CRYPTOGRAPHIC TUNING KNOB INSTALLATION

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This invention relates to electrical pick-up apparatus for musical instruments, and more particularly to arrangements for mounting electrically connected microphones on an accordion.

In microphone pick-up arrangements for musical instruments, it is desirable that the microphones be so placed that all of the tones emanating from the instrument will be received at substantially the same degree of quality and intensity, thus making a true reproduction thereof possible. If a microphone receives certain tones with a greater intensity than it will receive other tones, the reproduction of the music will be abnormal and distorted. On an instrument, such as an accordion, the various sounds and tones emanate therefrom at different locations about the instrument—the bass notes appearing at one side and the treble notes appearing at the other side. Furthermore, the various bass tones emanate from different sections of the bass side, and likewise the various treble tones emanate from different sections of the treble side. To satisfactorily pick up all of the tones from an accordion, it is necessary to employ an arrangement of several microphones, the electrical signals from which may be combined to permit a true reproduction of the music.

It is an object of this invention to provide an improved electrical pick-up arrangement wherein microphones are arranged on both sides of an accordion and volume controls are conveniently arranged on one side thereof.

It is a further object to provide an improved pick-up arrangement having a plurality of microphones positioned on each side of the accordion and having an electrical conduction means for passing electrical signals from all of the microphones through volume controls and to a single electrical connection point such as a jack plug assembly.

Another object of this invention is to provide an improved electrical contact path through the bellows chamber of an accordion to permit electrical connections between the volume controls and the electrical connection point on one side of the accordion and the microphones mounted on the other side.

A further object is to provide an improved shock absorbing arrangement for mounting microphones on an accordion, such arrangement including rigid supporting members holding the microphones between pads of foam rubber.

A more complete understanding of the present invention, its mode of operation and its advantages may be gathered from further reading of this specification together with an inspection of the accompanying drawings in which:

Fig. 1 is a perspective view of an accordion with the microphone pick-up arrangement as taught by this invention;

Fig. 2 is an enlarged frontal view of an accordion with portions thereof broken away to illustrate the positioning and the mounting of the microphones and the volume controls, and to further illustrate the zigzag supporting arrangement for the electrical conductors extending through the bellows chamber for providing a connection to those microphones on the bass side of the instrument.

Fig. 3 is an enlarged fragmentary perspective view of a microphone as it may be mounted on the bass side of the accordion;

Fig. 4 is a schematic diagram of the electrical connections of the microphone pick-up arrangement;

Fig. 5 is an enlarged fragmentary perspective view of a single eyelet support as it is attached to a fold of the bellows and for holding the electrical conductors; and

Fig. 6 is a fragmentary perspective view of a portion of the bellows chamber illustrating another embodiment of this invention wherein the electrical conductors extending from the bass side of the accordion to the treble side are disposed in a zigzag manner, being alternately threaded through eyelet supports on one wall of the bellows chamber and alternately threaded through eyelet supports on an opposed spaced wall of the bellows chamber.

As is illustrated in Figs. 1 and 2, the accordion comprises generally a bass side 1, a treble side 2, and a bellows 3 which encloses a chamber between the bass and treble sides of the instrument. A pair of microphones 4 are mounted at opposite ends of the bass side 1 of the accordion. Three microphones 5 are mounted with uniform spacing along the treble side 2 of the instrument.

The microphones 4 positioned on the bass side of the accordion are connected in parallel (see Fig. 4). The microphones 4 are intended to electrically transduce bass tones having comparatively low frequencies, and any high frequency noises which may be randomly picked up by these microphones are eliminated by a tone eliminator. A condenser 6 is connected in parallel with the microphones 4 and thereby provides a shunt path for short-circuiting the higher frequencies from the electrical signals. The condenser 6, therefore, suppresses the high frequency noises while permitting the low frequency bass tones to pass from the microphones 4. A rheostat 7 is mounted at a convenient location on the treble side of the accordion but is electrically associated with the microphones mounted on the bass side. The rheostat 7 is connected in series with the microphones 4 and functions to control the volume of the electrical signals representative of the bass tones which are generated by the microphones 4.

The three microphones 5 mounted on the treble side of the accordion are electrically connected in parallel. A second rheostat 8 is connected in parallel with the microphones 5 and provides a shunt path for the electrical signals developed by the microphones 5. The rheostat 8 functions as a volume control for the electrical signals representative of the treble tones and developed by the microphones 5.

Since the accordion employs the bellows 3 between the bass side 1 and the treble side 2, it is obvious that any electrical conducting means extending between the sides must be flexible in nature and must be capable of folding into a cramped space and extending into an elongated position as the bellows are alternately compressed and expanded. This flexibility of the electrical conducting means is accomplished by employing a cord or cable 9 arranged in zigzag or serpentine configuration forming a series of alternately reversed loops or bights, said cord extending from the bass end to the treble end of the accordion. To provide support for the intermediate portions of the zigzagged or bighted cable 9, several eyelet supports 10 are provided, spaced uniformly along the length of the bellows 3 and attached to the bellows. The flexible cable 9 may be supported as shown in Fig. 2 wherein the eyelet supports 10 are attached to one side of the bellows 3 and support the cable 9 at the loops or bights extending on one side of the zigzagged cable only. As is shown in Fig. 2, the cable 9 may hang
downwardly from the supporting eyelets 10 but should have sufficient rigidity to retain the established zigzag pattern even though the accordion were to be inverted, to thus present the unsupported bights or loops in position extending other than downwardly.

