Feb. 4, 1958 N. SANO 2,821,879

AUDIO WAVE "PICK-UP" FOR USE ON MUSICAL INSTRUMENTS

Filed Nov. 24, 1953 2 Sheets-Sheet 1

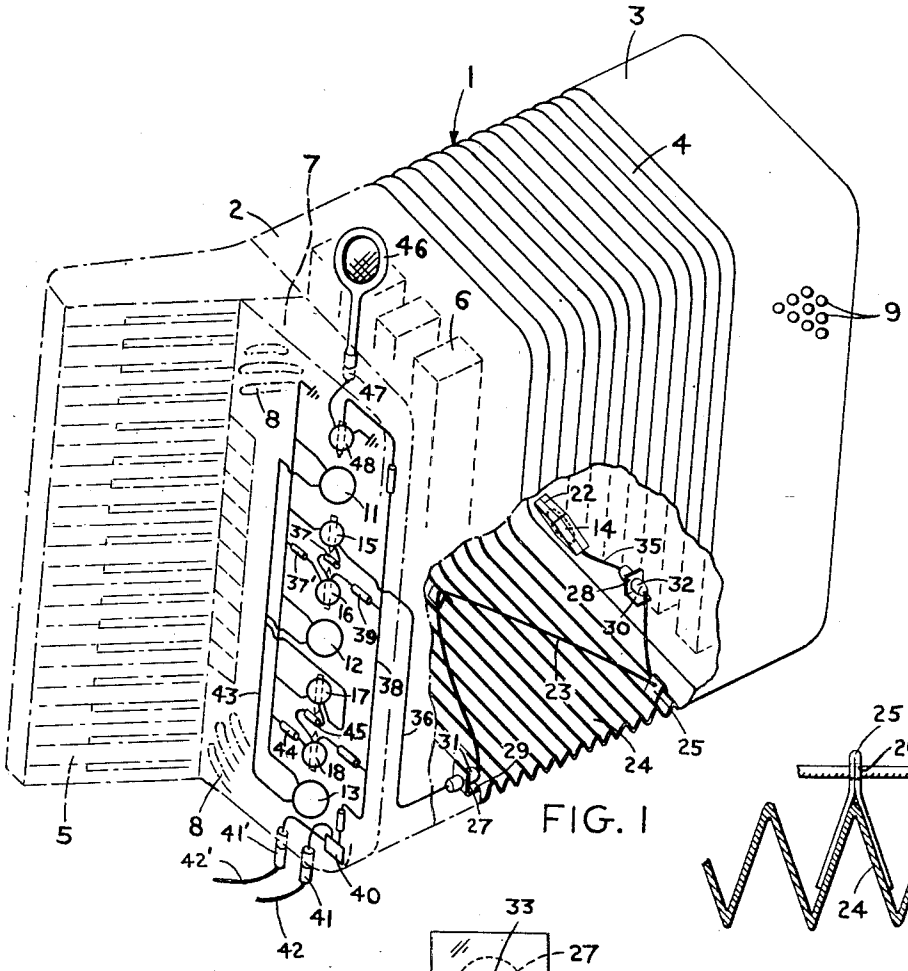


FIG. 1

FIG. 5

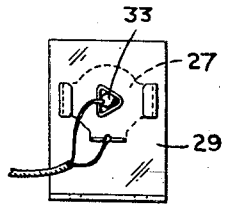


FIG. 3

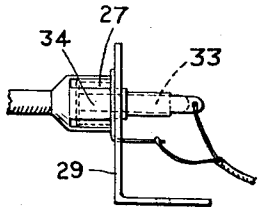


FIG. 2

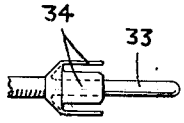


FIG. 4

NICK SANO
INVENTOR.

