Jan. 14, 1969 J. E. LICHTENSTEIN 3,421,401

MICROPHONE ATTACHMENTS FOR MUSICAL INSTRUMENTS

Filed Dec. 23, 1965 Sheet 1 of 2

Fig. 1

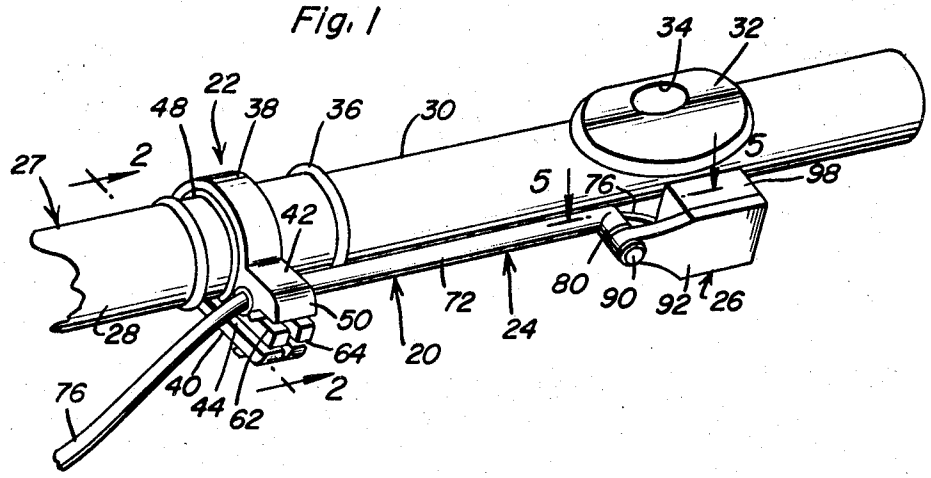


Fig. 2

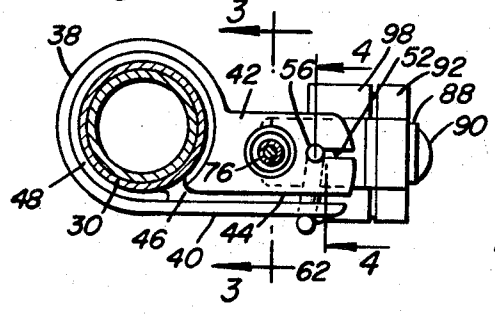


Fig. 3

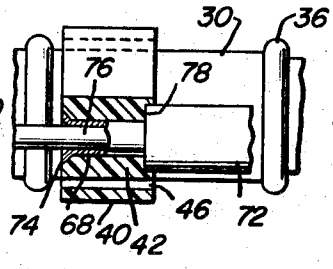


Fig. 4

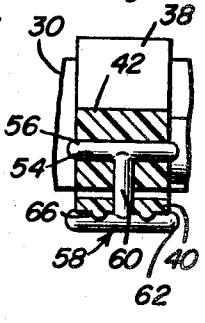


Fig. 5

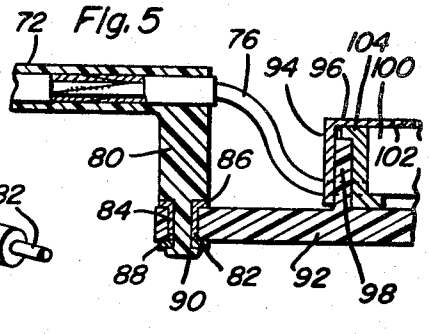
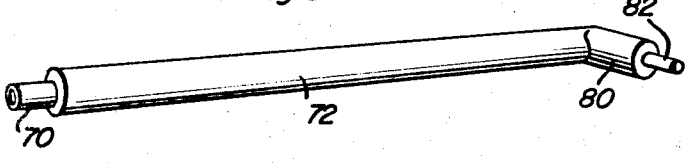


