piano element,

wherein the adjustment axis and the setting axis
5 are not parallel, and preferably orthogonal.

BRIEF DESCRIPTION OF THE DRAWINGS

Other characteristics and advantages of the invention will readily appear from the following description of one of its embodiments, provided as a non-
10 limitative examples, and of the accompanying drawings.

On the drawings :

- Fig. 1 is a partial perspective view of a musical instrument such as a grand piano,
- Fig. 2 is a partial perspective view of a
15 transmission device transmitting foot commands applied to the piano of Fig. 1,
- Fig. 3 is a partial perspective side view of a component for grand piano,
- Fig. 4 is a partial perspective view of the
20 component of Fig. 3,
- Figs. 5a to 5g are simplified side views similar to Fig. 3, illustrating different states of the component,
- Fig. 6 is a sectional side view of a part of the transmission device of Fig. 2,
- 25 - Fig. 7 is a partial perspective view of a resonance bar with an integrated damper abutment,
- Fig. 8a is a schematic side view of a pilote adjustment tool, and
- Fig. 8b is a schematic top view of the tool of
30 Figure 8a.

On the different Figures, the same reference signs designate like or similar elements.

DETAILED DESCRIPTION

Figure 1 shows in perspective a part of a string
35 musical instrument, such as a grand piano 1. Figure 1

shows only a part of the piano body 2 in which parallel strings 3 extend. The piano 1 is provided with a keyboard 4 of which only one key 5 is shown and further comprises a foot command 6 comprising a plurality of pedals such as, in
5 the present example, four pedals 6a, 6b, 6c, 6d. A component 7 is provided mounted on the piano body 2, to command the displacement of dampers 8 on and off the respective strings 3, depending on the actuation of the keys 5 and of the pedals 6a, 6b, 6c, 6d. Although only one
10 key 5, one string 3, and one damper 8 are shown on Figure 1, it is understood that the piano comprises a plurality of parallel disposed keys, parallel disposed strings, and parallel disposed dampers. Some strings might not have any associated damper.

15 In the provided example, a first pedal 6a is an *una corda* pedal adapted to laterally shift the keyboard 4 relative to the body 2 by a few millimetres. Operation of such a pedal is known *per se* and is not the object of the present invention, and will therefore not be described
20 in more details below.

The second pedal 6b is a tonal pedal adapted to maintain off the strings 3 the dampers 8 which are associated with the keys 5 which are depressed while the second pedal 6b is actuated. These dampers 8 will only move
25 back to the associated strings when the tonal pedal 6b is released. Operation of such a tonal pedal is known *per se* and is not the object of the present invention, and will therefore not be described in more details below.

The third pedal 6c is the so-called resonance pedal
30 (or *forte* pedal). Its actuation causes all the dampers 8 of the piano to be lifted off the strings. The dampers 8 will move back onto the strings only when the resonance pedal is released.

The fourth pedal 6d is the so-called harmonic pedal
35 adapted, in a remanence position, to cause all the dampers

8 to be lifted off the strings 3, and to allow only the dampers 8 associated with a key 5 which is depressed while the harmonic pedal is maintained in the remanence position to return back onto the respective strings. The harmonic pedal can also provide a resonance function, when further depressed, whereby all the dampers 8 are lifted off the strings, regardless of whether a key 5 has been pressed while the pedal was in the remanence position.

As shown on Figure 2, the component 7 comprises a harmonic bar 9 defining an internal cavity inside which a resonance bar 10 (not visible on Fig. 2, see Fig. 3) extends.

The pedals 6a, 6b, 6c, 6d are each connected with a respective command rod 11a, 11b, 11c, 11d, which are parts of the foot command actuation system. The resonance pedal 6c is connected to a resonance lever 12c through the command rod 11c. The resonance lever 12c is pivotally mounted on supports 13c which are fixed onto the piano body (not shown).

Similarly, the harmonic pedal 6d is connected, by way of the command rod 11d to a harmonic lever 12d comprising an external plate 62 which is pivotally mounted on supports 13d fixed to the piano body. The resonance lever 12c and the external plate 62 extend sensibly parallel to one another.

An U-shaped bracket 61 extends downward from the external plate 62 and integrally therewith, and forms the seat for a harmonic spring 16d, the other end of which rests on an internal plate 63 which is mounted by bearings to rotate relative to the external plate 62 about the same axis as the rotational axis of the external plate 62 relative to the supports 13d.

Further, a transverse lever 14 is pivotally connected on supports 13e fixed to the piano body and extends above both the resonance lever 12c and the external

plate of the harmonic lever 12d. The transverse lever 14 carries a resonance rod 15c, which extends from a first end connected to the transverse lever 14 to a second end extending inside the cavity and connected to the resonance bar 10. The resonance rod 15c thus passes through a hole 73 in the harmonic bar 9.

The transverse lever 14 further carries a resonance spring 16c adapted to cooperate with a facing abutment 17 of the piano body.

10 The internal plate 63 of the harmonic lever 12d carries a harmonic rod 15d having a first end connected to the internal plate 63 and a second end connected to the harmonic bar 9.