BY Robert Meyer
Atty

Feb. 4, 1958 N. SANO 2,821,879

AUDIO WAVE "PICK-UP" FOR USE ON MUSICAL INSTRUMENTS

Filed Nov. 24, 1953 2 Sheets-Sheet 2

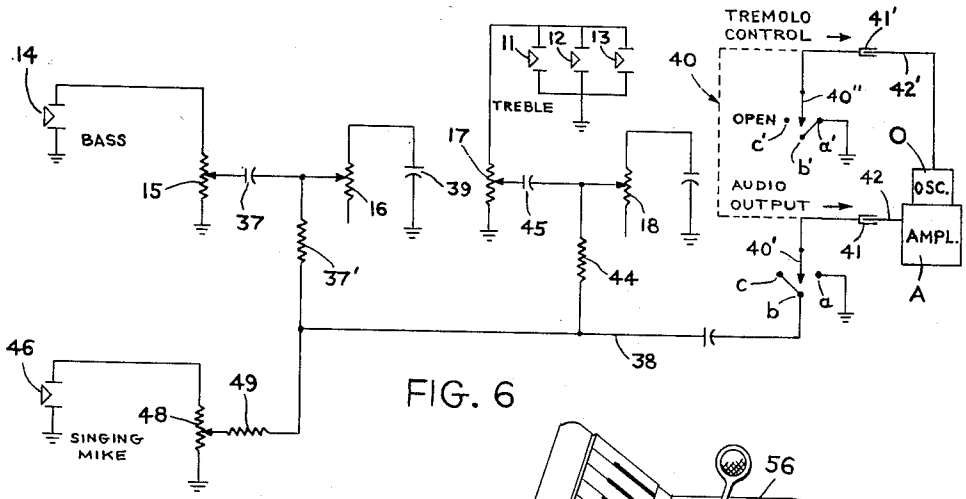


FIG. 6

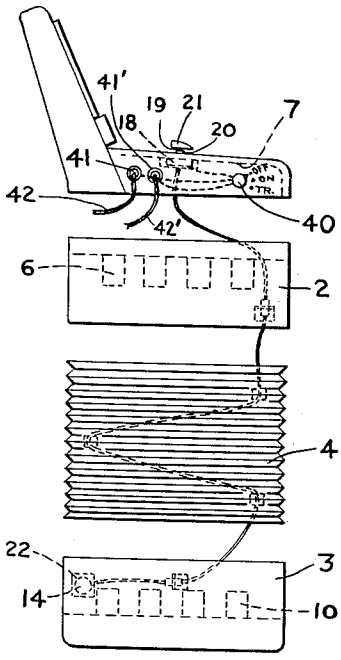


FIG. 7

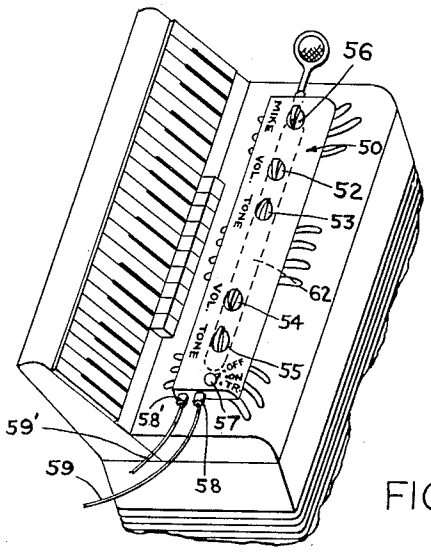


FIG. 8

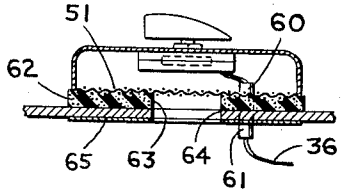


FIG. 9

NICK SANO
INVENTOR.

BY Robert Meyer atty

United States Patent Office

2,821,879

Patented Feb. 4, 1958

2,821,879

AUDIO WAVE "PICK-UP" FOR USE ON MUSICAL INSTRUMENTS

Nick Sano, Newark, N. J., assignor to Sano Corporation, Irvington, N. J., a corporation of New Jersey

Application November 24, 1953, Serial No. 394,130

3 Claims. (Cl. 84—1.04)

This invention relates generally to musical instruments and more particularly to an audio wave pick-up and circuit therefor and means for attaching the same to an instrument to reproduce the audio or sound waves made by the instrument with a minimum amount of distortion, maximum clarity and quality of tone.