Fig. 6



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MICROPHONE ATTACHMENTS FOR MUSICAL INSTRUMENTS

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Fig. 7

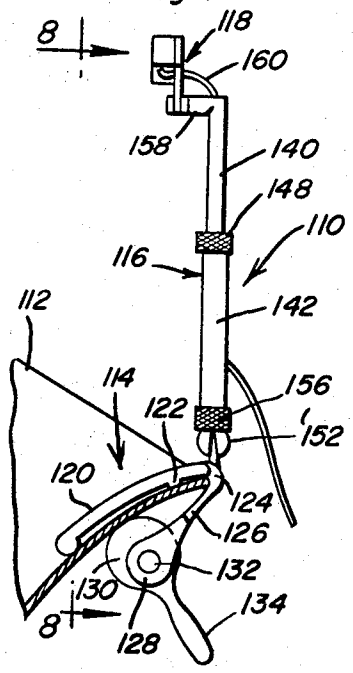


Fig. 8

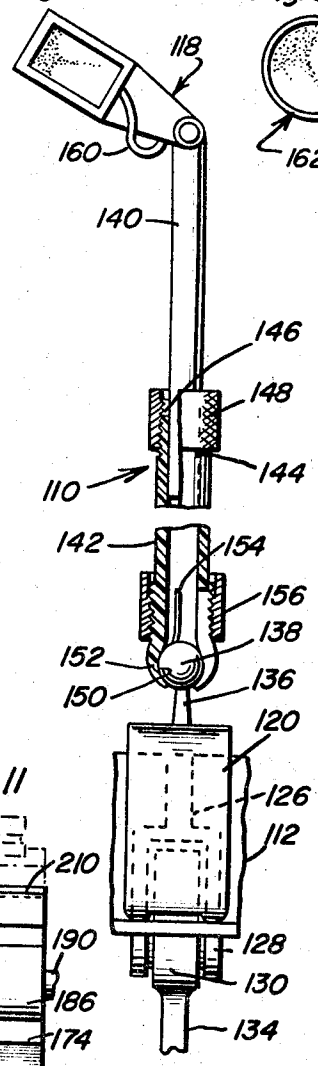


Fig. 9

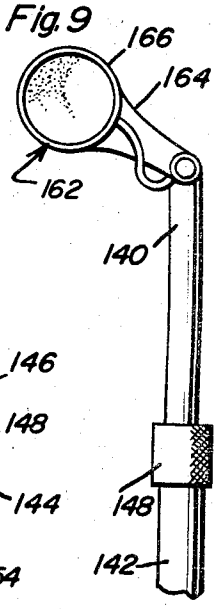


Fig. 10

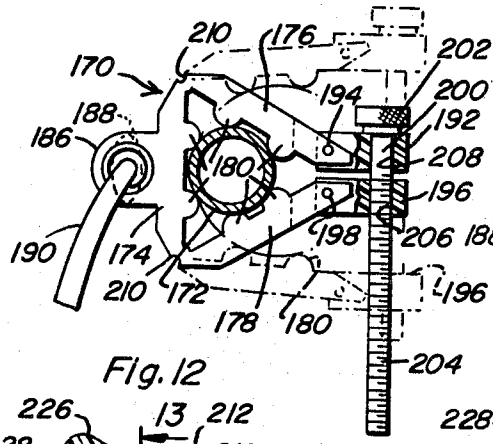


Fig. 11

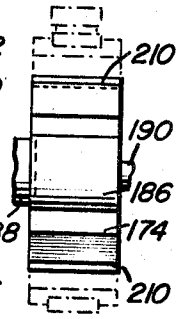


Fig. 12

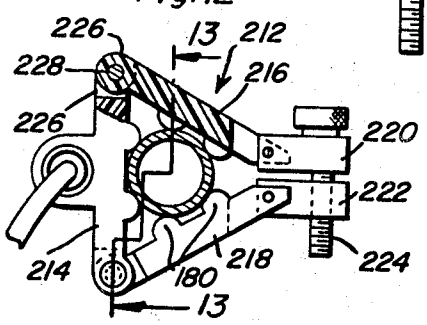
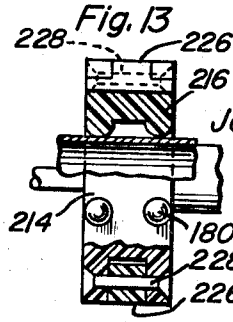