As shown in details on Figure 4, a support 18 is fixed on the piano body. A resonance bracket 19 has a first end pivotally mounted on the support 18 through bearings about a rotation axis X. The second end of the resonance bracket 19 is fixed or otherwise connected to the resonance bar 10. In the present example, the resonance bar is shown as comprising a profiled sheet plate having a main body 65 of hollow rectangular cross-section, for example made of a lightweight metal which is torsion-resistant and bend-resistant such as for example, an AU4G-type aluminium profile. In the example, three hollow portions extend along the profile: two T-shaped portions symmetrical with respect to a central +-shaped portion. Those hollow portions allow to decrease the weight of the resonance bar, while ensuring its good mechanical properties. The thicker portions are useful for performing threads and/or for receiving screws and/or other fixation tools. The top face of the main body 65 carries an actuation portion 66, for example made of a felt of a plain rectangular cross-section, for cooperation with the damper arm elements.

35 The harmonic bar 9 is mounted on the support 18 by

bearings, so as to allow the harmonic bar 9 and the resonance bar 10 to rotate independently about the axis (X).

As shown on Figure 4, the harmonic bar 9 is made of a profiled sheet plate which is, for example, made from a lightweight metal which is torsion-resistant and bend-resistant such as, for example, an AU4G-type aluminium. Conveniently, the harmonic and resonance bars are made of the same material. The harmonic bar 9 is manufactured with an generally U profile having a first wing 20 and a second wing 21 opposed to each other, and connected to each other through a base 22. The first wing 20, the base 22 and the second wing 21 together define an internal cavity 23 inside which the resonance bar 10 extends in the rest position of the system. The first wing 20 of the harmonic bar 9 is fixed onto a mounting bracket 24 which is pivotally connected on the support 18 about the rotation axis X, and independently of the resonance bracket 19. The first wing 20 is pierced with a plurality of mounting holes 25 which each serves to receive a bracket 26 for a corresponding damper arm element (not shown, see Figure 3). This bracket 26 extends from a first end fixed to the harmonic bar 9 at the mounting hole 25, to a second end which defines a reception hole 27 for a respective damper arm element.

As explained above in relation to Figure 2, the bottom face of the base 22 of the harmonic bar 9 defines an actuation portion receiving actuation from the harmonic pedal 6d through the harmonic rod 15d. The base 22 is also provided with a hole through which the resonance rod 15c extends (see Figure 3), the resonance rod 15c cooperating with an actuation face 28 of the resonance bar 10.

The second wing 21 is provided with a lip 29 outwardly extending from the second wing 21, for example throughout the length of the profile.

As shown on Figure 3, the damper support element 30

comprises a damper arm element 31 and an escapement nose 32 pivotally connected to the arm 31 about a pivoting axis 33. The arm 31 is pivotally mounted on the bracket 26 about the pivoting axis 34 which, in the present embodiment extends
5 along the direction X, and is the same as the rotational axis of the harmonic and resonance bars relative to the support 18. A damper rod 35 has a first end connected, for example pivotally, to the arm 31 at a pivoting axis 36 and an opposed second end connected to an associated damper 8.

10 The escapement nose 32 has a key actuation portion 37 which, in the rest position of the escapement nose 32 faces a corresponding actuation portion 38 of the respective key 5. The escapement nose 32 further comprises a harmonic bar actuation portion such as a tail 39 which
15 faces the lip 29 of the harmonic bar 9. The escapement nose 32 further comprises an abutting portion 40 spaced from a corresponding abutting portion 41 of the arm 31.

The bottom face of the damper arm element 31 comprises an actuation portion 42, such as the bottom face
20 of a pilote 48, which faces the resonance bar 10. The exact position of the actuation portion 42 with respect to the resonance bar can be tuned precisely as described below in relation to Figure 8.

The operation of the system will now be described
25 in relation to Figures 5a to 5g.

Figure 5a schematically shows the system in its rest position, sensibly corresponding to the above described Figure 3.

As shown on Figure 5b, when no pedal is depressed,
30 actuation of a key 5 will bring its actuation portion 38 in contact with the corresponding key actuation portion 37 of the escapement nose 32, thereby causing rotation of the escapement nose 32 relative to the arm 31 about the pivoting axis 33 until the abutting portion 40 on the
35 escapement nose contacts with the corresponding abutting

portion 41 of the arm 31. Further rotation of the escapement nose 32 relative to the arm 31 is then prevented so that a further movement of the key 5 causes, as shown on Figure 5b, the rotation of the whole of the arm 31 and the
5 escapement nose 32 relative to the harmonic bar 9 about the rotation axis 34. This rotation will cause a movement upward of the damper rod 35 and will therefore lift the damper off the corresponding string.

Upon release of the key 5, the system will move
10 back to the position of Figure 5a.

When the harmonic pedal 6d is depressed to its remanence position, this will cause the rotation of the whole harmonic lever 12d (Figure 2) about the support 13d, which will result in an upward movement of the harmonic rod
15 15d. The rotative motion of the harmonic lever 12d will also cause the rotation of the transverse lever 14 about its support 13e, while compressing the spring 16c, and will therefore also cause an upward movement of the resonance rod 15c. As shown on Figure 5c, in this position, the
20 harmonic bar 9 (as well as the resonance bar) has rotated about the pivot axis X by a few degrees and the lip 29 pushes the escapement nose 32 upward, without causing a rotation of the escapement nose 32 relative to the arm 31 about the pivoting axis 33. This movement upward of the
25 escapement nose 32 will therefore cause a rotation of the arm 31 about the pivoting axis 34 up to its remanence position. This will therefore cause an upward movement of the damper rod 35. Thus, all the dampers are lifted off the strings.