Various attempts have been made to attach amplifying devices to musical instruments but where the structure of the instrument such as an accordion, requires that the player accentuate or decrease the volume and tone of the sound thereof, it has been found that to get uniformity of tone or proper accentuation as desired it is very difficult because of the nature of the pick-up means which collects and relays the audio or sound waves of the musical instrument to some suitable type of amplifier and the manner in which the pick-up is either connected to or disposed on the musical instrument.

The present invention seeks to overcome these problems by providing an audio or sound wave pick-up device which may be attached directly to the instrument without requiring alteration of the instrument or with only minor alterations of the instrument, which device will pick up the audio waves and convey them to a suitable amplifier without distortion or addition of undesirable extraneous noises.

In the preferred forms of the present invention the pick-up device is shown as applied to an accordion in which the spaced heads connected by a separable bellows member will require separate means in a single circuit in each of the respective heads thereof, which separate means are connected to each other by an electric current conducting wire, which wire is adapted to engage connectors on the respective heads to allow for detachment of the electric conducting wire on separation of the bellows and head members when it is desired to disassemble the accordion. This object is, of course, specific to the accordion and like structures which have separated pick-up elements which are in the same circuit.

It is a further object of the present invention to provide a dampening means for the tones which coact with the pick-up devices to insure the delivery of undistorted tones from the musical instrument to the amplifying device.

It is a still further object of the present invention to provide means such as a metallic coating either in the accordion head or on a separate pick-up arrangement coacting with the accordion head as a portion of the pick-up circuit.

In addition, it is highly desirable to include means for creating a tremolo effect which is the rapid fluttering reiteration of the accordion tones transmitted without apparent breaks.

The present invention, by utilizing a control for an oscillator circuit coacting with the amplifier for the sound waves enables the musician to produce this desired result.

With these and other objects in view, as may appear from the accompanying specification, the invention consists of various features of construction and combination of parts, which will be first described in connection with

the accompanying drawings, showing an audio wave "pick up" for use on musical instruments of a preferred form embodying the invention, and the features forming the invention will be specifically pointed out in the claims.

In the drawings:

Figure 1 is a perspective view of an accordion partly broken away showing the invention thereon.

Figure 2 is a side elevation of one of the connecting means disposed on the accordion head.

Figure 3 is an end view of the connecting means.

Figure 4 is a side view of the male element of the connecting means.

Figure 5 is a partial section through several folds of the bellows showing the electrical current conducting wire and means for holding it to the folds of the bellows.

Figure 6 is a diagram of the pick-up circuit.

Figure 7 is an exploded view of the accordion taken from the bottom end thereof and showing the invention.

Figure 8 is a perspective view showing the invention mounted on the exterior of one of the heads of the accordion.

Figure 9 is a cross section showing the means for mounting the invention on the exterior of one of the heads of the accordion.

Referring more particularly to the drawings, the invention is shown on an accordion generally designated **1**, it being understood that while an accordion is shown that the invention may be applied to any other type of musical instrument suitable for receiving it so as to permit amplification of audio waves produced by such musical instrument. The accordion shown in the drawings is of the usual type and includes spaced heads **2** and **3** which are connected by a bellows **4** which may be disconnected therefrom by loosening or unscrewing whatever means such as threaded members (not shown), etc., which may be holding the bellows to the adjacent ends of the respective heads.

The head **2** is provided with striking keys **5** and includes the treble tone collecting chamber **7** and sound escape openings **8**, while the other head **3** has buttons or keys **9** and a bass reed block **10**, all of which is clearly shown in Figures 1 and 7 of the drawings. The accordion may be any standard make or type of which there are several easily purchasable on the open market.

The invention may be connected to the accordion or other musical instrument in either of two ways, it may be mounted in the treble tone collecting chamber such as in the accordion shown in Figures 1 and 7, or it may be disposed and attached to the outside of the musical instrument so as to communicate with the tone collecting chambers through suitable openings provided in the head or even through the sound escape openings **8** as is hereinafter described with reference to the type of musical instrument shown herein.

