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O. J. ALVAREZ
ELECTRICAL PIANO

2,486,545

Filed May 22, 1946

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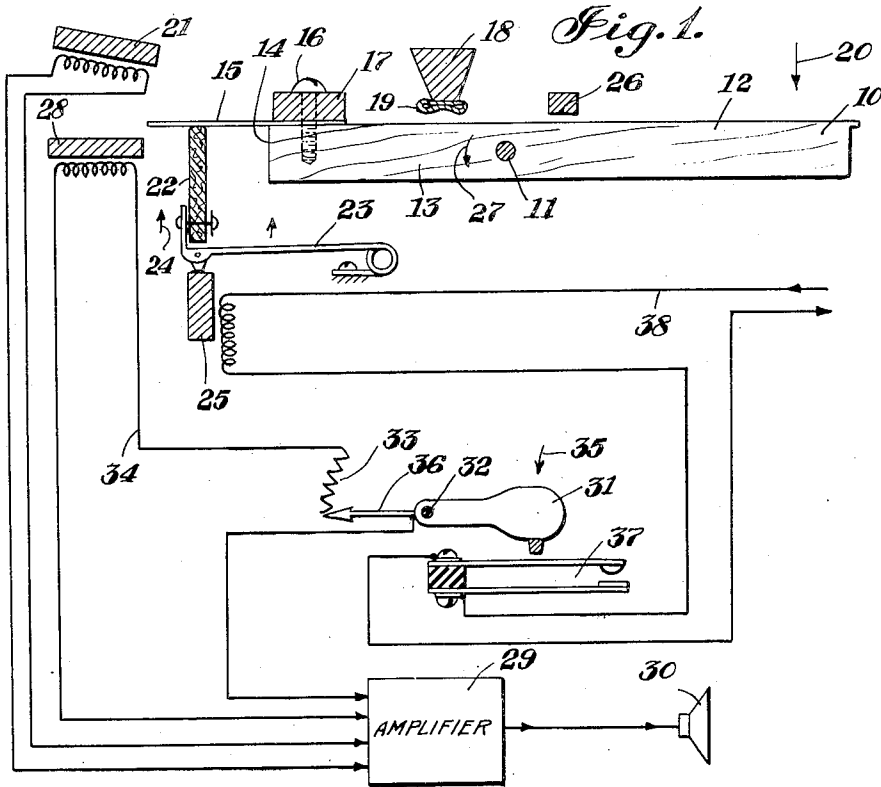
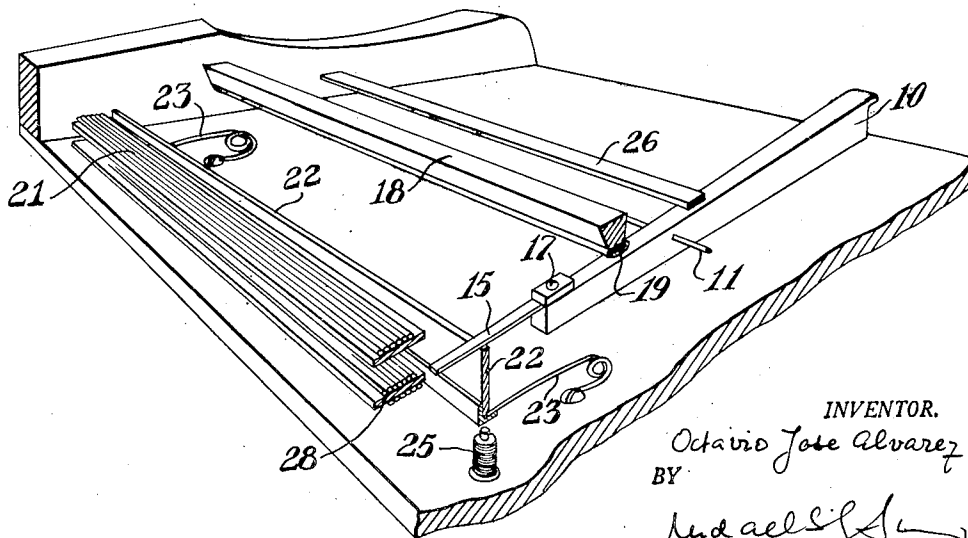


Fig. 2.



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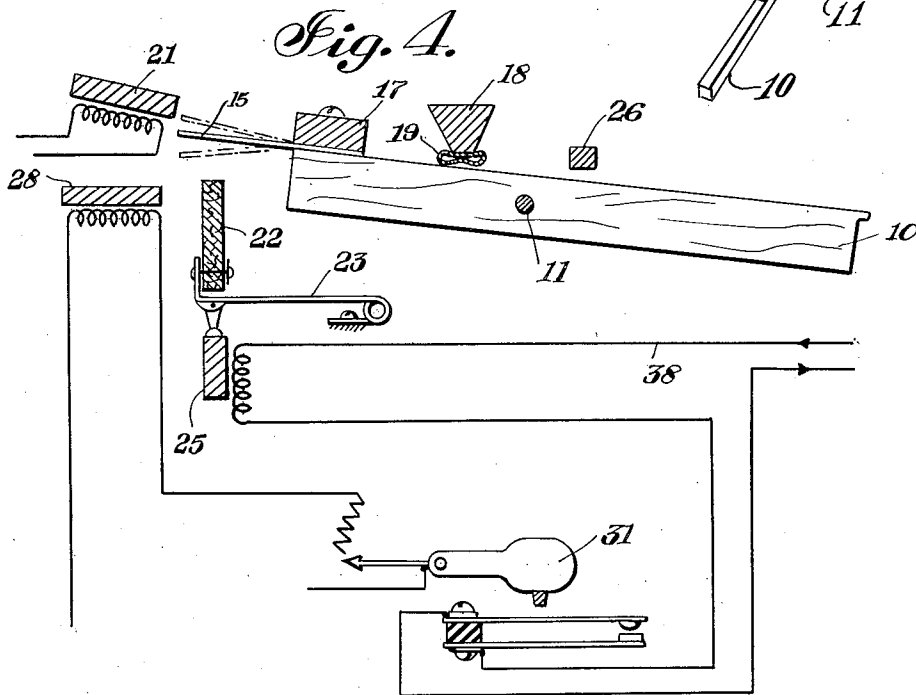
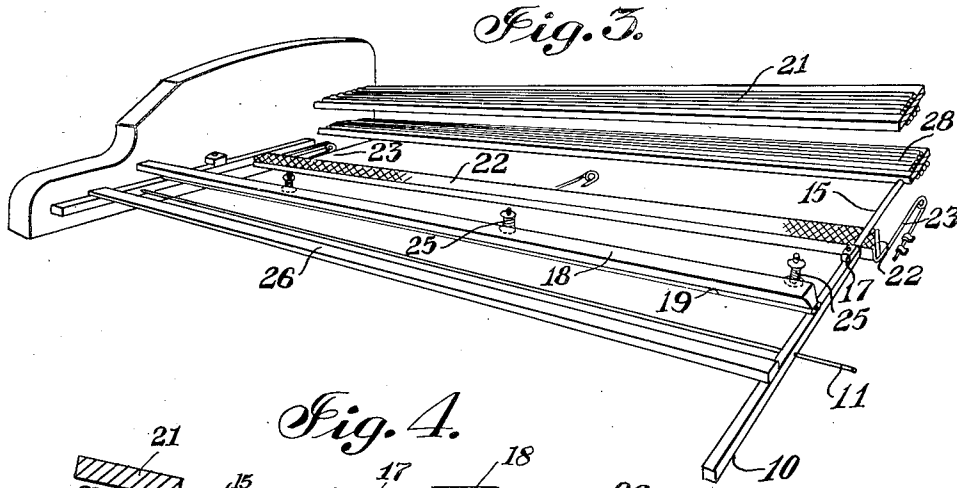
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Filed May 22, 1946