Fig. 13



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3,421,401

MICROPHONE ATTACHMENTS FOR MUSICAL INSTRUMENTS

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Filed Dec. 23, 1965, Ser. No. 516,016
U.S. Cl. 84—453 10 Claims
Int. Cl. G10g 7/00

ABSTRACT OF THE DISCLOSURE

An attachment for musical instruments that attaches directly to a musical instrument and holds a microphone allowing the microphone to be placed in an optimum position in relation to the sound producing section of the musical instrument.

The present invention generally relates to a microphone attachment for musical instruments and more specifically involves the use of several structural variations of the microphone attachment to enable a microphone to be adjustably positioned in relation to the instrument so that optimum amplification may be obtained both as to flexibility, volume and quality.

Heretofore, microphones have been associated with various musical instruments so that the sound produced by such instruments may be amplified. In certain types of musical instruments, especially woodwind instruments, a stand-type microphone is placed so that one or more instruments more or less directs the sound or music towards the microphone of the house public address system. While this procedure does provide some degree of amplification, this procedure does not produce the amplification in a natural manner nor of a consistent uniform quality of that produced by a microphone being attached directly to the musical instrument.

Accordingly, it is an object of the present invention to provide a microphone attachment for woodwind musical instruments including a clamping assembly for attaching a supporting arm or rod in an adjusted position in relation to the instrument so that a pickup microphone mounted on the rod may be orientated adjustably in the optimum position in relation to the instrument thereby allowing personal amplifiers to be placed among orchestra members, allowing additional effects through the use of reverberation, allowing volume and tone to be controlled by the performer. Normally, microphones supplied by the individual performer would not readily be adaptable to conventional public address installations.

Another object of the present invention is to provide a microphone attachment for musical instruments having a novel clamping assembly to enable the microphone to be readily attached to the musical instrument without alteration of the instrument, damage thereto or marring of the surface thereof with the clamp assembly being differently constructed for association with different types of musical instruments.

A further object of the present invention is to provide a microphone attachment in accordance with the preceding objects which includes a tubular supporting standard or rod through which the lead wire from the microphone may pass, emerging close to the performer's hand which acts as a fulcrum thus reducing the imbalancing weight of the microphone and enabling the microphone holder to be associated adjustably in relation to a particular area of the musical instrument for efficiently picking up the desired sounds for amplification.

Still another object of the present invention is to provide a microphone attachment for a flute having a clamp structure attached to the body of the flute which is adequately damped to reduce key noises and a standard extending alongside the head joint with a microphone holder supporting the microphone in optimum relation to the embouchure plate for providing ample volume while at the same time eliminating or reducing breath noise.

A further important object of the present invention is to provide a microphone attachment for a saxophone or the like having a clamping arrangement for clamping the attachment to the bell of the saxophone thereby allowing accurate placement of the microphone to obtain optimum balance between tones emitting from the keys and from the bell of the saxophone.

Still another feature of the present invention is the provision of a microphone attachment having a generally triangular shaped clamp assembly which is universal for clampingly engaging tubular portions of musical instruments of various sizes, shapes and configurations and provided with resilient knobs for damping key vibration.