Thus Figures 1 and 7 show the pick-up means mounted inside the treble tone collecting chamber **7**, as a series of spaced microphones **11**, **12** and **13**, and a microphone **14** mounted adjacent the bass reed blocks **10** in the head **3** which microphones **11**, **12**, **13** and **14** have their volume and tone controlled by a series of variable rheostats **15**, **16**, **17** and **18**. The variable rheostats are also mounted in the treble tone collecting chamber **7** by means of shafts which extend through the head **3**, the suitable threaded means, such as is indicated in Figure 7 showing the variable rheostat **18**, its shaft **19** and a locking nut **20**. Each of the variable rheostats will be similarly connected, and this method of connection is no more fully described because it is well known in the art. The shaft **19** is shown having a knob **21** to rotate the shaft for varying the control of the rheostat from its minimum to maximum and each of the respective rheostats have a similar knob (not shown) on the exterior portion of the head.

The microphone 14 which picks up the bass tones is disposed in a vibration tone dampening means 22 which may be composed of spongy or other suitable material adapted for this purpose. The microphone 14 is joined to the main pick-up circuit which is disposed in the treble tone collecting chamber which circuit is hereinafter described, by means of an electrical current conducting wire 23 which extends through the bellows and is connected to the inside thereof on one or more of the folds 24 of the bellows member 4 by tab elements 25.

Figure 5 shows the tab elements as substantially Y-shaped members the legs of which are glued to the inner surface of the folds 24 and the upstanding tab being provided with an opening 26 to receive the electrical current conducting wire 23 therethrough. It will be observed that the wire 23 is so disposed on the folds of the bellows that it will extend and retract with the operations of the folds and it is, of course, advisable therefore to place the wire at the lower end of the bellows when in operating position because it will be under minimum movement during the usual operation of this type of musical instrument.

Figures 1 and 7 show that the housings each have female connector elements 27 and 28, respectively, which are mounted thereon by brackets 29 and 30 so that male connector elements 31 and 32 provided at the respective ends of the electrical current conducting wire 23 are adapted to engage and make contact therewith and to be easily separable when the bellows member 4 is separated from the respective head elements 2 and 3 in disassembly of the accordion.

The female connector elements 27 and 28 are shown in Figures 2 and 3 and since they are identical in construction only member 27 will be more fully described as shown in these figures. Thus female connector element 27 is shown as an annular element which is carried by the bracket 29. The male element 31 for this respective female connector is also shown in Figures 2, 3 and 4, as having an elongated prong portion 33 which extends or can be inserted into the female connector 27 and three circumferentially spaced clasps 34 which grasp the outer surface thereof, which type connecting elements are adapted to snugly engage each other and can be readily disengaged by manually removing or sliding the male connector element from the female connector element.

Referring to Figures 1 and 6 showing the circuit, the bass microphone picks up the accordion bass tones which tones pass by a line 35 to the female connector 28, thence through male connector 32 and the electrical current conductor wire 23 and male connector 31 to the female connector 27 in turn connected by line 36 to the variable rheostat 15 which controls the volume. The tone is controlled by a variable rheostat 16 connected into the circuit which is decoupled from the volume control by means of a condenser 37 and resistor 37' between the rheostats 15 and 16 and the main output line 38. The tone rheostat control is also connected through a condenser 39 to a ground which functions to effect a sharp drop in tone as is desirable for expression by the musician during the rendition of a musical composition on variation of the rheostat control 16.

The main output line 38 leads through an on-off tremolo switch generally designated 40 and hereinafter more fully described to an audio output jack 41 and a tremolo circuit jack 41' having releasable connectors 42 and 42' of the type well known in the art which provide means for connecting these respective jacks to any suitable type of amplifier A and oscillator O of which there are several well known types easily purchasable on the open market, and hence these units are not more fully described herein.

The oscillator O, which is of the usual well known type of oscillator, purchasable on the open market, is connected in the usual manner of connecting such a device in an electrical circuit, in the circuit between the on and off control switch 40 and the amplifier A, so that when the switch 40 is closed the audio current will pass through the oscillator O, which will set up oscillations in the audio current, resulting in a tremolo effect of the music as it is released through and by the amplifier A.

The on-off tremolo switch and control 40 is indicated in Figure 6 as a 2-gang three-position type switch, it being understood that while this switch is shown that any other suitable type switch may be utilized for this purpose.

