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VOLUME CONTROL MEANS FOR MUSICAL INSTRUMENTS COMPRISING HAND OPERATOR ROLLER BAR

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Fig. 1.

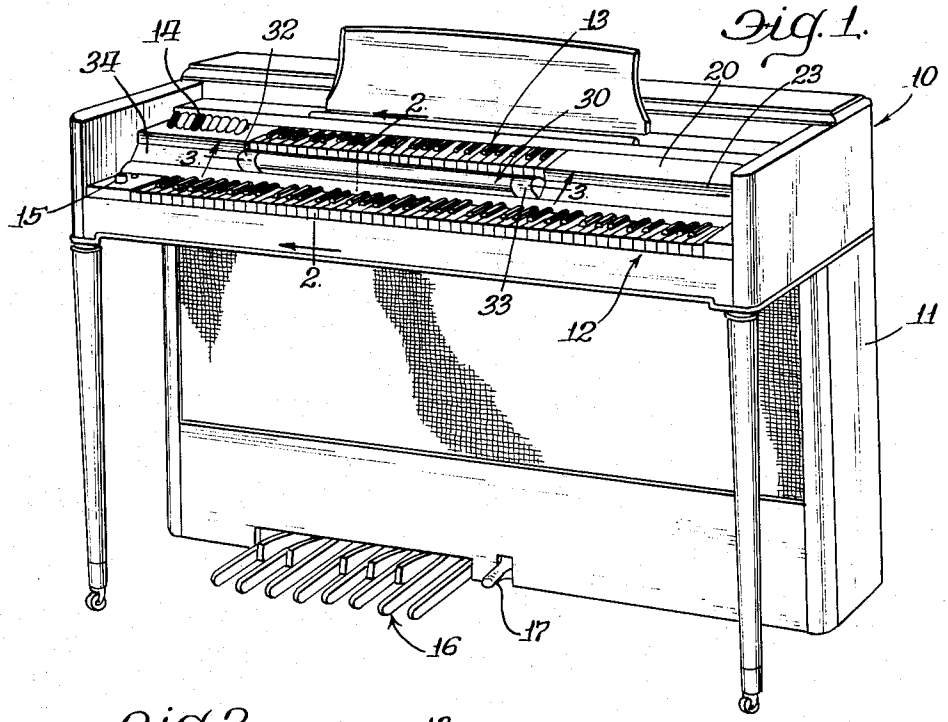


Fig. 2.

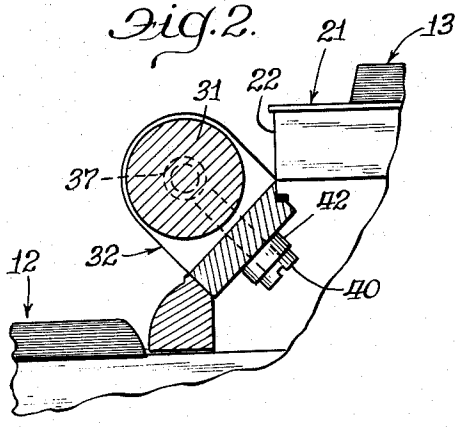


Fig. 5.

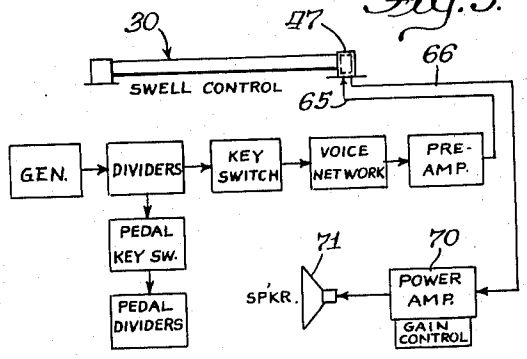


Fig. 3.