Another significant object of the invention is to provide a microphone attachment for woodwind musical instruments which is simple in construction, easy to attach, effective for adjustably holding a microphone in optimum relation to the musical instrument, light weight in construction and relatively inexpensive to manufacture.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a perspective view of the microphone attachment of the present invention associated with a flute;

FIGURE 2 is a transverse, sectional view taken substantially upon a plane passing along section line 2—2 of FIGURE 1 illustrating the clamp structure for supporting the microphone attachment from the barrel of the flute;

FIGURE 3 is a detail sectional view taken substantially upon a plane passing along section line 3—3 of FIGURE 2 illustrating further structural details of the clamp mechanism including the tubular standard and the manner in which the lead wire extends therethrough;

FIGURE 4 is a detail sectional view taken substantially upon a plane passing along section line 4—4 of FIGURE 2 illustrating further structural details of the clamp mechanism;

FIGURE 5 is a detail sectional view taken substantially upon a plane passing along section line 5—5 of FIGURE 1 illustrating the manner in which the microphone cartridge holder is mounted on the standard;

FIGURE 6 is a perspective view of the elongated tubular standard for supporting the microphone holder from the clamp;

FIGURE 7 is a fragmental elevational view illustrating a modified form of the invention clamped to the bell end of a saxophone;

FIGURE 8 is a front elevational view, with portions shown in section taken generally along reference line 8—8 of FIGURE 7 illustrating the structural details of the adjustable hollow standard;

FIGURE 9 is a fragmental front view similar to FIGURE 8 but illustrating a holder for a circular or cylindrical microphone cartridge;

FIGURE 10 is an end view of a modified form of clamp structure with portions thereof broken away for clampingly engaging a tubular component of a musical instrument;

FIGURE 11 is an edge elevational view of the construction of FIGURE 10;

FIGURE 12 is an end view of another form of the invention, with portions thereof broken away illustrating

a triangular clamp arrangement in which the two legs of the triangle are attached to the base by pivot pins; and

FIGURE 13 is a detail sectional view taken substantially upon a plane passing along section line 13—13 of FIGURE 12 illustrating further structural details of this form of the invention.

Referring now specifically to FIGURES 1–6, the microphone attachment of the present invention is generally designated by numeral **20** and includes a clamp assembly generally designated by numeral **22**, a standard generally designated by numeral **24** and a support housing **26** for a microphone cartridge. The attachment **20** is illustrated attached to a standard flute generally designated by numeral **27** which includes a tubular body **28** and head joint **30** and the usual embouchure **32** having the usual embouchure hole **34** therein. The flute **27** is of completely conventional construction and as is well known, the head joint **30** having the embouchure **32** thereon is longitudinally adjustable for tuning. The clamp assembly **22** is disposed between two peripheral ribs **36** formed normally integrally on the flute body **28** which allows the locating of clamp assembly **22**.

The clamp assembly **22** includes a generally cylindrical member **38** having a tangentially extending plate portion **40** and a laterally extending portion **42** which is rigid with the cylindrical member **38** and has a substantial thickness as compared with the thickness of the plate **40**. The plate **40** is spaced from the laterally extending arm **42** and is spaced therefrom by a slot-like opening **44** which extends throughout the length of the arm **42** and forms an interrupted space **46** to enable the cylindrical member **38** to be expanded to be moved longitudinally over the end of the head joint **30** and rib **36** on body **28** and in order to enable effective increase in the diameter of the cylindrical member **38**. On the interior of the cylindrical member **38** is a covering of cushioning material **48** or the like which may be felt, rubber, plastic or the like phone attachment of the present invention is generally coinciding with the space **46** to allow for variation in size of cushion **48**, to cushion the clamp where it engages the body **28**, preventing the clamp from marring the body **28** in an obvious manner and damping vibrations caused by key action.

The outer ends of the arm **42** and plate **40** are rounded or arcuately curved as at **50** and a slot **52** paralleling the slot **44** extends inwardly from the central end portion of the arm **42** and terminates in a cylindrical socket **54** which pivotally receives a rod portion **56** of a latch member **58**. Attached to the rod member **56** is a radially extending rod member **60** having a rod member **62** on the end thereof parallel to the rod member **56** as illustrated in FIGURE 4. A slot **64** intersects the slot **52** and also the slot **44** to enable the fastener or catch **58** to swing about an axis defined by the rod **56** to the position illustrated in FIGURE 2 which is permitted by curve **50** at least on plate **40**. To lock the bar or rod **62** in locked position, the arm or plate **40** is provided with a pair of detents **66** over which the rod **62** is snapped for securing the clamp assembly **22** on the head joint **30** of the flute **27** in the manner illustrated in FIGURES 1–4.

