Aug. 16, 1966 W. F. SCANLON 3,266,326

MASTER CONTROL ASSEMBLY FOR AN AUDIO VOLUME CONTROL SYSTEM

Filed Jan. 4, 1965

FIG.1

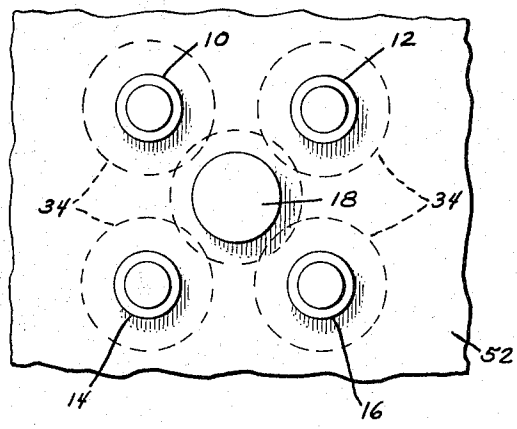


FIG.2

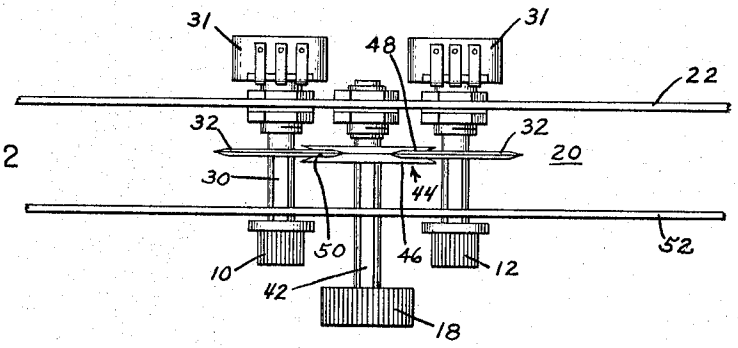
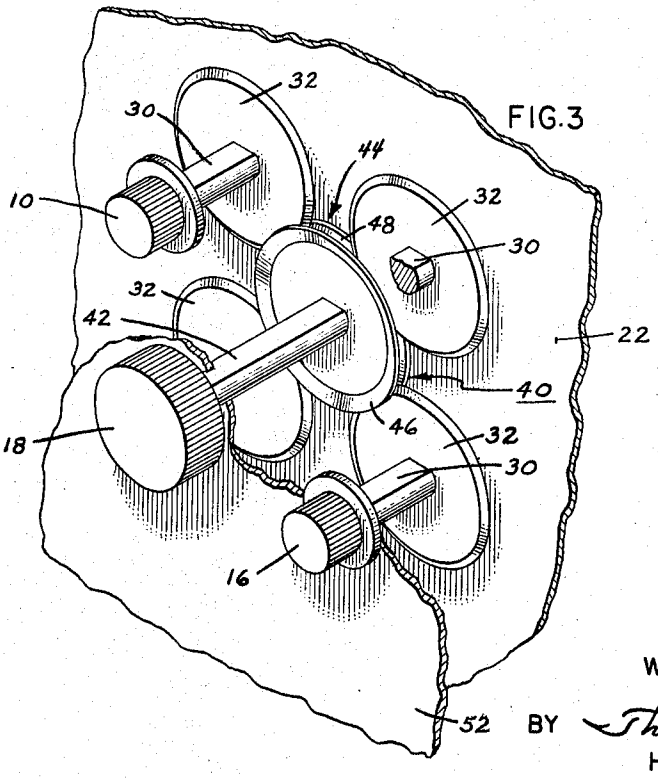


FIG.3



INVENTOR:
WILLIAM F. SCANLON,
BY Thomas A. Briody
HIS ATTORNEY.

United States Patent Office 3,266,326 Patented August 16, 1966

3,266,326

MASTER CONTROL ASSEMBLY FOR AN AUDIO VOLUME CONTROL SYSTEM

William F. Scanlon, Decatur, Ill., assignor to General Electric Company, a corporation of New York

Filed Jan. 4, 1965, Ser. No. 423,191
3 Claims. (Cl. 74—10.45)

This invention relates to audio volume controls, and more particularly to an improved master control assembly for operation in conjunction with a plurality of individual audio volume controls.

An important commercially successful type of sound reproduction which gives the listener the desirable impression that the sound is reproduced from a plurality of directions, is known as stereophonic sound reproduction. To provide this type of sound reproduction, a plurality of separate and distinct sound amplification systems are utilized. In analyzing master control systems for concurrently varying the loudness of a plurality of separate and distinct sound amplification systems, it has been found that most of these systems are either relatively complex, unduly expensive, or difficult for the listener to readily operate. It has been found desirable then to provide a master volume control assembly for a stereophonic amplifier, which substantially improves convenience of the operator and is of novel construction.