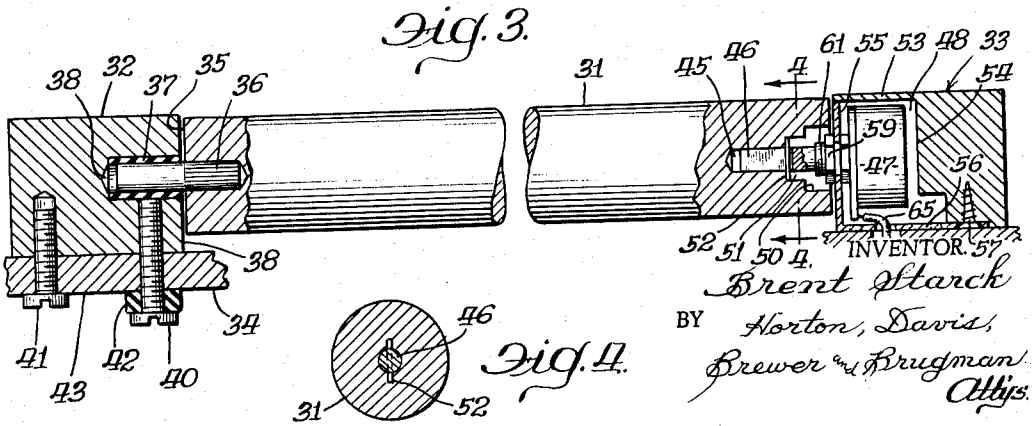


Fig. 4.

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VOLUME CONTROL MEANS FOR MUSICAL INSTRUMENTS COMPRISING HAND OPERATOR ROLLER BAR

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This invention relates to improved control means for musical instruments and, more particularly, to improved means for controlling volume output of musical instruments employing electronic sound systems.

Musical instruments utilizing electronic sound producing and amplifying systems, such as electronic organs, typically include, among various other control means, some type of control for regulating the volume output of the sound amplifier. Electronic organs particularly employ a so-called "swell" control which is designed to provide the operator with a convenient means for giving expression to the music by gradually or abruptly changing the audible volume output of the instrument. In the past, such swell controls on organs have been operated by foot engageable pedals or, in other instances, by a manual control knob or key located generally adjacent the instrument's manual keyboard. However, such previously known control means have not proven fully satisfactory due largely to their inconvenient location and accessibility. For example, the foot pedal operating means are usually located to one side of a foot operated bass pedal keyboard and it is normal practice for the operator to maintain one foot on the expression or swell control pedal during play of the instrument, leaving the other foot free to manipulate the various pedals of the bass keyboard. In certain instances, depending on the extent of the bass keyboard, this requires an awkward cross-over of the operator's legs. In other instances, it is necessary to use both feet to manipulate the bass keyboard, thereby making the swell control unavailable for operation. In installations where the swell control has been provided adjacent the upper manual keyboards, the same is generally placed adjacent one end of the keyboards. Generally such manual swell control means constitute either a rotatable control knob or a depressible key which, in either event, must be manually engaged by the operator. It will be understood that in such installations, use of the operator's hand to manipulate the swell control necessarily prevents use of that hand, at least temporarily, for playing the instrument.

In view of such defficiencies, the need for improving such control means, particularly as applied to electronic organs, is apparent and it is to this that the present invention is directed. In this respect, it will be appreciated that while the present invention is hereinafter described in association with an electronic piano-organ instrument, its features are also applicable to other types of electronic instruments, for example, electronic guitars, where volume control means are employed.

In brief, the present invention comprises a unique manually engageable, horizontal roller bar means for controlling operation of a variable rheostat in circuit with the electronic sound amplifying system associated with a musical instrument, such as an electronic organ. One of the more novel aspects of the present control means resides in the location and mounting of the rotatable roller bar in juxtaposition to and substantially along the length of a manual keyboard of the organ instrument so that the same is conveniently engageable substantially throughout the playing range of the keyboard. Swell control operation to achieve desired volume expression is brought about simply by engaging the roller bar with the palm of the hand and rotating the same, while the fingers of that hand continue free to manipulate and play the keys of the adjacent keyboard. Selectively adjustable means for regulating the sensitivity of the roller bar to accommodate the operator's touch is also provided. This latter feature comprises adjustable brake means which adjustably regulates the rotational freedom of the roller bar to fit the operating characteristics of the present invention to the individual operator, permitting regulatable sensitivity of the control means. Thus the present invention is directed to improved control means for regulating the swell or volume output of an electronic sound system associated with a musical instrument which is uniquely accessible to the operator's hand throughout the registry of the keys or other means by which the instrument is played.

The main object of the present invention is to provide a new and improved control means for use in electronic musical instruments whereby to manually regulate the volume output of the electronic sound system thereof.

Another important object of this invention is to provide a new and improved control means, as aforesaid, which is manually engageable and operable by the operator's hand while the same hand continues to manipulate or play the instrument.

A still further object of this invention is to provide a new and improved manually operable means for volume control of electronic musical instruments which includes means for adjustably accommodating the operating sensitivity of the control means to the individual operator's touch.