Inwardly of the rounded inner end **54** of the slot **52**, the arm **42** is provided with a bore **68** extending therethrough which receives a tubular projection **70** on an elongated hollow standard **72**. The end of the projection **70** is deformed outwardly as at **74** to lock the standard **72** to the arm **42**. A microphone lead wire **76** extends through the projection **70** and the tubular rod or standard **72** which is oval-shaped in configuration and has the inner end thereof received within a correspondingly shaped recess **78** in the arm **42** to prevent rotation of the standard or hollow rod **72** about its longitudinal axis. Other nonsymmetrical or polygonal shapes may be used for the standard and recess **78**.

The other end of the standard **72** is provided with a laterally extending terminal end portion **80** provided with an integral axially extending reduced end or pin **82** which receives a bushing **84** of a compressible material such as soft rubber in order to provide a friction fit and provide damping to further reduce vibration noises. The bushing **84** has an integral washer **86** engaging the shoulder defined by the juncture between the pin **82** and the end portion **80**. A washer **88** of compressible material is engaged with the pin **82** in opposed relation to the washer **86** and the end of the pin **82** is riveted or deformed outwardly as at **90** to secure the bushing **84**, washers **86** and **88** in place and pivotally support the microphone cartridge housing **26** which includes a plate-like structure **92** having a reduced end portion received on and pivotally carried by the pin **82** and bushing **84**. The plate **92** is provided with a projecting flange **98** and a cap **96** having a projecting flange **94** telescoped over the flange **98** is provided for retaining the microphone cartridge **100** in place. The cap **96** is provided with openings **102** for the passage of sound and a cushioning member **104** is disposed between the cartridge **100** and the flange **98** for cushioning the microphone cartridge **100** in an obvious manner. The microphone lead wire **76** extends out through the tubular standard at the end thereof where the laterally extending end portion **80** is joined and is connected to the microphone cartridge **100** in an obvious manner. The flanges **94** and **98** are frictionally retained in place which enables the microphone cartridge **100** to be removed and replaced as may become necessary.

As illustrated in FIGURES 1–6, the microphone holding flange **94** and the cap **96** are of rectangular configuration to receive a generally rectangular microphone cartridge. However, the shape and configuration of the microphone housing may vary depending upon the shape and configuration of the microphone. For example, the cylindrical housing such as that illustrated in FIGURE 9 may be employed rather than the generally rectangular microphone cartridge housing **26** as employed in FIGURES 1–6. Also, the particular orientation of the apertures **102** may vary depending upon the particular individual requirements.

In this form of the invention, the microphone cartridge is oriented closely adjacent the emission of tone or sound and in an optimum position to provide ample volume while eliminating as much breath noise as possible by virtue of the longitudinal position of the microphone holder **26** being adjustable by loosening the clamp assembly **22**, the angular position of the microphone holder about the longitudinal axis of the flute being adjustable by loosening the clamp assembly **22** and with the angular position of the microphone holder **26** being adjustable about the pivot pin **82** by overcoming the frictional resistance to movement exerted by the head **90** on the pin **82** with friction developed by bushing **84** being used to retain the microphone holder in position. This will enable tuning of the flute in the usual manner, that is, by sliding the head joint **30** longitudinally in relation to the body **28** of the flute **27**.

The effective over-all length of the holder may be varied and the components thereof may be constructed of plastic material such as nylon, polycarbonate (Lexan, manufactured by General Electric) or other suitable plastics thus rendering the device extremely light weight in construction so that it will not disturb the balance or fulcrum point of the flute which is important since it is necessary to be able to hold the flute in the usual manner. The particular configuration of the grid which overlies the microphone cartridge may vary and be either in the form of a straight gridwork, a baffle-type of gridwork or any conventional form to satisfy acoustical requirements.