Accordingly, an important object of my invention is to provide a new and improved master control assembly for a stereophonic reproduction device.

Another object of the present invention is to provide an improved stereophonic control device which is simplified in construction and low in cost.

A further object of my invention is to provide an improved master control device which is characterized by simplicity of construction and mode of operation.

In carrying out the present invention, in one form thereof it is applied to a stereophonic volume control assembly which incorporates a plurality of individual manually controllable mechanisms for selectively adjusting the volumes emanating from associated amplifiers. Each of these individual mechanisms includes a knob and a shaft associated therewith. An annular slip disc is secured to each of these shafts. With such an arrangement, a master control with an associated shaft is arranged in proximity to the individual mechanisms. A wheel with an annular peripheral groove formed therein is secured to the shaft of the master control assembly and rotatable therewith. The wheel of the master control assembly is in continuous frictional engagement with the annular discs of the individual control mechanisms. By means of such an arrangement, by rotating the master control knob, the grooved wheel associated therewith concurrently drives the slip discs of the individual control mechanisms for conjointly selectively adjusting these mechanisms. In the event that it becomes desirable to individually set any of the individual control mechanisms, the knobs associated therewith may be readily and separately adjusted without in any way affecting the setting of the master control assembly. The present invention thus provides a simplified and effective means for selectively conjointly setting a plurality of individual controls for an audio system in mechanical fashion by means of a master control assembly.

Further aspects of my invention will become apparent hereinafter, and the specification concludes with claims particularly pointing out and distinctly claiming the subject matter which I regard as my invention. The invention, however, as to organization and method of operation, together with further objects and advantages thereof, may best be understood by reference to the following description when taken in conjunction with the accompanying drawing in which:

FIG. 1 is a front elevation view of a control assembly for a stereophonic reproduction system, embodying one form of my invention;

FIG. 2 is a top view of the control assembly of FIG. 1; and

FIG. 3 is a perspective view, partially broken away, to show further details of the structure of the control mechanism embodying my invention.

Referring now to the drawing for a detailed explanation of the present invention, attention is initially directed to FIG. 1. As shown therein, four separate control knobs **10**, **12**, **14** and **16** are arranged in symmetrical radially spaced proximity relative to a centrally located control knob **18**. Each of the control knobs **10**, **12**, **14** and **16** is individually operable to control the volume of a separate amplifier system. The centrally located knob **18** is a master control knob which, in accordance with my invention, mechanically couples to four individual volume control assemblies to conjointly set each of these volume control assemblies.

More particularly, as further shown in FIG. 2, the overall control assembly unit of my invention, which includes four separate control sub-assemblies and a master control sub-assembly cooperable therewith, is referred to for the sake of convenience by the reference numeral **20**. Control assembly unit **20** is mounted upon a supporting plate **22**, which may be part of the chassis of a four-channel amplifier frame. The control assembly unit **20** comprises four manually controllable mechanisms which include the aforementioned control knobs **10**, **12**, **14** and **16**. Thus, the individual control assembly operated by knob **10** comprises a flat sided shaft **30** which extends forwardly through a suitable aperture in plate **22** and is rotatably journalled to a potentiometer **31**. The potentiometer **31** is secured to the rear side of plate **22** (viewing FIG. 2) by suitable means, so that shaft **30** may be manually rotated relative to the plate **22** and the potentiometer **31** with which it is associated. Each of the other individual control knobs **12**, **14**, and **16** is associated with another potentiometer **31**, in the same manner as described for knob **10**. It will further be understood from viewing FIG. 1 that the shafts **30** associated with the four knobs **10**, **12**, **14** and **16** are located radially outwardly from and in symmetrical offset relationship to the knob **18**. The reason for such an arrangement shall become apparent hereinafter.

It will be noted further from viewing FIGS. 2 and 3 that each of the shafts **30** has an enlarged slip disc **32** secured thereto. Each of the slip discs **32** has the configuration of a round flat plate, with a relatively sharp peripheral outer edge.