30 With the harmonic pedal 6d maintained in this remanence position, if a given key 5 is played by the piano, its actuation portion 38 will cooperate with the key actuation portion 37 of the respective escapement nose 32, thereby causing rotation of the escapement nose 32 relative
35 to the arm 31 about the pivoting axis 33, and disengaging

the tail 39 of the escapement nose 32 from the lip 29 of the harmonic bar 9, as shown on Figure 5d.

When this key 5 is released, while the harmonic pedal 6d is still maintained in this remanence position, the damper arm element 31 will rotate downward relative to the bracket 26 about the pivoting axis 34 to its rest position, whereby the damper rod 35 moves downward and the damper moves back to the corresponding string, as shown on Figure 5e. This occurs only for keys 5 pressed and released when the harmonic pedal is maintained in the remanence position.

Therefore, at this stage, with the harmonic pedal still maintained in the same remanence position, some of the damper arm elements 31 exhibit the configuration of Figure 5c, and some others the configuration of Figure 5e regarding whether the corresponding key of the keyboard has been pressed and released in the meanwhile.

At this stage, if the pianist releases the pedal 6d, all the damper arm elements will move back to their rest position.

A contrario, if the player further presses the harmonic pedal 6d, the further rotation of the external plate 62 of the harmonic lever 12d will cause a further movement of the transverse lever 14 while the internal plate 63 remains in place, compressing the harmonic spring 16d. The upward movement of the transverse lever 14 will cause a further upward movement of the resonance rod 15c. As shown on Figure 5f, this will cause the further rotation of the resonance bar 10 about the rotation axis X, whereby an actuating portion 43 of the resonance bar 10 will engage the corresponding actuation portion 42 of the arm 31 and will cause, for the damper arm elements 30 which are in the position of Figure 5e, a rotation of the damper arm element about the pivoting axis 34. This rotation involves an upward displacement of the associated damper rod 35,

whereby the associated damper is lifted off the corresponding string.

If the harmonic pedal 6d is released at this stage, the system will be brought back to the preceding stage.

5 If the player continues to actuate the harmonic pedal 6d, a further rotation of the arm 31 relative to the pivoting axis 34 to its resonance position will disengage the tail 39 of the escapement nose from the lip 29 of the harmonic bar 9, whereby the escapement nose 32 will be
10 allowed to rotate relative to the arm 31 about the pivoting axis 33. Simultaneously, this further movement will also bring the damper support arm 31 corresponding to keys which have not been depressed and released in the remanence position of the harmonic pedal into the resonance position
15 illustrated on Figure 5g. Stated otherwise, all the damper arm elements 31 and noses 32 exhibit the configuration of Figure 5g at this stage, whereby all the dampers are lifted off the strings. In this configuration, the key actuation portion 37 of the escapement noses 32 are too far away from
20 the corresponding actuation portion 38 of the corresponding keys 5, whereby the keys 5 can be played without causing the rotation of the escapement noses 32 relative to the associated bodies 31 about the pivoting axis 33.

The arms 31 thus have a movement along one degree
25 of freedom from their rest position to their remanence position and further to their resonance position.

When the harmonic pedal 6d is released, from this configuration, the system takes back the configuration of Figure 5c, then that of Figure 5a.

30 When the resonance pedal 11c is depressed by the player, it will cause the rotation of the resonance lever 12c with respect to the supports 13c. The resonance lever 12c will engage the transverse lever 14, thereby causing rotation of the transverse lever 14 relative to the support
35 13e and the upward movement of the resonance rod 15c,

whereby the resonance bar 10 alone is rotated about the longitudinal axis X, whereby the damper arm elements 31 take their resonance position.

Figure 6 is a detailed view of the connection
5 between the harmonic bar 9 and the harmonic lever 12d. As shown on Figure 6, the harmonic rod 15d comprises a second end provided with a ball 44 which rotates in a socket 45 fixed on the harmonic bar 9.

On the opposite first end, the harmonic rod
10 comprises a ball 44 which rotates in a socket 45 of a sleeve 46. A joint 64 is integrated between the balls and the sockets, such as, for example, an auto-lubricated joint. This joint could be made of a plastic material such as nylon. This enables a silent and/or long-lasting
15 operation of the foot command. The sleeve 46 has an outer thread (non visible with this degree of detail) with which a threaded ring 47 cooperates. The ring 47 is rotated about the sleeve 46 so as to move upward until it fixes the sleeve 46 on the harmonic lever 12d by cooperation with the
20 lower face of the lever.

The above assembly enables an easy adjustment of the harmonic bar 9 to any piano. The threaded ring 47 and the harmonic lever can indeed be disposed outside the piano body (not shown), thereby allowing an easy adjustment. The
25 rods extend through suitable holes (71,72, see figure 1) in the piano body.

Although this assembly was described for the harmonic rod, it should be mentioned that the resonance rod, or any other similar rod used within the piano could
30 exhibit the above described geometry (Figure 6).

Further, as shown on Figure 7, according to another aspect, an abutment bar 67 is fixed to the resonance bar 10. It should be noted that a different embodiment of a resonance bar, with two hollow portions, is also shown on
35 Fig. 7. The abutment bar 67 extends along the length of the

component 7, and has a lower surface with a soft material such as a felt, and is disposed so as to limit the stroke of the damper arm elements. When the resonance bar 10 is not actuated, the abutment bar is in a low position, thereby preventing a long stroke for the dampers. With the abutment bar adjustably integrated with the resonance bar, a longer stroke of the dampers is allowed whenever the resonance bar is actuated. The position of Fig. 5g is thereby allowed.