A still further and important object of this invention is to provide a new and improved swell control means which is manually engageable by the operator of an electronic musical instrument and is particularly useful in such musical instruments wherein foot controls for such purpose are not feasible.;

The above and further objects, features and advantages of the present invention will appear from time to time in the following description of a preferred embodiment thereof as illustrated in the accompanying drawings, wherein:

FIGURE 1 is a perspective view of an electronic instrument embodying the control means of this invention;

FIGURE 2 is a cross-sectional view taken substantially along line 2—2 of FIGURE 1 and looking in the direction of the arrows thereon to illustrate the operational location of the control means of the present invention with respect to the manual keyboards of the instrument;

FIGURE 3 is another cross-sectional view taken substantially along the line 3—3 of FIGURE 1 and looking in the direction of the arrows thereon to illustrate the structural features of the present invention;

FIGURE 4 is another cross-sectional view taken along the line 4—4 of FIGURE 3 and looking in the direction of the arrows thereon; and

FIGURE 5 is a schematic diagram of a typical electronic sound reproducing network employed in the instrument of FIGURE 1 and illustrating the relationship of the control means of the present invention thereto.

Turning now to the embodiment of the present invention illustrated in the accompanying drawings, FIGURE 1 illustrates an electronic musical instrument, designated generally at **10**, with which the present invention is useful. In this particular instance, instrument **10** constitutes a combined electronic piano-organ which includes a conventional cabinet **11**, having a normal piano manual keyboard **12** extending substantially along the frontal length of the cabinet **11**. Disposed to the rear of keyboard **12** and elevated thereabove is a shorter organ manual keyboard **13**. Associated with the organ manual and shown adjacent the left hand end thereof in FIGURE 1 is an organ stop keyboard **14**, while an on-and-off switch for

controlling energization of the electronic organ is indicated at **15** adjacent the left hand end of piano keyboard **12**. The usual bass keyboard **16** for the organ is provided for foot engaging operation along the lower marginal reaches of cabinet **11** and a piano tone control pedal **17** is also provided adjacent thereto. It will be understood that the piano keyboard **12** and the tone control pedal **17** serve as the conventional operating means for the piano portion of instrument **10**, while the manual organ keyboard **13**, the stop keyboard **14** and the bass keyboard **16** serve in a similar capacity for operating the organ portion thereof. In this respect, the organ and piano instrument portions are capable of independent or simultaneous operation.

As previously mentioned, the manual keyboard **13** for operating the electronic organ is disposed horizontally above and to the rear of the piano keyboard **12** flush with a substantially planar platform member **20** of a supporting structure therefor. It will be noted further that the white keys of keyboard **13**, typified by key **21** illustrated in FIGURE 2, are mounted so that a leading edge **22** thereof lies substantially coplanar with the frontal edge **23** of the platform member **20**. For convenience of accessibility, the organ manual keyboard **13** also is offset slightly to the left of the longitudinal centerline of the instrument **10** since that keyboard is normally played by the fingers of the operator's left hand. Mounted intermediate the organ keyboard **13** and the piano keyboard **12**, substantially forwardly adjacent of the leading edge **23** of the platform member **20** and the adjacent leading edges **22** of the white keys thereof illustrated in FIGURE 2, is the improved control means of this invention indicated generally by numeral **30** in FIGURE 1.

As will be understood best with reference to FIGURES 1–3 of the drawings, the control means **30** comprises a substantially cylindrical roller bar **31** disposed horizontally between a pair of laterally spaced mounting pads or blocks **32, 33** located adjacent opposite ends of the roller bar. Such mounting blocks are fixedly secured to an underlying mounting panel **34** of the instrument cabinet **11** which extends substantially angularly upwardly between the piano keyboard **12** and the organ keyboard **13**. It will readily be seen from FIGURE 2 that the mounting of the roller bar **31** between the blocks **32** and **33** effectively locates the same in such a position that it is readily engageable by the palm of the operator's hand when the fingers of that hand are engaged with the various keys of the organ keyboard **13**, thereby to provide convenient operational accessibility.

As best shown in FIGURE 3 of the drawings, the roller bar **31**, constitutes a substantially solid cylindrical rod, preferably made of wood or a similar material compatible with cabinet **11**, which is fitted at one end **35** thereof with an axle shaft **36** which extends coaxially outwardly for reception in a cylindrical sleeve bearing **37** housed within a blind bore opening **38** formed inwardly of one end of mounting block **32**. Sleeve bearing **37** is preferably made of a relatively soft or pliable bearing material, such as felt or plastic.