Alternately, the cable 9 may be arranged as shown in Fig. 6, wherein eyelet supports 10 are fastened in spaced relation along opposed walls of the bellows, and the cable 9 is threaded alternately through eyelets on said spaced walls. In this embodiment of the invention, the cable 9 is supported at its opposite ends respectively on the bass and treble sides of the accordion, and sufficient slack or excess cable extends between the various segments held by the eyelets 10 so that the bellows may be expanded without stretching the cable or the eyelets. A specific means for attaching the eyelet supports 10 to folds of the bellows 3 is illustrated in Fig. 5. The eyelet 10 comprises a strip of paper or fabric which is folded upon itself, thereby providing a stiffened cantilevered portion through which a grommet 11 may be inserted to provide the eyelet hole and to provide further stiffening of the cantilevered portion. Flaps 12 of the paper or fabric are provided with adhesive material which will adhere to opposite sides of a fold in the bellows 3, thereby holding the eyelet support with sufficient rigidity for supporting the cable 9.

As shown in Fig. 3, each of the microphones 4 is mounted on the bass side of the accordion by a pair of brackets 13 which are L-shaped and have one arm of the L 14 attached to a rigid portion of the bass side of the accordion. The upstanding arms 15 of the bracket 13 are in spaced relation to hold the microphone 4 therebetween. Foam rubber pads 16 are positioned between the microphone 4 and each of the brackets 13 to cushion the microphone from shocks which may result from rough handling or dropping of the accordion.

The three microphones 5 may be mounted along the treble side of the accordion by being sandwiched between a pair of elongated foam rubber pads 17 (see Fig. 2). The microphones 5 and the foam rubber pads 17 may be held by a rigid member 18 attached to a rigid part of the treble end of the accordion—said rigid part of the accordion may in itself constitute a second rigid member for holding the microphones 5 and the pads 17 in a sandwiched position. Thus, all of the microphones on the accordion are mounted between foam rubber pads and further rigid members of a pair of rigid members.

The rigid member 18, being conveniently located on the treble end 2 of the accordion may provide the support upon which the two volume control rheostats 7 and 8 are mounted. Each rheostat has a convenient knob 7' and 8' positioned externally of the member 18 and available for adjustment of the volumes.

A jack 19 provides a single point to which all of the microphones 4 and 5 and the two rheostats 7 and 8 may be electrically connected and through which the electrical signals may pass to external equipment for amplification and for reproduction of the music. As shown in Fig. 4, the jack may comprise a common terminal 28, a terminal 21 for passing electrical signals generated by the microphones from sounds emanating from the bass side of the accordion, and a terminal 22 for passing electrical signals generated by the microphones 5 from sounds emanating from the treble side.

An amplifier circuit 23, external to the accordion, may have a jack similar to that on the treble side of the accordion and having a common terminal 20', a bass signal terminal 21' and a treble signal terminal 22'. Connection is made between the amplifier circuit and the accordion by a cable or cord having plugs 24 having pins adapted to engage the terminals of the jacks 19 and 19'. The amplifier circuit 23 includes a pair of preamplifiers 26 and 27, each electrically associated with the microphones 4 and the microphones 5. Output signals from the preamplifiers 26 and 27 are fed into a combined network 28 and thence into a power amplifier 29 which is coupled to one or more speakers 30 for reproduction of the sounds.

By use of the microphone arrangement as taught by this invention, a true reproduction of the accordion music is possible. The individual bass tones are combined such that each maintains its proper intensity as compared with the others, and likewise the individual treble tones are similarly combined. The use of the separate volume controls permits a musician playing the instrument to emphasize either the bass of the treble or to bring them out equally as he may wish. And the convenient mounting of both volume controls on a single side of the accordion, together with single plug connection of the external amplifying and reproducing equipment, is made possible by the novel zigzag suspension of the electrical conductors within the bellows chamber.

Changes may be made in the form, construction and arrangement of parts from those disclosed herein without in any way departing from the spirit of the invention or sacrificing any of the attendant advantages thereof, provided, however, that such changes fall within the scope of the claims appended hereto.

The invention is hereby claimed as follows:

1. In an accordion having a bass side, a treble side, and an expansible bellows secured to and enclosing the space between said bass and treble sides of the accordion, a microphone mounted on one of said sides and a connection receptacle secured on the other side, means for electrically connecting said microphone with said receptacle, comprising a flexible cable forming alternately reversed serpentine loops and extending between the bass and treble sides of the accordion, and means supporting spaced apart loops of said cable on correspondingly spaced portions of said bellows.