It is apparent from the above description that the above described component could be easily manufactured to be installed on any suitable piano. It would be sufficient, given the width of the piano and the locations and spacing of the strings and keys, to manufacture (stamping or extruding) a suitable length of profiled sheet plates for forming the harmonic bar and/or the resonance bar, and to perform mounting holes 25 at the suitable positions for receiving the brackets 26 and the associated damper arm elements 31. All the elements of the component 7 can thus be standardized. The above component, either including the foot command and transmission devices or not, can then after being fixed onto the piano, be finely tuned on site on the piano.

For example, it is common in the field of pianos to use so called "pilotes" such as shown by reference 48 on Figure 3. Such pilotes are fine adjustment devices which allow to easily tune the geometric relative positions of the mechanical parts. For example, pilotes are provided under the damper arm elements for cooperation with the resonance bar 10, at the end of the keys, on escapements of the (not shown) string-striking hammers,

According to another aspect of the invention, such a pilote comprises a rod, a first end of which is threaded (the end which is threadingly inserted into the arm 31 on Figure 3), and the second end of which is fixed into a head

49 which, in the described embodiment has an adjustment portion made of a cylindrical toothed wheel. A corresponding tool 50 for finely adjusting the position of the pilote 48 is shown on Figures 8a and 8b. As shown on 5 Figure 8a, this tool comprises a handle 51 integral with a housing 57, and internally receiving a rotating rod 52 extending along a setting rotation axis 60. One end of the rod 52 is connected to an actuating indexed button 53, and the other end comprises an endless screw 54 supported in a 10 bearing 55 integral with the handle 51. The pilote 48 is mounted to pivot relative to the housing 57 about an adjustment pivot axis 58 which is orthogonal to the rotation axis of the endless screw 54. Upon use, the toothed portion 49 of the pilote is inserted in a pilote receiving space 59 of the tool. Rotation by the user of 15 the button 53 about the rotation axis 60 causes the rotation of the endless screw 54 whereby the pilote is made to rotate and threaded into or out from its receiving element along the adjustment axis 58. An easy setting of 20 the pilotes is possible thanks to the non-parallel, such as orthogonal, setting and adjustment axis, which allows to adjust the position of the pilote by a limited tool movement, not interfering with the neighbour parts of the piano.

25 The above described pilote and the associated tool can be used in the piano as described above in relation to Figures 1 to 7, but could also be used in any other appropriate piano.

CLAIMS

1. Component for a musical instrument comprising:

- a support (18) to be fixed to a musical
5 instrument body,
- a harmonic bar (9) mounted on the support, and
movable relative to the support between a rest position and
a remanence position,
- a plurality of damper arm elements (31) each
10 adapted to cooperate with a respective damper (8), each
damper arm element being mounted on the harmonic bar and
movable relative to the harmonic bar (9) between a rest
position and a remanence position,
- an escapement nose (32) being mounted on each
15 damper arm element and being movable relative to the arm
between a rest position and an escapement position,
each damper arm element (31), in the rest position
of the escapement nose, cooperating with the harmonic bar
(9) so that movement of the harmonic bar from its rest
20 position to its remanence position causes the displacement
of the damper arm element (31) from its rest position to
its remanence position,
each escapement nose being actuatable by a
respective key (5) of the musical instrument to be
25 displaced to its escapement position, whereby key actuation
of the escapement nose, when the damper arm element (31) is
in its remanence position, enables the movement of the
damper arm element from its remanence position to its rest
position,
- 30 whereby the harmonic bar (9), when in its remanence
position, maintains the damper arm elements in the
remanence position, where the respective damper does not
dampen vibrations of the respective strings, if the
corresponding key is not played, and
35 the harmonic bar (9) allows a damper arm element to

return to its rest position, where the respective damper dampens vibrations of the respective string, when the corresponding key is released, while maintaining other not-key-actuated arm elements in their remanence position,

5 - a resonance bar (10) mounted on the support (18), and movable relative to the support between a rest position and a resonance position, the resonance bar cooperating with the damper arm elements (31) so that a displacement of the resonance bar from its rest position to
10 its resonance position displaces all damper arm elements (31) to a resonance position, the remanence position of the damper arm elements being intermediate between their rest position and their resonance position along one degree of freedom, a damper (8) not dampening the vibrations of a
15 respective string in the resonance position, regardless of the position of the escapement nose (32) relative to the respective arm (31),

 wherein the harmonic bar (9) is shaped as a profiled sheet plate shaped to define a cavity (23), and
20 having a harmonic portion (29) for cooperation with the damper arm elements (31) and an activation portion (22) adapted to cooperate with a harmonic command (15d) of the user for displacing the harmonic bar from its rest position to its remanence position,

25 and wherein the resonance bar (10) extends inside said cavity.

 2. Component for a musical instrument according to claim 1, wherein the harmonic portion (29) of the harmonic bar (9) is adapted to cooperate with the respective
30 escapement nose (32) so that movement of the harmonic bar from the rest position to the remanence position displaces the respective damper arm element (31) from the rest position to the remanence position.

 3. Component for a musical instrument according to
35 claim 1 or 2 wherein the sheet plate has a through hole,

and wherein the resonance bar (10) has an activation portion (28) adapted to cooperate with a resonance command (15c) of the user for displacing the resonance bar from its rest position to its resonance position,

5 wherein the resonance command (15c) passes through said through hole of the sheet plate.