4 Sheets-Sheet 2



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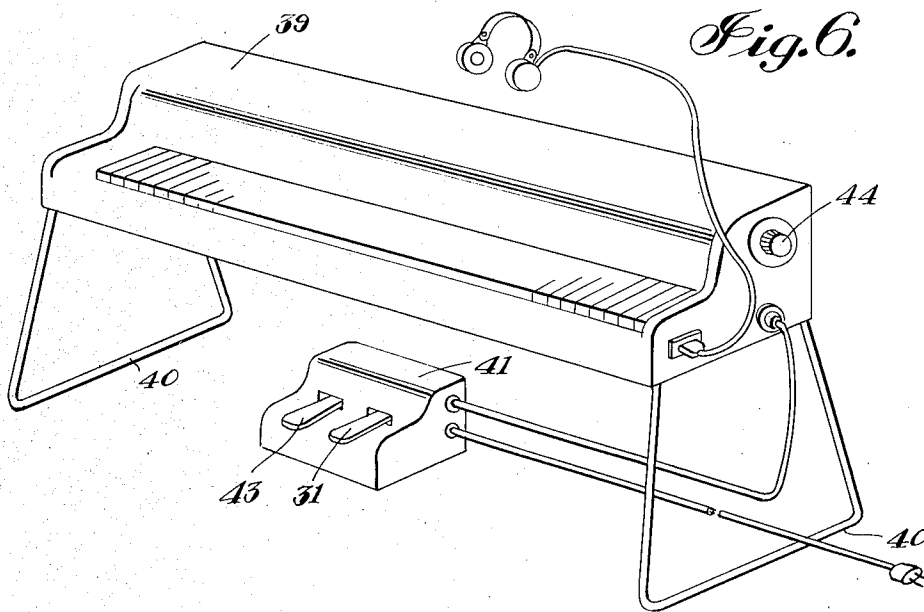
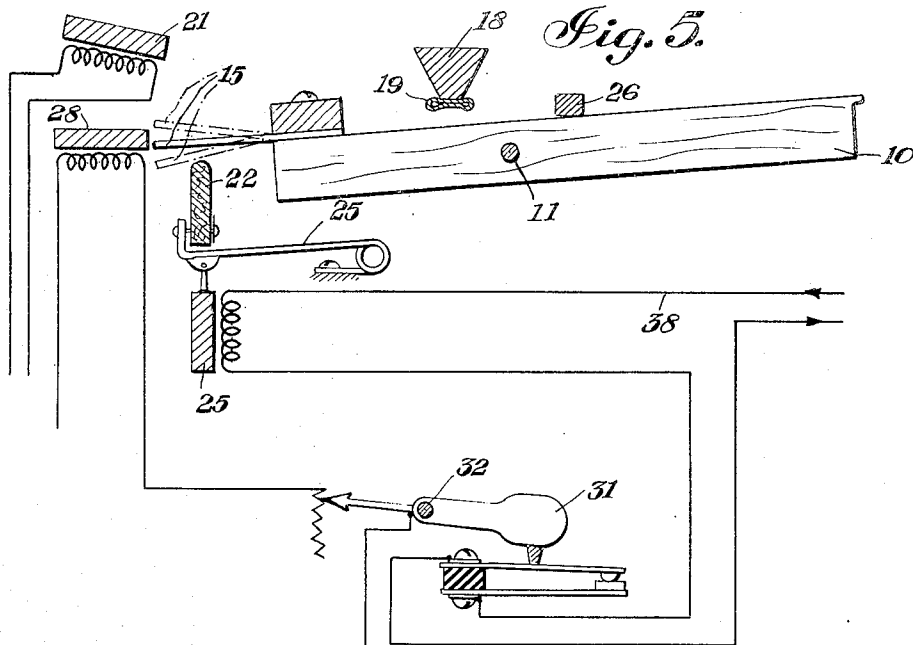
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4 Sheets-Sheet 3



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2,486,545

ELECTRICAL PIANO

Filed May 22, 1946

4 Sheets-Sheet 4

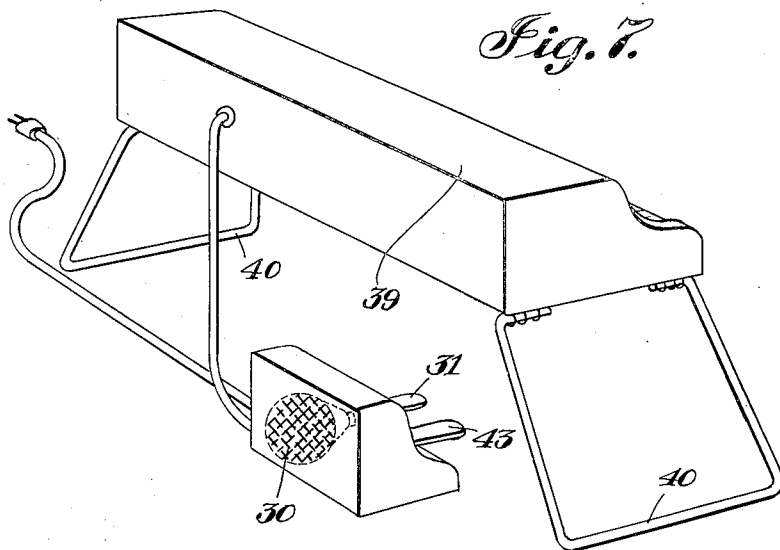


Fig. 7.