Thus the switch and control 40 is shown having spaced movable contact arms 40' and 40'' adapted to be moved simultaneously for contact with their respective contact points A, B and C on the audio gang portion of the switch 40 and A', B' and C' on the tremolo gang portion of the switch 40. When the movable contact arms 40' and 40'' are moved to the positions A and A' no audio or sound waves can be transmitted to the amplifier and the output of the oscillator circuit O is brought through the tremolo line circuit to the movable contact arm 40'' where it is grounded. In the positions B and B' the audio or sound waves from the main output line 38 connected to the contact B pass through the movable arm 40' on the audio gang portion of the switch 40 and then to the amplifier. However, since the B' contact is grounded on the tremolo gang portion of the switch 40 the output of the oscillator circuit will also be grounded. In the C and C' positions since the C contact is connected to the B contact position on the audio gang portion of the switch 40 the audio or sound waves from the main output line 38 will pass through the contact arm 40' to the amplifier as in the case of the B contact position thereof. The C' position on the tremolo gang portion of the switch 40, however, is open and accordingly the output of the oscillator will thus pass to the amplifier to produce the desired tremolo effect on the audio and sound waves transmitted thereto.

Similarly, Figures 1 and 6 show that the microphones 11, 12 and 13 conduct audio waves which they receive from the treble reed bank 6 through line 43 to the variable rheostat 17 which controls the volume thereof. The tone is controlled by variable rheostat 18, resistor 44 and condenser 45 which regulate, control and limit the frequency of the tone before it is passed to the main output line 38, as above described for the bass microphone.

This circuit also allows for the tying-in of a suitable externally disposed microphone 46 which is also shown in Figure 1 disposed at the upper end of the accordion when it is carried in operating position by a player. This makes the external "mike" easily available for use in talking or singing through while the player accompanies himself with the accordion. The microphone 46 is inserted at this point in a microphone jack 47 which is connected to a variable rheostat 48 in turn connected through resistor 49 to the main output line 38. Thus, when the microphone 46 picks up audio waves created by singing or talking thereinto, the volume and tone can be controlled by the variable rheostat 48 before it is passed to the main output line 38.

By suitably varying the rheostats 15, 16, 17, 18 and 48, it is believed obvious that the sound waves may be regulated both as to volume and tone and channeled either individually or collectively through the main output line to the amplifier (not shown) connected thereto.

In the art of instrument-making usually the heads 2 and 3, or any other tone collecting chambers on a particular instrument, will be made of wood or plastic or other suitable material. Hence, in order to complete the circuit, that is, the ground, the microphones, rheostats, etc., it is necessary to coat the inside of the treble collecting chamber with a suitable type of metal coating for providing a metal backing so that this circuit may be completed. Similarly, where the pick-up circuit is encased in a non-metallic housing for attachment to the exterior of the musical instrument, it too will be coated on the inside for this purpose. Such coating means is

well known in the art and since it cannot be specifically distinguished on the drawings it is mentioned herein but is not described more fully.

Figures 8 and 9 show the form of the invention when applied to the external portion of a musical instrument. In the present form of the invention the same is shown as applied to an accordion in which the pick-up circuit coacts with a sound escape opening and the direct activation of the bass microphone by the bass reed block **10**.

The pick-up circuit is disposed in an elongated housing **50** which may be made of any suitable material, although it has been found that plastic with a metallic coating on its inner surface is highly desirable for such purpose by reason of the cosmetic appearance that it gives when attached to the head **2** of the accordion. In addition, this type material is less costly than a metallic housing.

The housing is provided with one open side which is closed by a removable perforated closure sheet **51** having sufficient perforations therein especially in the central portion to permit the passage of audio waves therethrough. The pick-up circuit in the housing is not more fully described because it is identical with the circuit above described when the pick-up is to be mounted inside the housing. Hence, all that appears in Figure 8 are the external knobs **52**, **53**, **54**, **55**, and **56** for their respective variable rheostats **15**, **16**, **17**, **18** and **48**, shown in Figure 6 of the drawings.

Figure 8 further shows the location of an on-off tremolo switch **57** and a connecting jack **58** and its line **59** from the amplifier A, and connecting jack **58'** and its line **59'** to the oscillator O.

Figure 9 shows a jack element **60** and a connecting jack **61** which is on one end of a line **36** which leads to the female connector **27** as above described for the accordion structure where the pick-up element is inside of the tone collecting chamber. This jack element **60** and **61** provides means for collecting and conducting the audio waves received by the bass microphone into the pick-up circuit as above described.