4. Component for a musical instrument according to any preceding claim, wherein the harmonic bar (9) is adapted to rotate relative to the support (18) about a
10 rotation axis (X),

 wherein each damper arm element (30) is adapted to rotate relative to the harmonic bar (9) about said rotation axis (X),

 wherein the resonance bar (10) is adapted to rotate
15 relative to the support (18) about said rotation axis (X).

5. Component for a musical instrument according to any preceding claim, wherein the sheet plate has a U-shaped profile having a base (22), a first wing (20) and a second wing (21) opposed to the first wing and connected to the
20 first wing through the base,

 wherein the first wing comprises a mount portion (24) for mounting the harmonic bar on the support (18), wherein the second wing (21) comprises the harmonic portion (29), and wherein the base (22) comprises the activation
25 portion.

6. Component for a musical instrument according to any preceding claim wherein the sheet plate is made of a lightweight bend- and torsion-resistant material.

7. Component for a musical instrument according to
30 any preceding claim, wherein the resonance bar (9) is made of a profiled sheet plate of the same material as the harmonic bar (10).

8. Component for a musical instrument according to any preceding claim further comprising a damper abutment
35 (67) adapted to cooperate with at least a damper arm

element (31) to limit a stroke of at least one damper arm element relative to the support (18),

wherein the damper abutment (67) is mounted on the resonance bar (10).

5 9. Component for a musical instrument according to any preceding claim further comprising at least an activation device (15c; 15d) comprising a first end adapted to cooperate with an activation portion of one of the resonance bar (10) and the harmonic bar (9), and a second
10 end adapted to cooperate with a pedal (6c; 6d) of the musical instrument, wherein said second end comprises a threaded adjustment device (46, 47) for adjusting the position of the second end relative to the first end.

10. Musical instrument comprising:

- 15 - a body,
- a component according to any preceding claim, with said support (18) fixed to said body,
- a plurality of strings (3),
- a keyboard (4) comprising a plurality of keys
20 (5) each for striking at least one respective string (3), at least one of said keys facing at least one respective escapement nose (32) so as to displace it into its escapement position,
- a foot command (6) adapted to independently
25 actuate said harmonic bar and said resonance bar.

COMPONENT FOR MUSICAL INSTRUMENT, AND MUSICAL INSTRUMENT
PROVIDED WITH SUCH COMPONENT.

ABSTRACT

Component for a musical instrument comprising:

5 - a support (18),

 - a harmonic bar (9) movable between a rest
position and a remanence position,

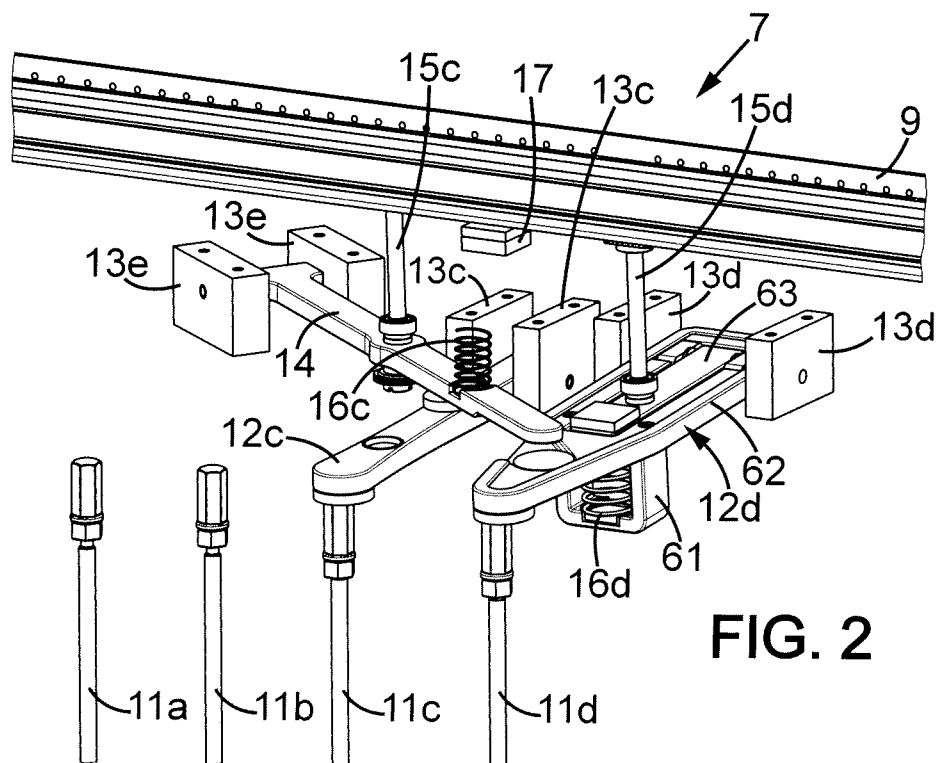
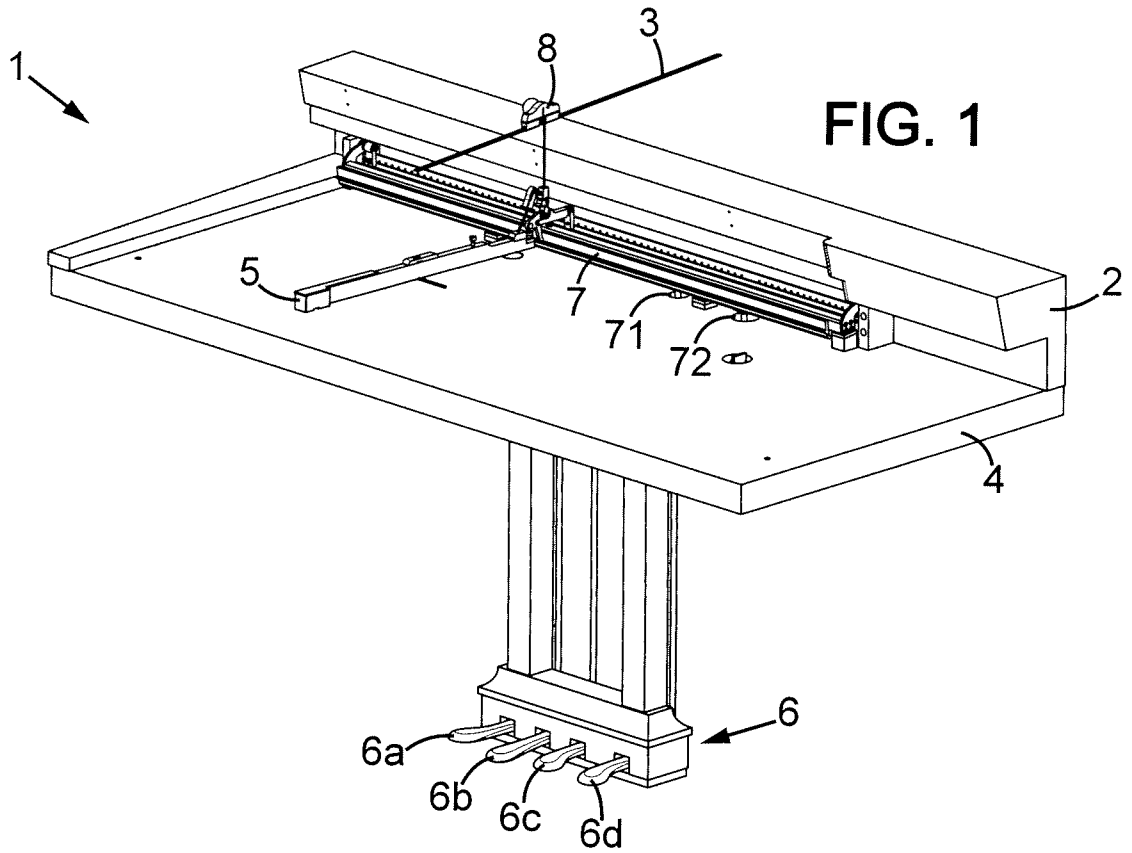
 - damper arm elements (31) mounted on the harmonic
bar and movable between a rest position and a remanence
10 position,