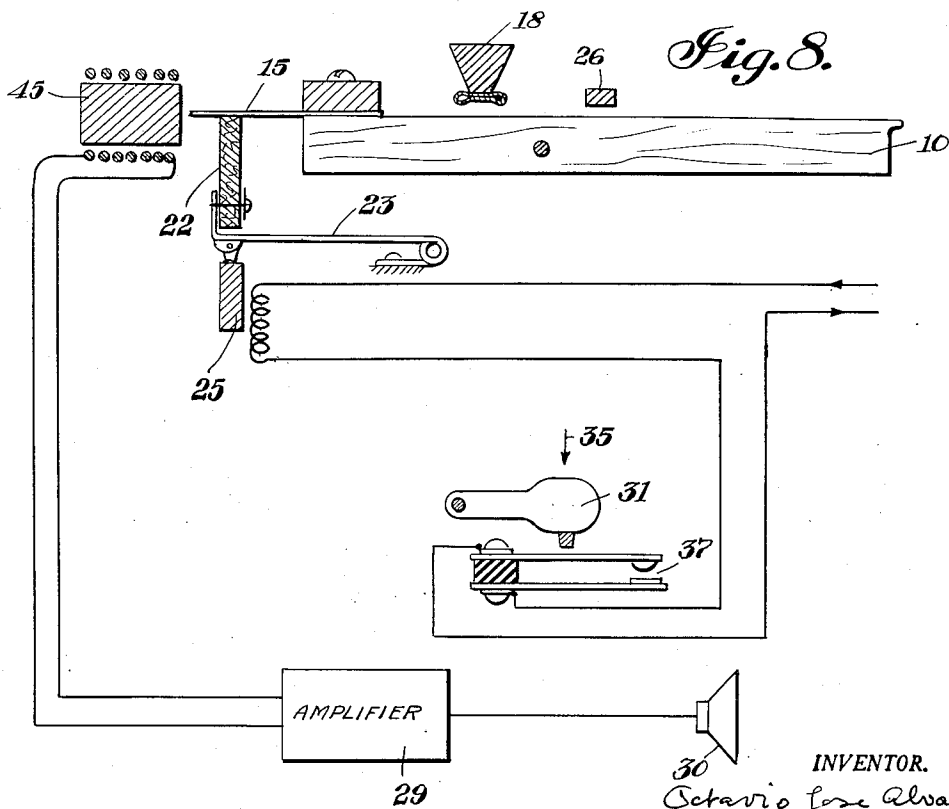


Fig. 8.

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UNITED STATES PATENT OFFICE

2,486,545

ELECTRICAL PIANO

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Application May 22, 1946, Serial No. 671,587

21 Claims. (Cl. 84—1.15)

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My present invention relates to musical instruments and more particularly to electrical instruments of the piano type.

It is an object of my present invention to provide an electrical musical instrument which is extremely simple in construction and nevertheless, has a touch which is very similar to the one of a piano of usual type. Also the music obtained from an electrical musical instrument of this type is very similar in tonal quality to the music obtainable with a conventional mechanical piano.

It is a further object of my present invention to provide a musical instrument of the above type which is equipped with a conventional keyboard and pedals adapted to be operated like those of a conventional piano.

With the above objects in view, my present invention mainly consists of an electrical musical like instrument comprising in combination a series of vibration creating units each of which consists of a magnetized steel reed, a turnable holding member to which this magnetized steel reed is secured so as to be adapted to vibrate relative to this holding member, and a stop member arranged so as to be adapted to stop turning of the holding member after the same has been turned by said operating member.

An electrical musical instrument of the type proposed above comprises in addition to the described vibration creating units an electric vibration pick-up arrangement arranged so that the reeds secured to the holding members are turnable between two positions in one of which they are near to the pick-up arrangement and in the other of which they are farther therefrom.

In an instrument of the type described the various tones are preferably obtained by making the reeds of different lengths. When an operating member is moved the corresponding holding member will turn until it abuts against the stop member; thus, this stop member will abruptly terminate turning movement of the holding member thereby causing vibration of the reed secured to the same. Such vibration of the reed will be picked up by the electrical vibration pick-up arrangement and transformed in well-known way into sound vibrations which are transmitted then by a loud speaker of conventional type.

In accordance with a preferred embodiment of my present invention, an electrical piano embodying the above described elements and features comprises a common electric vibration pick-up arrangement and a series of vibration creating units; each of these vibration creating units comprises a piano key consisting of an outer operating key portion and an inner supporting key portion, a vibratable magnetized steel reed secured to this inner supporting key portion at the inner end thereof in such a manner as to enable vibration of the reed relative to the key, common

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pivoting means turnably supporting all piano keys so that each of them is turnable between inoperative position in which the reed secured to the key is relatively far from the common pick-up arrangement and operative position in which the reed is relatively near to the common pick-up arrangement within the pick-up sphere of the same, and a common slightly resilient stop member arranged in the path of turning of all piano keys so as to abruptly stop turning of a key when the same is turned by its outer operating portion from inoperative into operative position; and abrupt stopping of the key in turn will result in vibration of the reed secured thereto.

Of course, a piano of the type proposed by me might also be provided with a so-called loud pedal and a so-called soft pedal which are simply combined with the electrical amplifier and loud speaker actuated by the electric vibration pick-up arrangement mentioned above. Of course, it is also possible to obtain with one single pedal both effects.