As further shown in FIG. 3, there is also provided between the four individual control assemblies of previous description, a master control assembly **40**, which includes the manually operable knob **18**. Knob **18** is connected to the outer end of a flattened elongated shaft **42** which is rotatably journalled to supporting plate **22**. Shaft **42** has secured thereto a grooved master wheel unit **44**. The master wheel unit **44** includes a pair of pinch wheels **46** and **48** which are secured together to effectively provide a peripheral groove **50** (FIG. 2) therebetween. The peripheral diameters of the slip discs **32** of the individual control mechanisms, are all of the same magnitude and are of such a magnitude relative to the internal diameter of groove **50** that a frictional engagement for cooperation is achieved between each of the slip discs **32** and the wheel unit **44** of the master control assembly **40**.

As further shown in FIG. 3, the slip discs **32** and the master control wheel unit **44** are generally arranged in coplanar relationship and in perpendicular relationship to the shafts **30** and **42**. Master control knob **18** of the master control assembly **40** is preferably located further outwardly than or forwardly from the smaller knobs **10, 12, 14** and **16**, to facilitate accessibility of the master control knob **18**. A face plate **52** is located between the five knobs **10, 12, 14, 16** and **18**; and discsc **32** and wheel **44** for appearance purposes.

Turning now to a description of the operation of my improved control device, attention is directed to FIG. 3. Each of the individual manually controllable mechanisms is set to its desired level of operation for establishing a pre-selected audio volume, by means of the selective rotation of the knobs **10, 12, 14** and **16**. As each of the knobs **10, 12, 14** and **16** is rotated, its associated shaft **30** thereupon imparts the desired setting to its associated potentiometer **31** for selecting a predetermined audio volume for one of the amplifiers. When each individual control mechanism is being operated by the rotation of its associated knob, central wheel **44** is frictionally restrained by inertia of the remainder of the mechanism so that the disc **32** slips with respect thereto. Individual setting of the knobs **10, 12, 14** and/or **16**, thus does not in any way affect the position of the master control assembly and its associated shaft **42**. After each individual control has been set to its desired level, the master knob **18** may thereupon be rotated. Each of the individual controls is then rotated at the same rate, so that the audio signal emanating from each of the four controlled amplifier channels increases or decreases to a like extent. Thus, more particularly, the rotation of knob **18** causes wheel **44** to drive each of the discs **32** to a like extent. By means of this device, it will thus be seen that once the individual audio volume is set for each discrete amplifier, the master control knob **18** may be turned in either of its directions to vary the effective volume level of all of the individual controls, conjunctively.

It will further be understood by those skilled in the art that each of the four potentiometers **31** of the overall control device is constructed in such a manner that it includes stops (not shown) for limiting the angular rotation of the potentiometer shaft **30**. In accordance with my invention, the rotation of master control shaft **42** by knob **18** may concurrently drive the four individually operable shafts **30** so that they each have the same orientation relative to their associated stops.

It will now, therefore, be seen that my new and improved control device as illustrated herein provides a simplified and effective means for mechanically conjointly adjusting a plurality of individually adjustable controls. It will be further understood that the control mechanisms incorporating my invention are of extremely simplified construction and of relatively low cost.

While in accordance with the patent statutes, I have described what at present is considered to be the preferred embodiment of my invention, it will be obvious to those skilled in the art that various changes and modifications may be made therein without departing from my invention, and I, therefore, aim in the following claims to cover all such equivalent variations as fall within the true spirit and scope of this invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In a control device having a plurality of individual manually controllable mechanisms, a master control mechanism for conjointly operating each of said individual control mechanisms, said master control mechanism comprising a rotatable driving wheel in continuous frictional engagement with each of said individual control mechanisms, whereby the operation of said master control mechanism uniformly adjusts the settings of the individual control mechanisms but is not affected when each of said individual control mechanisms is adjusted.

2. In a control device having a plurality of individual manually controllable mechanisms, each of said individual mechanisms including a manually operable shaft, a master control mechanism for conjointly operating each of said individual control mechanisms, said master control mechanism comprising a rotatable driving wheel in continuous frictional mating engagement with the periphery of a disc on a shaft of each of said individual control mechanisms, whereby the operation of said master control mechanism uniformly adjusts the settings of the individual control mechanisms but is not affected when each of said individual control mechanisms is adjusted.

3. The device of claim **2** wherein there are at least four individual manually controllable mechanisms each of which includes said shaft and said disc, the four discs of said individual mechanisms each having the same peripheral diameter and being rotatable about axes parallel to the axis of rotation of the driving wheel.

References Cited by the Examiner

UNITED STATES PATENTS

2,859,627	11/1958	Gallop	74—16
3,101,628	8/1963	Shelley et al.	74—10.45 X
3,236,110	2/1966	Clark	74—10.27

MILTON KAUFMAN, *Primary Examiner.*