FIGURES 7 and 8 illustrate another embodiment of microphone attachment **110** for mounting on the bell **112** of a saxophone. This structure also includes a clamping assembly **114**, a supporting standard **116** and a microphone holder **118**.

The clamp assembly **114** includes an arcuately curved plate **120** having a plurality of knobs or projections **122** of resilient or soft material for conforming with and engaging the convexly curved interior surface of the saxophone bell and causing damping of mechanical vibrations in the saxophone. One end of the plate **120** is provided with a U-shaped portion **124** and a mounting portion **126** which generally extends parallel to the arcuate member **120** but with it slightly diverging therefrom. The end of the mounting portion **126** is bifurcated as at **128** and pivotally supports a cam **130** on a pivot pin **132** which is, of course, eccentric to the cam **130**. The cam **130** has a handle **134** connected thereto to enable movement of the cam **130** about the pivot pin **132** thus clamping and releasing the clamp assembly **114** from the saxophone bell **112** by moving the handle **134** in an obvious manner. For further damping, the surface of cam **130** may be soft or resilient where it engages the saxophone bell.

At the U-shaped portion of the clamp assembly **114**, there is provided a laterally extending projection or stud **136** having a spherical ball **138** on the outer end thereof. The stud **136** is generally perpendicular to the plate **120** as illustrated in FIGURES 7 and 8.

The standard assemby **116** includes an outer tubular portion **140** and an inner tubular portion **142** which telescopically receives the outer tubular member **140** and is mounted on the spherical ball **138** as illustrated in FIGURE 8 thus enabling longitudinal adjustment of the standard **116** and also universal angular adjustment thereof in relation to the clamp assembly **114**.

The outer end of the inner tubular member is longitudinally slit as at **144** and is externally threaded as at **146** for receiving an internally threaded and slightly tapering clamp sleeve or nut **148** which is externally knurled so that as the nut or sleeve **148** is threaded inwardly on the tubular member **142**, the tubular member **142** will compress inwardly thus gripping the tubular member **140**.

The lower end of the inner tubular member **142** is provided with a partially spherical socket **150** formed by a plurality of independent fingers **152** which are separated by longitudinal slits **154**. The fingers **152** are externally threaded for threadedly receiving an internally threaded sleeve **156** which is knurled on the exterior surface thereof so that as the sleeve or nut **156** is threaded inwardly onto the fingers **152**, the shape of the socket **150** will be reduced thus clampingly engaging the fingers **152** with the spherical ball **138** thereby adjusting and locking the standard **116** in fixed angular orientation in relation to the plate **120**.

The outer end of the outer member **140** is provided with a laterally extending end portion **158** which supports the microphone cartridge holder **118** in exactly the same manner as the laterally extending end portion **80** in FIGURES 1–6 supports the microphone holder **26** in FIGURES 1–6. In this construction, the lead wire **160** may extend laterally outwardly of the inner tubular member **142**.

As illustrated in FIGURE 9, the microphone cartridge holder is generally designated by numeral **162** and includes a plate **164** and a cylindrical cap **166** and corresponding structure thus indicating that the microphone cartridge holder may be in the configuration illustrated in FIGURES 1–8 or it may be circular or cylindrical as illustrated in FIGURE 9.

FIGURES 10 and 11 illustrate a universal type of clamping assembly **170** for clamping engagement with a tubular component **172** of a musical instrument which may vary in size as indicated by the dotted line illustration in FIGURE 10 thus providing a universal type of clamp that includes three plates or bars including a base member **174** and a pair of legs **176** and **178** which are substantially equal in length and which combine with the base member **174** to form generally a triangular shaped member when the free ends of the legs **176** and **178** are disposed in adjacent relation. The base member **174** and each of legs **176** and **178** is provided with a plurality of generally semi-spherical knobs **180** of soft or resilient material which form effective means for clampingly engaging the tubular component **172** at a plurality of circumferentially spaced points even though the size of the tubular component **172** may vary and causing damping of mechanical vibrations in the musical instrument.