The removable perforated closure sheet **51** will be sufficiently strong to affix the housing to the exterior of the head **2** of the accordion. Thus, affixed to the underside of the perforated closure sheet **51** by any suitable manner such as gluing, is a vibration and shock-resistant material such as sponge rubber **62** which covers all but an oval opening **63** therein, as is shown in Figures 5, 8 and 9. The sponge rubber is in turn affixed similarly by gluing or other suitable manner to the exterior of the accordion at the treble reed end thereof or on the exterior of the head **2**. The head will be modified so that it will have a suitable oval-shaped sound escape opening **64** also formed therein, which oval-shaped opening will be in substantial alignment and coincident with the oval opening in the sponge rubber element **62**. Thus the sound escape opening **64** and the oval-shaped opening **63** in the sponge rubber **62** creates a passage which allows the collected tones in the tone collecting chamber **7** to pass freely into the elongated housing **50** through the perforated closure **51** where it can be picked up by the microphones **11**, **12** and **13** to be transmitted through the pick-up circuit to the amplifier through the output jack **58** and line **59**.

To reduce distortion and excess unnecessary noises a piece of felt **65** is affixed also by gluing or in other suitable manner to the inner surface of the treble collecting chamber **7** about the oval-shaped sound escape opening **64** formed therein when the external pick-up is attached to the head **2** in the manner above described. This mutes or controls the vibrations so that when the audio waves are amplified only the clear and undistorted tones will be heard.

It will be understood that although the preferred form of the invention shows the control for the oscillator as a part of the pick-up circuit attached to the accordion that it may be separated from the on-off switch and placed for independent operation on the oscillator itself as will be understood by those skilled in the art.

The presence of two jacks, one for the audio and one for the tremolo circuit as shown in the preferred form is to aid clarity in representing the circuit. It is well known in the art to use a single jack with a two-conductor wire arrangement without departing from the present invention so as to eliminate one of these jacks.

While this form of the invention has been illustrated and described, it is obvious that those skilled in the art may vary the detail of the construction as well as the precise arrangement of arts without departing from the spirit of the invention and therefore it will be understood that the invention is not to be limited to the specific construction or arrangement of parts shown but that they may be widely modified within the invention as defined by the claims.

What is claimed is:

1. In an accordion having a pair of spaced head sections one having a treble reed block and the other having a bass reed block, a treble tone collecting chamber formed in said head section having the treble reed block, sound escape openings in said head sections communicating with said treble tone collecting chamber, and a detachable bellows connecting said head sections, the combinations with said treble tone collecting chamber of a pick-up circuit for an amplifier to pick up audio waves produced by said respective reed blocks, and an electric current conducting wire connecting said pick-up means in the head having the bass reed block to the pick-up means for the treble reed block, a connector mounted in each head adjacent the point of connection between said bellows and the respective head, said electric current conducting wire having a connector on both ends thereof disposed to detachably engage the respective connectors mounted on the heads to enable said bellows to be separated from the head sections.

2. In an accordion having a pair of spaced head sections one having a treble reed block and the other having a bass reed block, a treble tone collecting chamber formed in said head section having the treble reed block, sound escape openings in said head sections communicating with said treble tone collecting chamber, and a detachable bellows connecting said head sections, the combinations with said treble tone collecting chamber of a pick-up circuit for an amplifier to pick up audio waves produced by said respective reed blocks, and an electric current conducting wire connecting said pick-up means in the head having the bass reed block to the pick-up means for the treble reed block, said wire disposed to extend through said bellows, means attaching said wire to the lower end of said bellows when in operating position, and means forming separable connections with said electric current conducting wire to enable said bellows to be separated from the head sections.

3. In an accordion as claimed in claim 2, wherein said attaching means for the wire includes, Y-shaped tabs having legs affixed to a bellows, and said tabs each having an opening provided therein to receive said wire therethrough.

References Cited in the file of this patent

UNITED STATES PATENTS

Re. 23,162	Zaccagrino	Oct. 25, 1949
2,295,156	Bundy	Sept. 8, 1942
2,534,342	Daniel	Dec. 19, 1950
2,627,555	Lubenoff	Feb. 3, 1953