 - a resonance bar (10) movable between a rest
position and a resonance position,

 the harmonic bar (9) being shaped as a profiled
sheet plate shaped to define a cavity (23), the resonance
15 bar (10) extending inside said cavity.

FIGURE 3

1/6



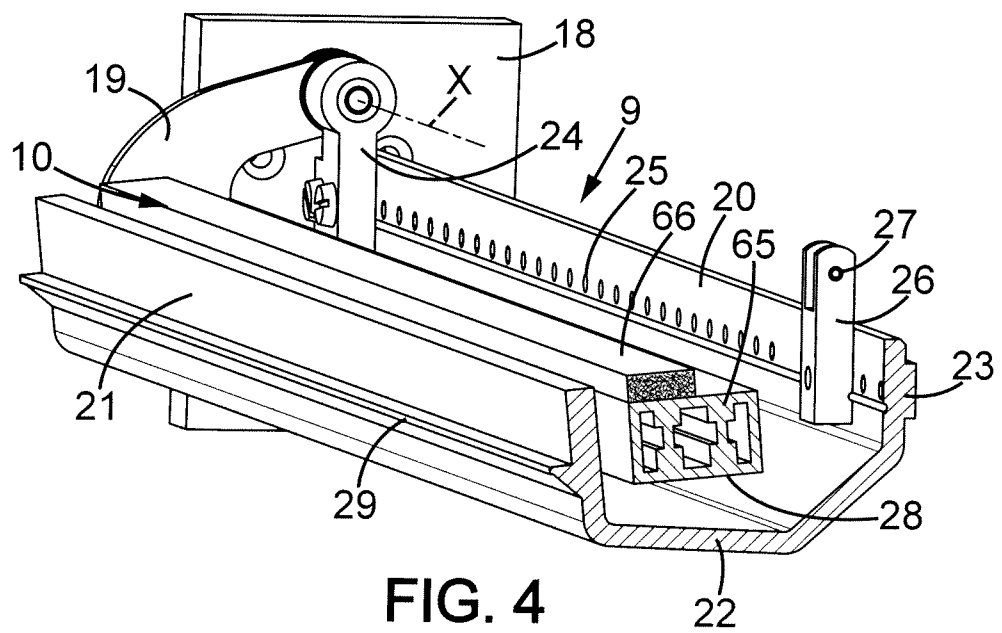
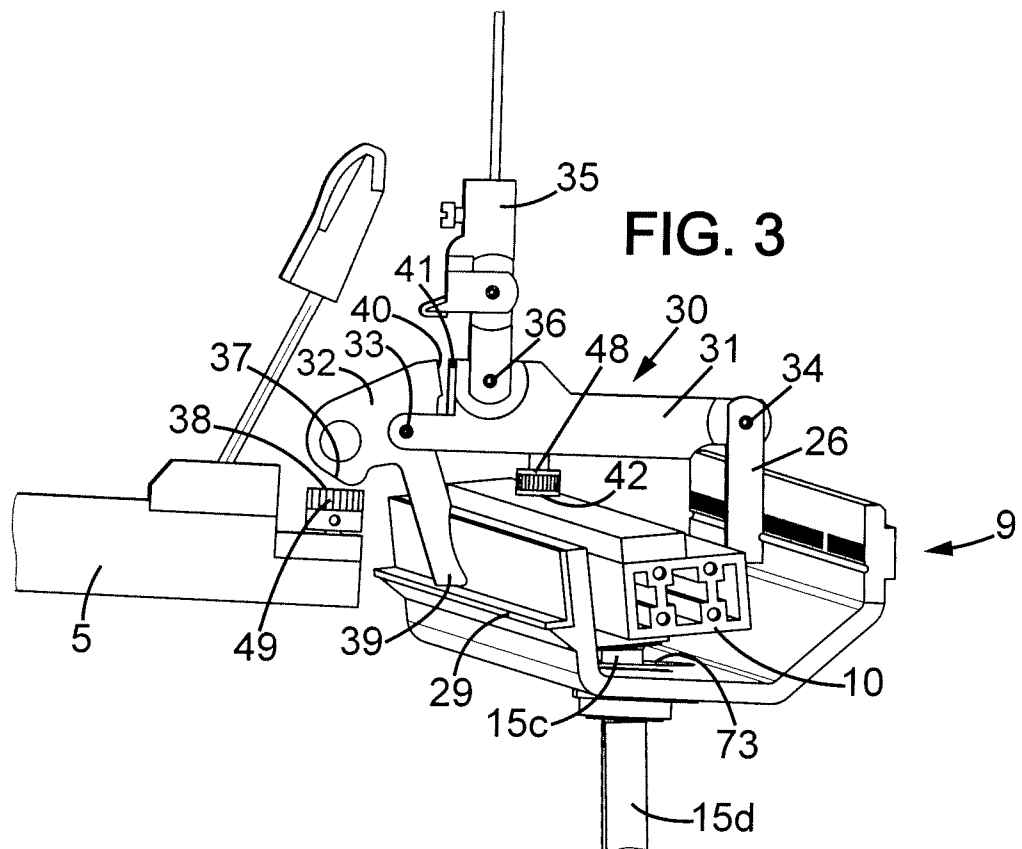


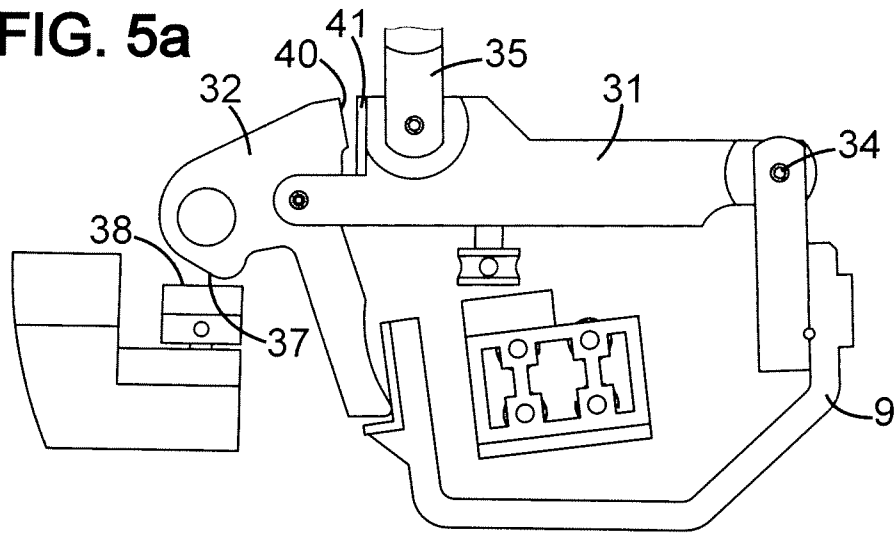
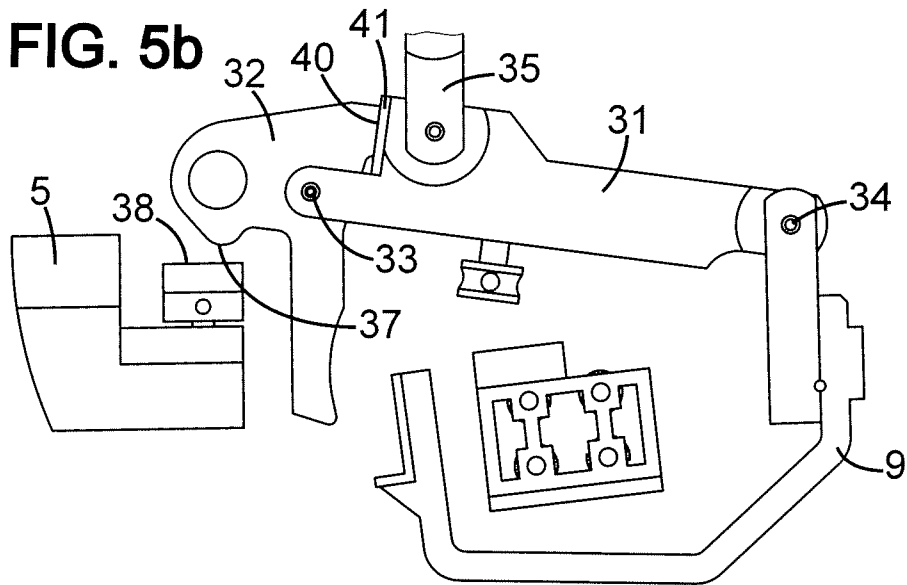
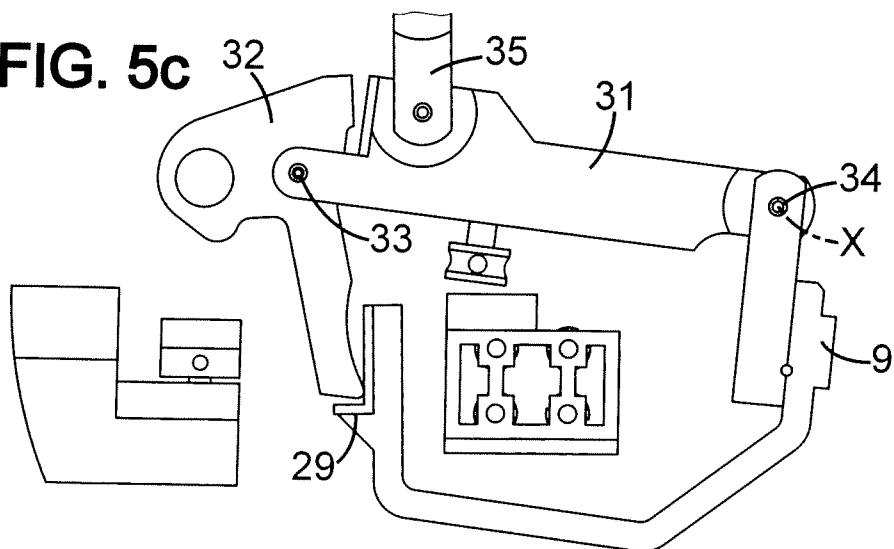
FIG. 5a**FIG. 5b****FIG. 5c**