In addition to these pedals, it is of course, also necessary to have a sustaining pedal by which it is possible to sustain or draw out the tones created by depressing the keys.

In order to obtain this sustaining effect I provide in accordance with a preferred embodiment of my present invention a second electric vibration pick-up arrangement arranged spaced from the first electric vibration pick-up arrangement described above; the keys and their pivoting means are then arranged so that each of the keys is turnable between a first position in which the reed secured to the key is located near the first pick-up arrangement and a second position in which it is located near the second pick-up arrangement.

If a second pick-up arrangement is provided as described in the preceding paragraph, the slightly resilient stop member, preferably called first stop member, is arranged so as to stop movement of a key when depressed in the above mentioned first position, namely in a position in which the reed secured to the key is located near the first pick-up arrangement. Furthermore, I provide also a second stop member which is arranged movably into the path of the reeds themselves so as to stop vibration of the same after the keys have been depressed and released thereafter. Finally, I provide also a third stop member arranged in the path of the keys so as to stop the same when the reeds secured thereto are located near the second pick-up arrangement mentioned above.

The pedal which creates a sustaining tone effect is electrically connected with the second stop member and adapted to move the same out of the path of the keys and the reeds secured thereto when a sustained tone effect is desired.

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By such action of the pedal the key or keys are free to move when released until the reed or reeds secured to them are located opposite the above mentioned second pick-up arrangement which will transform the continuing vibrations of the reeds into sustained tone effects reproduced by the loud speaker arrangement mentioned above.

The novel features which I consider as characteristic for my invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

Fig. 1 is a schematic diagrammatic side view, partly in sections, of an electrical piano of the type proposed by me;

Fig. 2 is a perspective rear view of the piano schematically and diagrammatically shown in Fig. 1, partly in sections;

Fig. 3 is a perspective front view of the piano shown in Figs. 1 and 2, partly in sections;

Fig. 4 is a schematic diagrammatic side view of my new piano similar to the view shown in Fig. 1, showing a key in depressed position;

Fig. 5 is a view similar to the one in Figs. 1 and 4, showing the sustaining pedal in depressed operative position;

Fig. 6 is a perspective outer front view of an electrical piano of the type shown in Figs. 1 to 3;

Fig. 7 is a perspective outer rear view of the same piano; and

Fig. 8 is a diagrammatic, schematic side view, partly in section, of a modified embodiment of a piano of the type proposed by me.

As shown in Figs. 1 to 3, my new piano comprises a series of piano keys 10 all of which are pivoted on a common pivoting rod 11. Each of the keys 10 consists of an outer operating key portion 12 and an inner supporting key portion 13.

In accordance with my present invention I secure to the inner end 14 of each of the keys 10 a reed 15 which is freely vibratable and consists of a steel band or like member as clearly shown in Figs. 2 and 3.

I wish to mention that for purposes of clarity I have shown in Figs. 2 and 3 only one single key; of course, there are in a piano the usual number of keys; however, I have omitted them in order to facilitate showing of the construction details of a key. All keys are equal in construction; the only difference is that the reeds are differently shaped, e. g. of different lengths so as to create different vibrations and thus cause different tones.

Reed 15 mentioned above is secured to the inner end 14 of the supporting portion 13 by means of screw 16 and the magnetized steel block 17.

I arrange in the path of the key itself three stop members: A first stop member consisting of a rod 18 to which the slightly resilient tubular member 19 made of a plastic material and having a substantially elliptical cross section is secured. This first stop member which, as shown in Figs. 2 and 3 cooperates with all the keys is arranged so that when one of the keys 10 is depressed at its operating portion 12 in direction of arrow 20 the key moves into the position shown in Fig. 4 abutting against the plastic tubular member 19 at the moment when reed 15 is located at least substantially opposite and near the common electrical vibration first pick-up arrangement, i. e. first pick-up coil 21.

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In addition to this first stop member I provide a second movable stop member which consists of a band-shaped piece 22 of felt or like resilient material, arranged as shown in the drawings. This second stop member is movably supported by the spring supports 23 tending to move it from its position shown in Fig. 5, in direction of arrow 24 into its position shown in Fig. 1. The spring supports 23 are combined with solenoid arrangements 25 of well-known type adapted when energized to move the second stop member 22 against action of spring support 23 from its position shown in Fig. 1 into the position shown in Fig. 5.

Finally, I arrange in the path of the keys 10 a common third stop member which consists of a bar 26 arranged in such a manner as to stop turning movement of the keys in direction of arrow 27 when the second stop member 22 is in a retracted position shown in Fig. 5. It should be stressed that this stop member 26 has to be located so that in the position shown in Fig. 5 all non-depressed keys 10 are located near the second electric vibration pick-up arrangement, i. e. near the pedal pick-up coil 28.

Although evident, it should be noted that all keys 10 are supported by the pivoting bar 11 in such a manner that each of them has a tendency to turn in direction of arrow 27, i. e. to return automatically from the depressed position shown in Fig. 4 into one of the positions shown in Figs. 1 and 5.

Both the main pick-up coils 21 as well as the pedal pick-up coil 28 are connected in well-known manner with the amplifier 29 and loud speaker 30.

In order to properly operate the pedal pick-up coil 28 and to synchronize it with the movements of the second stop member 22 described above, the pedal 31 is turnably supported by pivot 32 and electrically connected on the one hand with pick-up coil 28 and on the other hand with the solenoids 25 serving for retracting the stop member 22.

The electrical connection between pedal 31 and the pick-up coil 28 consists of the combined resistor switch arrangement 33 included in conductor 34 connecting the pick-up coil 28 with amplifier 29. This combined resistor switch arrangement 33 is constructed so that in the inoperative position of the pedal 31 shown in Fig. 1 the connection between the pick-up coil 28 and the amplifier 29 is interrupted.

If the pedal is pressed down in direction of arrow 35, e. g. into the position shown in Fig. 5, the turnable switch arm 36 forming part of the switch resistor 33 will contact the resistor element and establish contact between the pick-up coil 28 and amplifier 29.

The resistor effect of resistor 33 upon the electrical vibrations transmitted from pick-up coil 28 to amplifier 29 will depend upon the degree to which the pedal is pressed down: If the pedal 31 is pressed down slightly all windings of the resistor 33 will be included in conductor 34 while if pedal 31 is entirely pressed down actually no resistor winding will be interposed between pick-up coil 28 and amplifier 29.