2. In an accordion having a bass side, a treble side, and an expansible bellows secured to and enclosing the space between said bass and treble sides of the accordion, a microphone mounted on one of said sides and a connection receptacle secured on the other side, means for electrically connecting said microphone with said receptacle, comprising a flexible cable forming alternately reversed serpentine loops and extending between the bass and treble sides of the accordion, and means supporting spaced apart loops of said cable on spaced anchorage stations on one side of said bellows, and means supporting intermediate loop portions of said cable at spaced mounting stations on another side of said bellows.

3. In an accordion having a bass side, a treble side, and an expansible bellows secured to and enclosing the space between said bass and treble sides of the accordion, a microphone mounted on one of said sides and a connection receptacle secured on the other side, means for electrically connecting said microphone with said receptacle, comprising a flexible cable forming alternately reversed serpentine loops and extending between the bass and treble sides of the accordion, and a plurality of eylet supports secured in spaced relation on the bellows in position to supportingly receive correspondingly spaced loops of said cable.

4. In an accordion having a bass side, a treble side, and an expansible bellows secured to and enclosing the space between said bass and treble sides of the accordion, a microphone mounted on one of said sides and a connection receptacle secured on the other side, means for electrically connecting said microphone with said receptacle, comprising a flexible cable forming alternately reversed serpentine loops and extending between the bass and treble sides of the accordion, and a plurality of eylet supports secured to spaced apart folds of the bellows in position extending within the space enclosed thereby, said eylet each carrying a correspondingly spaced loop of the cable.

5. In an accordion having a bass side with a microphone mounted thereon, a treble side with a microphone mounted thereon and an expansible bellows enclosing the
space between said sides, flexible conductor means forming an electrical conduction path for passing electrical signals from the microphone on one of said sides to the other side, thereby permitting electrical signals from all of the microphones to pass through a signal connection station on one of said sides of the accordion, said flexible conductor means extending between the bass and treble sides of the accordion, and a plurality of eyelet supports attached to folds in the bellows and extending into the bellows, said flexible conductor means being threaded through and supported by the eyelets in serpentine configuration.

6. In an accordion having a bass side with a microphone mounted thereon, a treble side with a microphone mounted thereon and an expandable bellows enclosing the space between said sides, flexible conductor means forming an electrical conduction path for passing electrical signals from the microphone on one of said sides to the other side, thereby permitting electrical signals from all of the microphones to pass through a signal connection station on one of said sides of the accordion, said flexible conductor means comprising a cable extending between the bass and treble sides of the accordion, and a plurality of eyelet supports spaced apart on opposed walls of the bellows, said electrical cable being threaded alternately through the eyelets on said opposed walls of the bellows, thereby disposing the cable in a serpentine configuration between the bass side and the treble side of the accordion.

7. In an accordion having a bass side with a microphone mounted thereon, a treble side with a microphone mounted thereon and an expandable bellows enclosing the space between said sides, flexible conductor means forming an electrical conduction path for passing electrical signals from the microphone on one of said sides to the other side, thereby permitting electrical signals from all of the microphones to pass through a single connection station on one of said sides of the accordion, said flexible conductor means comprising a cable extending between the bass and treble sides of the accordion, and a plurality of eyelet supports spaced apart on opposed walls of the bellows, each of said eyelets being attached to a fold in the bellows by at least one flap having adhesive substance thereon, said electrical cable being threaded alternately through the eyelets on said opposed walls of the bellows, thereby disposing the cable in a serpentine configuration between the bass side and the treble side of the accordion.

8. Apparatus for electrical pick-up of sounds emanating from an accordion having a bass side and a treble side with a bellows enclosing the space between the bass side and the treble side, said apparatus comprising microphones mounted on the bass side of the accordion, each of said microphones being held between a pair of brackets having foam rubber pads positioned between the microphones and the brackets, other microphones sandwiched between a pair of foam rubber pads held by and between a pair of elongated members mounted on the treble side of the accordion, a pair of volume control devices mounted on the treble side of the accordion, one of said volume control devices being electrically associated with the microphones on the bass side of the accordion and the other of said volume control devices being electrically associated with the microphones on the treble side of the accordion, an electrical connection receptacle mounted on the treble side of the accordion and adapted to receive a plug from external amplifying and reproducing means, and electrical conducting means interconnecting the microphones, the volume control devices and the electrical connecting device, said electrical conducting means including a flexible cable extending between the bass and treble sides of the accordion, eyelet supports spaced apart along opposed walls of the bellows, said eyelet supports being adhesive-ly attached each to a fold of the bellows, said flexible cable being threaded alternately through the eyelets on said opposed walls, to thereby support the flexible cable in serpentine configuration between the bass side and the treble side of the accordion, said flexible cable being operable to provide an electrical connection through the bellows chamber for connecting the two microphones on the bass side of the accordion to a volume control device and the electrical connection receptacle on the treble side.

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