FIG. 5d

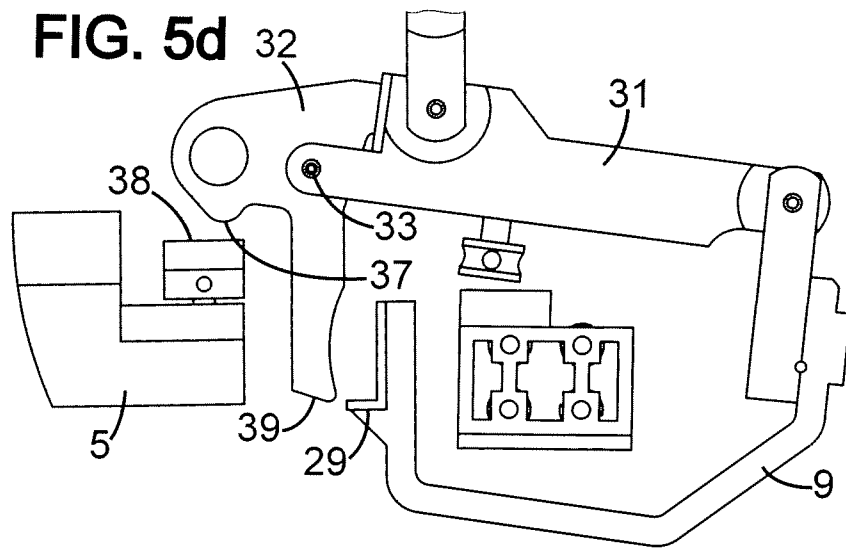


FIG. 5e

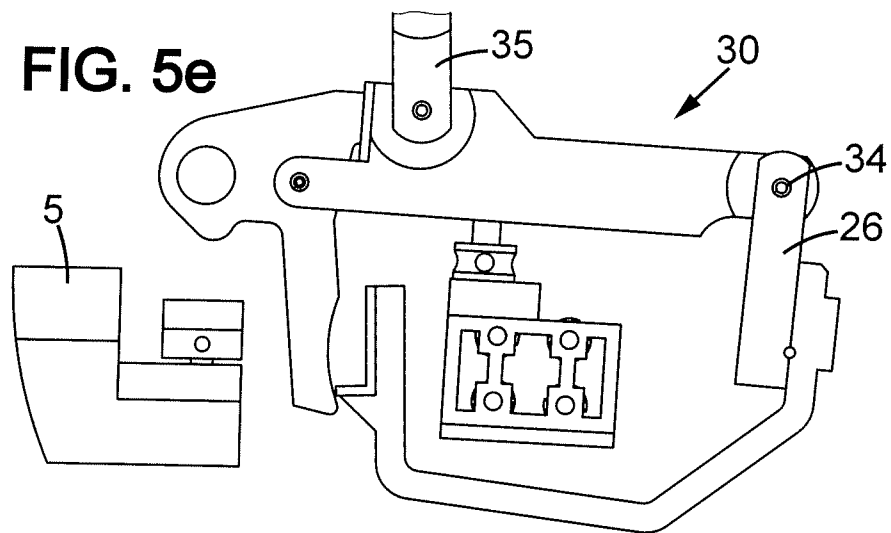


FIG. 5f