Pressing down of pedal 31 results also in closing of switch 37 included in circuit 38 of the solenoids 25. Thus, by pressing down of the pedal 31 the solenoids 25 will be energized which results in a downward movement of the solenoid cores together with the stop member 22 to which they are secured from the position shown in Fig. 1, into the position shown in Fig. 5.

My new piano described above in detail operates as follows:

In inoperative position the pedal 31 and keys 10 are in the position shown in Fig. 1, i. e. the reeds 15 are supported by stop member 22 and the resistor 33 and switch 37 operated by pedal 31 are open.

In order to create a tone, one of the keys, e. g. key 10 shown in Fig. 7 is depressed in direction of arrow 20. This results in upward turning movement of the inner supporting key portion 13 until the same abuts against the resilient tubular stop member 19. This creates a certain impact resulting in vibration of the abruptly stopped reed 15.

At this moment the key 10 and the reed 15 are in the position shown in Fig. 4, i. e. reed 15 is located near the main pick-up coil 21. In this position the vibration of the reed 15 will be picked up by the coil 21, transformed into electrical vibrations which, after amplification by means of amplifier 29 are transformed into audible sound waves by means of the loud speaker 30.

As stated above, the reeds 15 are differently shaped so that vibration of each reed will create a different audible tone. In this connection it should be stressed that if several keys are depressed simultaneously the created vibrations will not interfere with each other; to the contrary, each of the vibrations will be transformed into corresponding electrical vibrations, amplified separately and reproduced by the loud speaker independently from other vibrations. Thus, a musical accord created by depressing several keys will sound on an electrical piano of the above type the same as on a conventional hammer type piano.

If the pedal 31 is in the position shown in Fig. 1 and key 10 is released from its position shown in Fig. 4 after having been depressed and having created a tone as described above, it will automatically return into its position shown in Fig. 1. During such movement reed 15 will abut against the stop member 22 which will block further vibration of the reed. Thus, release of the key 10 will result in turning of the same into the position shown in Fig. 1 and termination of vibration of the reed 15, which in turn will abruptly terminate the tone reproduced by loud speaker 30.

In order to sustain the tone after release of one or more keys it is necessary to depress pedal 31 in direction of arrow 35 into the position shown in Fig. 5. In this position switch 37 is closed and the solenoids 25 are energized, moving the stop member 22 out of the path of the reed 15. Simultaneously, depression of pedal 31 results in closing of the resistor switch 33 and operative connection between the pedal pick-up coil 28 and amplifier 29.

Thus, if key 10 is released after pedal 31 has been depressed it will turn due to its own weight into the position shown in Fig. 5, i. e. into a position in which the operating portion 12 of key 10 abuts against the third stop member, i. e. against the stop bar 26. In this position, the reed 15 will be opposite the pedal pick-up coil 28 and the undampened vibrations of the reed will influence this coil and create in the same electrical vibrations which then are transformed in well-known way by means of amplifier 29 and loud speaker 30 into audible tones.

I wish to stress the important fact that stopping of the turning movement of key 10 in direction of arrow 27 by means of the stop rod 26 does not result in termination or dampening of the

vibrations of reed 15 after such vibrations have been created by abutment of key 10 against the tubular stop member 19. Vibrations of the reeds 15 can be stopped only by the stop member 22 if the same contacts the reeds 15 directly as shown in Fig. 1.

In order to terminate the sustaining effect of pedal 31 it is only necessary to release the same, i. e. to permit the pedal 31 to turn from its position shown in Fig. 5 into the position shown in Fig. 1. Such turning movement of the pedal is caused by spring means of usual type not shown in the drawings.

Return of the pedal 31 into the position shown in Fig. 1 will result in opening of the resistor switch 33 and of the switch 37. This in turn will disconnect the pedal pick-up coil from amplifier 29 and simultaneously interrupt the circuit 38 energizing the solenoids 25. Thereby the stop member 22 will be released and moved by means of the springs 23 in direction of arrow 24 until it contacts reed 15 stopping vibration of the same as shown in Fig. 1.

In Figs. 6 and 7, I have shown the general arrangement of a preferred embodiment of a piano of the above described type. In this embodiment all keys, reeds, the various stop members and both pick-up coils are arranged in the piano case 39 which, due to the fact that it is not needed as a vibratable resonance element can be made relatively small and light. The supporting legs 40 are turnably attached to the piano case 39 so that they might be folded under the same.

The pedal casing 41 contains the pedals and the various switch means described above together with the loud speaker 30 as shown in Fig. 7. The amplifier 29 might be arranged either in the piano case 39 or the pedal casing 41. As clearly shown in Figs. 6 and 7, I preferably construct the pedal casing 41 so that it has the same cross section as the piano case 39; this facilitates transportation and storage of the same.

Furthermore, I might combine with the piano a set of earphones 42 and a switch for disconnecting the loud speaker 30 so as to enable hearing of the music produced only by means of the earphones whenever desired.

I have shown in Figs. 6 and 7, two pedals: One of these pedals, namely sustaining pedal 31 operates as described above. The other pedal 43 serves as combined loud and soft pedal and is connected with a resistor not shown in the drawings for regulating the volume of the reproduced music. In addition to pedal 43 I might provide another hand operated volume control knob 44 as shown in Fig. 6.

In Fig. 8 I have shown a modified embodiment of my piano in which one common electrical pick-up arrangement, e. g. one single pick-up coil 45 is provided for transforming the mechanical vibrations of reed 15 into electrical vibrations irrespective of the position of the key 10 and reed 15 supported by the same. This means that the pick-up arrangement 45 has to be constructed so as to be adapted to pick up the vibrations of reed 15 when the same is in its so-called second position shown in Fig. 5. I wish to stress that it is of advantage if this pick-up arrangement is also adapted to pick up the vibrations of reed 15 while it is moving between these two positions.

The pick-up arrangement 45 is connected with amplifier 29 and loud speaker 30 in the same manner as the pick-up arrangement 28 shown in Figs. 1 to 5 and described above in detail.