The base member **174** is provided with a projecting arm **186** which has a standard **188** attached thereto in the same manner as the standard **72** is attached to the arm **42** in FIGURES 1–6. The lead-in wire **190** is also orientated in the same manner as in FIGURES 1–6.

The end of the leg **176** is bifurcated and receives a block **192** therein and pivotally attached thereto by pivot pin **194**. The end of the leg **178** is provided with a similar block **196** pivoted thereto by a pivot pin **198** to enable relative angular movement of the legs **176** and **178** when an elongated clamp screw **200** is employed for urging the legs **176** and **178** together or permitting them to expand. The elongated clamp screw **200** has a knurled head **202** for operation thereof and an elongated threaded portion **204** which extends through an internally threaded bore **206** in the block **196**. The shank of the threaded member **200** is received closely in a bore **208** through the block **192** thus retaining the blocks **192** and **196** generally in parallel relation to each other with the angular movement between the block **192** and leg **176** being permitted by the pivot pin **194** thereby enabling the clamp screw to effectively clamp the clamp assembly **70** to a tubular component **172** illustrated in FIGURE 10 and also a tubular component as large as the dotted line illustration in FIGURE 10. This form of the invention is constructed of polypropylene the only presently known plastic with self-hinging qualities.

The juncture between the leg **176** and the base member **174** and between the leg **178** and the base member **174** is defined by a hinge area **210** which is actually of unitary construction with the base member **174** and corresponding leg **176** or **178**. The hinge area **210** actually is a part of the leg and base member structure and is defined by a generally semi-cyclindrical notch or the like which hinge area is formed before the plastic is finally cured or set. After the plastic is set, the hinge area **210** will remain flexible while the base member **174**, leg **176** and leg **178** will be substantially rigid.

FIGURES 12 and 13 disclose another embodiment of the clamp structure **212** which includes a base member **214**, legs **216** and **218** having blocks **220** and **222** pivotally connected thereto and interconnected by a screw-threaded clamp member **224**. This form of the invention is exactly the same as the embodiment of the invention illustrated in FIGURES 10 and 11 except for the hinge connection between the base member **214** and the legs **216** and **218**. In this construction, overlapping hinge barrels **226** are provided and interconnected by hinge pins **228**. Other than the mechanical hinge construction formed by the hinge barrels **226** and hinge pin **228**, the clamp structure **212** is the same as the clamp assembly **170** illustrated in FIGURES 10 and 11 except that it could be made of many practical, durable, and moderately light materials such as nylon, aluminum or the like.

From the variations in the clamp structures disclosed, it will be clear that the microphone attachment may be mounted in an adjustable manner on various types of musical instruments and in each instance, the microphone pickup cartridge will be oriented in the optimum position for receiving the sound or music produced by the instrument so that it can be amplified. In addition, the structure of the device is primarly plastic material thus rendering it quite inexpensive to manufacture and at the same time relatively neat in appearance and also light in weight so that it will not disturb the balance of the instrument, mar the finish of the instrument or in any way require permanent alteration, modification or disfigurement of the instrument. Moreover, the attachment of this invention

will not interfere with the normal playing operation of the instrument and will enable substantially any woodwind instrument to be connected with its own amplifier so that such instruments will not be overpowered by other instruments in an orchestra or the like. Further, it allows variations in tonal qualities, effects and volume to be controlled by the performer and makes possible the emission of the amplified tone to always be in the proximity of the performer, to acquire a more natural orchestral effect.

In some installations, two or more microphones may fed into one amplifier input or into individual inputs of a multi-channeled amplifier to permit individual tone and volume adjustment and to improve balance of the tonal spectrum of the musical instrument.

With the present invention, the introduction of reverberation is accomplished in order to produce an entirely new group of effects. Also, this invention introduces the possibility of mobile amplification of woodwind instruments acquired without modification of the instruments by using a battery powered portable amplifier.

The foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modifications and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly all suitable modifications and equivalents may be restored to, falling within the scope of the invention as claimed.

What is claimed as new is as follows:

1. A microphone attachment for musical instruments comprising a clamp assembly adapted to be mounted directly on the musical instrument, a supporting standard attached to the clamp assembly, and a microphone holder attached to said standard, said microphone holder being pivotally adjustable on said standard, and said clamp assembly being adjustable in relation to a musical instrument whereby a microphone in the microphone holder can be orientated in the optimum position in relation to the sound producing section of a musical instrument.

2. The structure as defined in claim **1** wherein said clamp assembly includes a generally cylindrical member having a pair of laterally extending spaced arms forming an entrance slit, one of said arms being thicker than the other, a pivotal latch member mounted on said thicker arm, means on the other arm for engagement by said latch member whereby the cylindrical member may be clamped to a musical instrument, said standard being mounted on said thicker arm and extending therethrough in generally parallel relation to the axis of the cylindrical member.

3. The structure as defined in claim **1** wherein said clamp assembly includes an arcuately curved plate adapted to conform with the interior convex surface of a saxophone bell or the like and including a plurality of spaced projections engaging the interior surface of the saxophone bell at spaced points to enable the plate to conform with saxophone bells having various arcs or curvature, a pivotal clamp member mounted in spaced relation to the plate and including a clamping edge adapted to engage the saxophone bell in opposed relation to a point intermediate the projections on said plate, said standard being universally adjustably attached to said plate and including longitudinally telescopic sections.

4. The structure as defined in claim **1** wherein said clamp assembly includes a base member, a leg at each end of said base member, means hingedly interconnecting said legs and said base member at the ends of said base member, means interconnecting the free ends of the legs for moving the free ends of the legs towards each other for grippingly engaging a musical instrument, and spaced projections on the base member and each of the legs for engaging a musical instrument at a plurality of circumferentially spaced points, said base member including an arm projecting outwardly therefrom, said standard being connected to said arm.

5. The structure as defined in claim **4** wherein the means at the free ends of the leg members includes a pair of blocks projecting longitudinally therefrom, pivot pins connecting the blocks to their respective leg members, said means interconnecting the blocks including an elongated clamp screw having an operating knob on one end thereof engaging one of the blocks, the other of the blocks having an internally threaded bore engaging a threaded portion of the clamp screw whereby rotation of the clamp screw will move the leg members towards each other or permit the leg members to spread apart.

6. The structure as defined in claim **4** wherein said hinge means interconnecting the ends of the base member and the leg members includes hinge-forming barrels on the base member and the leg member with the barrels being disposed in aligned relation and having a bore extending therethrough, and a hinge pin extending through said bore thereby pivotally connecting the leg members to the base member.

7. The structure as defined in claim **4** wherein said hinge means between the base member and the leg members includes an area of flexible plastic material unitarily formed with the base member and leg members with the area being more flexible and less thick than the base member and the leg members to enable flexing at the ends of the base member.

8. The structure as defined in claim **1** wherein said standard is in the form of an elongated tubular member extending generally in perpendicular relation to the clamp assembly and being mechanically interlocked with the clamp assembly to prevent relative rotation therebetween.

9. The structure as defined in claim **8** wherein said standard has an offset upper end portion of solid construction the major portion of the standard being hollow for passage of a microphone lead wire, said microphone cartridge holder being pivotally attached to the offset end portion of said standard.

10. The structure as defined in claim **1** wherein said microphone cartridge holder includes a substantially flat plate having a peripheral flange thereon receiving the microphone cartridge, and a cap having openings therein engaged with the flange for retaining the microphone cartridge in place and enabling entrance of sound to the microphone cartridge, said plate being pivotally attached to said standard to swivel about an axis substantially perpendicular to the longitudinal axis of the standard.

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RICHARD B. WILKINSON, *Primary Examiner.*

GARY M. POLUMBUS, *Assistant Examiner.*