A pair of mounting bolts **40, 41** pass upwardly through the mounting panel **34** and threadingly engage suitable openings in the block member **32** to fasten the latter in position on the panel member **34**. It will be appreciated that the opening in block **32** which receives mounting bolt **40** communicates with the bearing sleeve **37** so that one end of bolt **40** engages the sleeve bearing while the enlarged head end thereof engages a compressible felt or rubber washer **42** disposed between itself and the adjacent face **43** of the mounting panel **34**. By this expedient, the radial engagement pressure of the flexible sleeve bearing **37** on axle member **35** may be adjustably regulated in accordance with the threaded positioning of mounting bolt **40**. This serves to effectively brake the axle **35** and provides adjustable regulation of the freedom of rotation for the roller bar **31** to accommodate its operational sensitivity to the operator's touch.

As illustrated best in FIGURE 3, the opposite end of the roller bar from that carrying the axle **35** is provided with an axial opening **45** receptive of a cylindrical operating shaft **46** associated with a variable rheostat **47**; the latter being housed within chamber **48** formed internally of the second mounting block **33**. The axial opening **45** of the roller bar is also formed with an enlarged stepped shoulder portion **50** at the outer end thereof and a slot **51** receptive of a connecting pin means **52** which extends through the operating shaft **46** for the rheostat. This provides positive connection between the roller bar and shaft **46** so that the same are conjointly rotatable. This interconnecting arrangement is particularly illustrated in FIGURE 4 of the drawings.

Mounting block **33** is hollowed out at one end to provide the internal chamber **48**, previously mentioned, which receptively houses the rheostat **47**. Thus chamber **48** is enclosed on two sides by the wall portions **53** and **54** of the mounting block. The remainder of chamber **46** is substantially closed over by a metal mounting bracket formed with two transversely related wall portions **55** and **56**, the latter receiving screw means **57** therethrough for connecting the mounting bracket to the mounting block **33**. Wall portion **55** is formed with a central opening for passage of the rheostat operating shaft **46**, while the rheostat unit **47** itself is supported by wall **55** and affixed thereto by a pair of locking nut members **59, 60** disposed on opposite sides of wall **55** and threadingly mounted on a threaded cylindrical collar **61** extending outwardly from one end of the rheostat unit in surrounding relation with the operating shaft **46** so that the latter is rotatable therewithin. Mounting bolts (not shown) corresponding to the mounting bolt means **41** associated with mounting block **32** are similarly utilized to fasten mounting block **33** to the panel **34**; threaded openings (not shown) being provided for that purpose in wall portion **56** of the mounting bracket.

From the foregoing it will be recognized that rotational movement of the bar **31** serves to effectively adjust the variable rheostat **47** which in turn is coupled by conductor means **65** and **66** in circuit with the various electronic components and stages of a typical electronic sound amplifying and reproducing network for the instrument. In this regard any suitable electronic network, of which numerous are known in the art, may be utilized with the present invention, but for purposes of the present description, a typical system is schematically set out in FIGURE 5 of the drawings. As shown in that figure, the rheostat **47** is connected in circuit between the power amplifier **70** and the other component sections of the electronic network, indicated as comprising a generator, dividers, pedal key switches, pedal dividers, key switch, voice network and preamplifier, according to recognized practice. Regardless of the particulars of the electronic network employed, those familiar with the art will readily understand that regulation of the variable rheostat **47** in the illustrated installation serves to variably adjust the output of the power amplifier and thus the audible output of the speaker **71**. This then provides the desirable swell or volume control familiar to electronic instruments, such as electronic organs. It will also be understood that the improved control means **30** of this invention provides a conveniently accessible and manually engageable operating means in roller bar **31** for readily regulating swell control of the electronic system, thereby permitting the instrument's operator to achieve desired volume expression in the music. In operating the instrument **10** herein described, the player will normally manipulate the keys of the organ manual keyboard **13** with one hand while his other hand fingers keyboard **12** when playing both the piano and organ sections of the instrument. In other circumstances, both hands may be employed on the organ keyboard. In either event, the positioning of the roller bar

31 adjacent and forwardly of the keys of keyboard 13 automatically places the palm of the operator's hand in a position whereby the same may conveniently engage the roller bar.

When swell control is desired in the music, the operator merely engages the roller bar and rotatably shifts the same appropriately to increase or decrease volume by moving his wrist upwardly or downwardly, thereby to correspondingly regulate the rheostat means 47. Importantly such operational manipulation of roller bar 31 advantageously may be carried out without interrupting or disengaging the player's fingers from the keys of keyboard 13. It will also be recognized that the linear extent and disposition of roller bar 31 provides operational accessibility of the control means of this invention substantially throughout the full range and extent of keyboard 13. Of added importance is the provision of the sensitivity control which serves to regulate the rotational freedom of roller bar 13 as provided by the above-described simplified brake means, comprising bearing means 37 and the mounting bolt 40 engageable therewith. By this expedient, the force necessary to effectuate rotational movement of bar 31 may be adjustably regulated to meet the touch or feel of the individual operator.