In the modified embodiment of my piano shown

in Fig. 8, I do not provide any switch resistor 33 operated by the pedal 31. In this event pedal 31 operates only and exclusively switch 37 serving for retracting stop member 22 in the same manner as described above in connection with my piano shown in Figs. 1 to 5.

In a modified piano of this type there is no separate pedal pick-up coil but the sustaining effect is obtained only by pressing down the pedal 31 in direction of arrow 35 and thereby retracting the stop member 22 which otherwise would block vibration of reed 15 after release of key 10.

I wish to stress that although I mentioned above use of a "pick-up coil" or "pick-up coils" as electrical vibration pick-up arrangements, my present invention is in no way limited to the provision of such coil or coils. Such coils were mentioned only as examples for pick-up arrangements and my new piano may be provided with "electrical vibration pick-up arrangements" of whatever type if the same are adapted to pick up vibrations of the reeds and to transform them into electrical vibrations as necessary for the purposes of my present invention.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of electrical musical instruments differing from the types described above.

While I have illustrated and described the invention as embodied in electrical pianos, I do not intend to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of my invention.

Without further analysis, the foregoing will so fully reveal the gist of my invention that others can by applying current knowledge readily adapt it for various applications without omitting features that, from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What I claim as new and desire to secure by Letters Patent is:

1. In an electrical piano a series of vibration creating units, each of said vibration creating units comprising a vibratable steel reed; a turnable double armed lever having two lever arms, one of said lever arms serving as holding arm and supporting said vibratable steel reed secured thereto and permitting free vibration of said vibratable steel reed relative to said holding arm and the other of said lever arms serving as operating arm and being turnable so as to turn said holding arm together with said vibratable steel reed secured thereto; and blocking means arranged in the path of turning of said turnable double armed lever for stopping turning of the same.

2. In an electrical piano a series of vibration creating units, each of said units comprising a piano key; pivoting means turnably supporting said piano key so that the same consists of an outer operating key portion and an inner supporting key portion and both said key portions are turnable about said pivoting means; a vibratable magnetized steel reed secured to said inner supporting key portion at the inner end thereof permitting vibration of said vibratable magnetized steel reed relative to said inner supporting key portion; and a stop member arranged in the path of turning of said piano key.

3. In an electrical piano equipped with an electric vibration pick-up arrangement, a series of vibration creating units each of said vibration creating units comprising a vibratable steel reed; a movable holding member to which said reed is secured vibratably relative to said holding member; an operating member for moving said holding member between inoperative position in which said vibratable steel reed secured to said holding member is outside of the pick-up sphere of said electrical vibration pick-up arrangement and operative position in which said vibratable steel reed is within said pick-up sphere of said electrical vibration pick-up arrangement; and a stop member for engaging said holding member and stopping movement of the same when it is in said operative position holding said vibratable steel reed within said pick-up sphere of said electrical vibration pick-up arrangement.

4. In an electrical piano equipped with an electric vibration pick-up arrangement, and a series of vibration creating units, each of said vibration creating units comprising a vibratable steel reed; a turnable double armed lever having two lever arms, one of said lever arms serving as holding arm and supporting said vibratable steel reed secured thereto so as to permit free vibration of said vibratable steel reed relative to said holding arm and the other of said lever arms serving as operating arm and being turnable so as to turn said holding arm together with said vibratable steel reed between inoperative position in which said vibratable steel reed secured to said holding arm is outside of the pick-up sphere of said electrical vibration pick-up arrangement and operative position in which said vibratable steel reed is within said pick-up sphere of said electrical vibration pick-up arrangement; and a stop member arranged in the path of turning of said turnable double armed lever so as to abruptly stop turning of said turnable double armed lever and cause thereby vibration of said vibratable steel reed secured to said holding arm of said turnable double armed lever when said holding arm is turned by said operating arm into said operative position.

5. In an electrical piano equipped with an electric vibration pick-up arrangement, and a series of vibration creating units, each of said vibration creating units comprising a piano key consisting of an outer operating key portion and an inner supporting key portion; a vibratable magnetized steel reed secured to said inner supporting key portion at the inner end thereof so as to permit vibration of said vibratable magnetized steel reed relative to said inner supporting key portion; pivoting means supporting said piano key turnably between inoperative position in which said vibratable steel reed secured to said inner supporting piano key portion is outside of the pick-up sphere of said electric vibration pick-up arrangement and operative position in which said vibratable steel reed is within said pick-up sphere of said electric vibration pick-up arrangement; and a slightly resilient stop member arranged in the path of turning of said piano key for abruptly stopping turning of the same and cause thereby vibration of said vibratable steel reed secured to said inner supporting key portion of said piano key when said piano key is turned by said outer operating piano key portion forming part thereof from said inoperative into said operative position.

6. In an electrical piano a first electric vibration pick-up arrangement, a second electric

vibration pick-up arrangement located spaced from said first electric vibration pick-up arrangement, and a series of vibration creating units each comprising a piano key consisting of an outer operating key portion and an inner supporting key portion; a vibratable magnetized steel reed secured to said inner supporting key portion at the inner end thereof permitting vibration of said vibratable magnetized steel reed relative to said inner supporting key portion; pivoting means turnably supporting said piano key so that the same is turnable by turning said outer operating key portion between a first position in which said vibratable steel reed secured to said inner supporting key portion is located relatively near to said first electrical vibration pick-up arrangement and a second position in which said vibratable steel reed is located relatively near to said second electrical vibration pick-up arrangement; a first stop member arranged in the path of turning of said piano key for engaging said piano key and abruptly stopping turning of the same causing thereby vibration of said vibratable steel reed secured to said inner supporting key portion of said piano key when said piano key is turned by said outer operating key portion forming part thereof from said second position into said first position; and a second stop member arranged movably between stopping position located in the path of turning of said vibratable steel reed and non-stopping position located outside of said path of turning of said vibratable steel reed.