From the foregoing, it is believed that those familiar with the art will readily recognize and appreciate the unique features and advantages of the present invention which serve to mark the same as a novel departure over previously known control means of this class. It will be understood and recognized that while the control means of this invention have been described in association with an illustrated combined piano-organ instrument, such is not necessarily so limited in its use and application, but is generally applicable to electronic sound systems, particularly as applied in musical instruments wherein means for controlling volume output is desired. Further, while the particulars of the present invention have been described in association with a specific preferred embodiment thereof, the same is generally susceptible to modification, change and substitutions of equivalents without departing from its spirit and scope. As a consequence, it is not intended that this invention be limited by the herein above described and illustrated embodiment, except as may appear in the following appended claims.

I claim:

1. In a musical instrument having an electronic sound producing system including amplifying means and manually engageable means for playing the instrument, improved control means for selectively varying the volume output of the amplifying means comprising, an elongated manually engageable actuating means comprising a roller bar rotatably mounted adjacent the means for playing the instrument and extending substantially along the playing area of the latter so as to be readily accessible to and selectively operable by the instrument operator's hand while that hand is manipulating the means for playing the instrument, variable rheostat means having an operating shaft mounted adjacent said actuating means, and means operatively interconnecting said actuating means and said shaft of said rheostat means whereby the latter is operatively responsive to rotatable manipulation of said actuating means, said rheostat means having circuit connection with the electronic amplifying means of the instruments so as to variably regulate the volume output thereof.

2. In a musical instrument having an electronic sound producing network including amplifying means and manually engageable means for playing the instrument, improved control means for selectively varying the volume output of the amplifying means comprising, an elongated rotatably mounted bar means disposed adjacent the means for playing the instrument and extending substantially along the length of the latter's playing area whereby said bar means may be rotatably actuated by the instrument operator's hand while the same is playing the instrument, variable rheostat means having circuit connection with the electronic network of the instrument so as to variably regulate the volume output of the amplifying means thereof, and means operatively interconnecting said bar means and rheostat means whereby the latter may be operated in response to manipulation of said bar means.

3. In an electronic organ having electronic sound producing means including amplifying means and a manually engageable keyboard, improved swell control means for selectively varying the volume output of the amplifying means comprising, an operating bar disposed substantially along the length of and adjacent the frontal margin of the organ keyboard, means rotatably supporting said bar means at its opposite ends whereby the same is rotatable about a substantially horizontal axis in response to manual engagement by the hand of the organ operator while that hand is manipulating the organ keyboard, variable rheostat means mounted adjacent one end of said bar means and having an operating shaft aligned coxially therewith, means interconnecting said operating shaft and said bar means for conjoint rotation whereby adjustable operation of said rheostat means is effected by rotational movement of said bar means, and electrical circuit means interconnecting said rheostat means and the amplifier means of the instrument's electronic network in a manner enabling adjustable operation of the rheostat means to vary the volume output of the amplifying means.

4. The combination as set forth in claim 3 including adjustable brake means for regulating the rotational freedom of said bar means.

5. For use in a musical instrument having an electronic sound producing system including amplifying means and a manually engageable keyboard for playing the instrument, an improved control means for varying the volume output of the amplifying means comprising, an elongated roller bar disposed along the leading margin of the instrument's keyboard, means rotatably supporting said roller bar whereby the same may be rotatably actuated by the hand of the instrument's operator while that hand is manipulating the keyboard, variable rheostat means mounted adjacent one end of the roller bar and having circuit connection with the instrument's electronic system for adjustably regulating the volume output thereof, means operatively interconnecting said rheostat means and roller bar whereby rotational manipulation of the latter serves to variably adjust the rheostat means and brake means associated with the roller bar for adjustably regulating the rotational freedom thereof whereby its sensitivity to the touch of the operator's hand may be regulated.

6. The combination as set forth in claim 5 wherein said means supporting said roller bar comprises a pair of mounting blocks disposed at opposite ends of said roller bar, shaft means extending coaxially between said mounting blocks and said roller bar, flexible sleeve bearing means mounted in one of said mounting blocks for journalling said shaft means, said bearing means being radially adjustable for regulating contacting pressure thereof with said shaft means, and bolt means threadingly engageable with said one mounting block for fastening the same to an underlying support member and having one end engageable with said bearing means whereby the radial contacting pressure of the latter with said shaft means may be adjustably regulated in accordance with the threaded positioning of said bolt means.

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