7. In an electrical piano a first electric vibration pick-up arrangement, a second electric vibration pick-up arrangement located spaced from said first electric vibration pick-up arrangement, and a series of vibration creating units each comprising a piano key consisting of an outer operating key portion and an inner supporting key portion; a vibratable magnetized steel reed secured to said inner supporting key portion at the inner end thereof permitting vibration of said vibratable magnetized steel reed relative to said inner supporting key portion; pivoting means supporting said piano key turnably by turning said outer operating key portion between a first position in which said vibratable steel reed secured to said inner supporting key portion is located relatively near to said first electrical vibration pick-up arrangement and a second position in which said vibratable steel reed is located relatively near to said second electrical vibration pick-up arrangement; a first stop member located in the path of turning of said piano key for engaging the same when it is in said first position with said vibratable steel reed located relatively near to said first electrical vibration pick-up arrangement; a second stop member arranged turnably between stopping position located in the path of turning of said vibratable steel reed between said first and said second position and non-stopping position located outside of said path of turning of said vibratable steel reed; electro-magnetic moving means for moving said second stop member from its said stopping position into its said non-stopping position; operating means for operating said electro-magnetic moving means; and a third stop member located in the path of turning of said piano key for engaging the same when it is in said second position with said vibratable steel reed located near said second electrical vibration pick-up arrangement.

8. In an electrical piano a first electric vibration pick-up arrangement, a second electric vi-

bration pick-up arrangement located spaced from said first electric vibration pick-up arrangement, electrical sound reproducing means electrically connected at least with said second electrical vibration pick-up arrangement, switch means arranged in the connection between said second electrical vibration pick-up arrangement and said electrical sound reproducing means, and a series of vibration creating units each comprising a piano key consisting of an outer operating key portion and an inner supporting key portion; a vibratable magnetized steel reed secured to said inner supporting key portion at the inner end thereof permitting vibration of said vibratable magnetized steel reed relative to said inner supporting key portion; pivoting means turnably supporting said piano key so that the same is turnable by turning said outer operating key portion between a first position in which said vibratable steel reed secured to said inner supporting key portion is located relatively near to said first electrical vibration pick-up arrangement and a second position in which said vibratable steel reed is located relatively near to said second electrical vibration pick-up arrangement; a first stop member arranged in the path of turning of said piano key engaging the same when it is in said first position located relatively near to said first electrical vibration pick-up arrangement; a second stop member arranged movably between stopping position located in the path of turning of said vibratable steel reed between said first and said second position and non-stopping position located outside of said path of turning of said vibratable steel reed; a third stop member arranged in the path of turning of said piano key for engaging the same when it is in said second position located relatively near to said second electrical vibration pick-up arrangement; and operating means for turning said second stop member from its said stopping position into its said non-stopping position and for simultaneously closing said switch means thus establishing sound reproducing connection between said second electrical vibration pick-up arrangement and said electrical sound reproducing means.

9. In an electrical piano a first electric vibration pick-up arrangement, a second electric vibration pick-up arrangement located spaced from said first electric vibration pick-up arrangement, electrical sound reproducing means electrically connected at least with said second electrical vibration pick-up arrangement, switch means arranged in the connection between said second electrical vibration pick-up arrangement and said electrical sound reproducing means, and a series of vibration creating units each comprising a piano key consisting of an outer operating key portion and an inner supporting key portion; a vibratable magnetized steel reed secured to said inner supporting key portion at the inner end thereof permitting vibration of said vibratable magnetized steel reed relative to said inner supporting key portion; pivoting means turnably supporting said piano key so that the same is turnable by turning said outer operating key portion between a first position in which said vibratable steel reed secured to said inner supporting key portion is located relatively near to said first electrical vibration pick-up arrangement and a second position in which said vibratable steel reed is located relatively near to said second electrical vibration pick-up arrangement; a first stop member located in the path of turn-

ing of said piano key for engaging the same when it is in said first position with said vibratable steel reed located relatively near to said first electrical vibration pick-up arrangement; a second stop member arranged turnably between stopping position located in the path of turning of said vibratable steel reed between said first and said second position and non-stopping position located outside of said path of turning of said vibratable steel reed; electro-magnetic moving means for moving said second stop member from its said stopping position into its said non-stopping position; operating means for operating said electro-magnetic means so as to move said second stop member from its said stopping position into its said non-stopping position and to simultaneously close said switch means thus establishing sound reproducing connection between said second electrical vibration pick-up arrangement and said electrical sound reproducing means; and a third stop member arranged in the path of turning of said piano key for engaging the same when it is in said second position with said vibratable steel reed located near said second electrical vibration pick-up arrangement.

10. In an electrical piano a first electric vibration pick-up arrangement, a second electric vibration pick-up arrangement located spaced from said first electric vibration pick-up arrangement, electrical sound reproducing means electrically connected with both said electrical vibration pick-up arrangements, first switch means located in this connection between said electrical vibration pick-up arrangement and said electrical sound reproducing means, and a series of vibration creating units each comprising a piano key consisting of an outer operating key portion and an inner supporting key portion; a vibratable magnetized steel reed secured to said inner supporting key portion at the inner end thereof permitting vibration of said vibratable magnetized steel reed relative to said inner supporting key portion; pivoting means turnably supporting said piano key turnably by turning said outer operating key portion between a first position in which said vibratable steel reed secured to said inner supporting key portion is located relatively near to said first electrical vibration pick-up arrangement and a second position in which said vibratable steel reed is located relatively near to said second electrical vibration pick-up arrangement; a first stop member arranged in the path of turning of said piano key for engaging the same when it is in said first position with said vibratable steel reed located relatively near to said first electrical vibration pick-up arrangement; a second stop member arranged turnably between stopping position located in the path of turning of said vibratable steel reed between said first and said second position and non-stopping position located outside of said path of turning of said vibratable steel reed; electro-magnetic moving means for moving said second stop member from its said stopping position into its said non-stopping position; second switch means combined with said electro-magnetic moving means for operating the same; operating means for simultaneously closing both said switch means whenever desired; and a third stop member arranged in the path of turning of said piano key for engaging the same when it is in said second position with said vibratable steel reed located near said second electrical vibration pick-up arrangement.

11. In an electrical piano a first electric vibra-

tion pick-up arrangement, a second electric vibration pick-up arrangement arranged spaced from said first electric vibration pick-up arrangement, electrical sound reproducing means electrically connected with both said electrical vibration pick-up arrangements, first switch means arranged in this connection between said electrical vibration pick-up arrangement and said electrical sound reproducing means, and a series of vibration creating units each comprising a piano key consisting of an outer operating key portion and an inner supporting key portion; a vibratable magnetized steel reed secured to said inner supporting key portion at the inner end thereof permitting vibration of said vibratable magnetized steel reed relative to said inner supporting key portion; pivoting means turnably supporting said piano key turnably by turning said outer operating key portion between a first position in which said vibratable steel reed secured to said inner supporting key portion is located relatively near to said first electrical vibration pick-up arrangement and a second position in which said vibratable steel reed is located relatively near to said second electrical vibration pick-up arrangement; a first stop member arranged in the path of turning of said piano key for engaging the same when it is in said first position with said vibratable steel reed located relatively near to said first electrical vibration pick-up arrangement; a second stop member arranged turnably between stopping position located in the path of turning of said vibratable steel reed between said first and said second position and non-stopping position located outside of said path of turning of said vibratable steel reed; electro-magnetic moving means for moving said second stop member from its said stopping position into its said non-stopping position; second switch means combined with said electro-magnetic moving means for operating the same; operating means for simultaneously closing both said switch means whenever desired; spring means for automatically turning said second stop member from its said stopping position when not held by said electro-magnetic moving means in said non-stopping position; and a third stop member arranged in the path of turning of said piano key for engaging the same when it is in said second position with said vibratable steel reed located near said second electric-vibration pick-up arrangement.

12. In combination a piano key; pivoting means for turnably supporting said piano key; a magnetized member secured to one end of said piano key; and a freely vibratable steel reed secured to the same end of said piano key in contact with said magnetized member.

13. In combination equipped with an electrical vibration pick-up arrangement, a piano key; a magnetized freely vibratable steel reed secured to one end of said piano key; pivoting means turnably supporting said piano key with said freely vibratable steel reed secured to said piano key movably in the pick-up sphere of said electrical vibration pick-up arrangement; and stop means located in the path of turning of said piano key for engaging the same when said freely vibratable steel reed secured to said piano key is located near said electric vibration pick-up arrangement in the pick-up sphere of the same.

14. In combination a piano key; a permanent magnet secured to one end of said piano key; and a freely vibratable reed secured to the same

end of said piano key in contact with said permanent magnet.

15. In an electrical piano equipped with an electric vibration pick-up arrangement, and a series of vibration creating units each comprising a piano key consisting of an outer operating key portion and an inner supporting key portion; a vibratable magnetized steel reed secured to said inner supporting key portion at the inner end thereof permitting vibration of said vibratable magnetized steel reed relative to said inner supporting key portion; pivoting means turnably supporting said piano key turnably by turning said outer operating key portion between a first and a second position being spaced from each other and in both of which positions said vibratable steel reed secured to said holding arm of said piano key is located within the pick-up sphere of said electrical vibration pick-up arrangement; a first stop member located in the path of turning of said piano key for engaging said piano key and abruptly stopping turning of the same causing thereby vibration of said vibratable steel reed secured to said inner supporting key portion of said piano key when said piano key is turned by said outer operating key portion forming part thereof from said second position into said first position; and a second stop member arranged movably between stopping position located in the path of turning of said vibratable steel reed and non-stopping position located outside of said path of turning of said vibratable steel reed.

16. In an electrical piano in combination an elongated stationary inductance coil; sound reproducing means for transforming electrical current created in said elongated inductance coil into audible sound waves; a series of different inductor members located side by side along said elongated inductance coil; a series of supports for said different inductor members each holding one of said different inductor members vibratably in a plane being normal to the longitudinal axis of said elongated stationary inductance coil; and a series of piano key members each serving for vibrating one of said different inductor members in said plane normal to the direction of said longitudinal axis of said elongated stationary inductance coil.

17. In an electrical piano in combination an elongated stationary inductance coil; sound reproducing means for transforming electrical current created in said elongated inductance coil into audible sound waves; a series of elongated magnetized inductor members located in a plane parallel to each other with their tips reaching near said elongated stationary inductance coil; a series of supports for said magnetized inductor members each holding one of said different inductor members vibratably in a plane being normal to the longitudinal axis of said elongated stationary inductance coil; and a series of piano key members each serving for vibrating one of said different inductor members in said plane normal to the direction of said longitudinal axis of said elongated stationary inductance coil.

18. In an electrical piano a series of vibration creating units, each of said vibration creating units comprising a support; a holding member freely movably secured to said support; a stop member arranged in the path of movement of said freely movable holding member for abruptly stopping movement of the same during movement

of said holding member; an operating member for moving said freely movable holding member against said stop member; and a vibratable reed secured to said holding member so as to vibrate relative to said holding member when said holding member is moved by said operating means against said stop member and abruptly stopped by the same.

19. In an electrical piano a series of vibration creating units, each of said vibration creating units comprising a support; a holding member freely turnably secured to said support; a stop member arranged in the path of turning of said freely turnable holding member for abruptly stopping turning of the same during turning of said holding member; an operating member for turning said freely turnable holding member against said stop member; and a vibratable reed secured to said holding member so as to vibrate relative to said holding member when said holding member is turned by said operating means against said stop member and abruptly stopped by the same.

20. In an electrical piano a series of vibration creating units, each of said vibration creating units comprising a support; a holding member freely turnably secured to said support; a stop member arranged in the path of turning of said freely turnable holding member for abruptly stopping turning of the same during turning of said holding member; an operating member for turning said freely turnable holding member against said stop member; and a vibratable magnetized steel reed secured to said holding member so as to be adapted to vibrate relatively to said holding member when said holding member is turned by said operating means against said stop member and abruptly stopped by the same.

21. In an electrical piano a series of vibration creating units, each of said vibration creating units comprising a support, a holding member freely turnably secured to said support, a stop member arranged in the path of turning of said freely turnable holding member for abruptly stopping turning of the same during turning of said holding member, an operating member for turning said freely turnable holding member against said stop member, and a vibratable magnetized steel reed secured to said holding member so as to be adapted to vibrate relatively to said holding member when said holding member is turned by said operating means against said stop member and abruptly stopped by the same; an elongated stationary inductance coil arranged extending along said series of vibration creating units within the zone of inductance of said vibratable magnetized steel reeds; and sound reproducing means for transforming electrical current created in said elongated inductance coil into audible sound waves.

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