

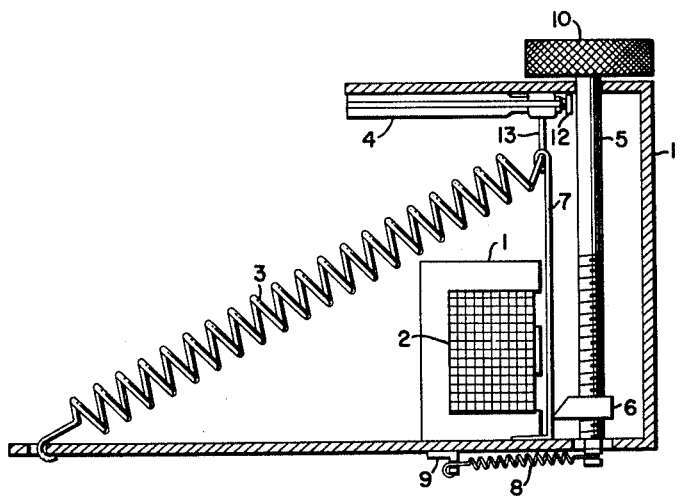
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ELECTRICAL SIGNAL DELAY DEVICE

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ELECTRICAL SIGNAL DELAY DEVICE

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7 Claims. (Cl. 333—30)

My invention relates to electrical signal delay devices and more particularly to cause electrically amplified sounds to be delayed for a time interval.

The object of my invention is to cause a more pleasing sound of music or speech when listened to through a phonograph, radio, television set or public address system.

More specifically, my invention will give an echo effect when used in conjunction with a phonograph, radio, television set or public address system by receiving signals or electrical impulses and storing them for a time interval by mechanical means and then releasing them in the form of delayed electrical signals to be superimposed upon the original signal as it is transmitted to a sound reproducing means. The accompanying drawing illustrates the method of operation of my invention.

The drawing shows an elevation view of the electrical signal delay device, which comprises a coil of wire 2 around an iron core 1. An electrical signal from the amplifier of a phonograph, television set, radio, public address system or other desired source is passed through coil 2. This current in coil 2 sets up a magnetic field around iron core 1 that causes a steel reed 7 or armature to vibrate in proportion to the intensity of the current passed through coil 2. These vibrations are transmitted through reed 7 to steel spring 3 which has one end fastened to the upper or free end of reed 7 and its other end fastened to a fixed support such as the mounting means 11. These delayed vibrations are transmitted to cartridge 4 through an extension 13 of the spring 3 which passes through and is secured in an eye at the upper end of reed 7 and fastens into cartridge 4 with set screw 12.

Cartridge 4 causes the primary vibrations of the reed 7, and the vibrations which are generated in the spring 3 by the reed, to be changed into electrical impulses which can be fed into another amplifier for operation of a loud speaker, or these impulses can be fed back to the original amplifier which energizes coil 2. If spring 3 and reed 7 are allowed to vibrate free, a feed back squeal will result except for a signal of low intensity fed into coil 2.

In order to damp out unwanted vibrations and eliminate the feed back squeal, damper 6 is adjustable to move up and down reed 7 by means of turning knob 10 connected to screw 5. Screw 5 passes through a threaded hole in damper 6 and damper 6 can be raised or lowered by turning knob 10. With low intensity signals damper 6 should be positioned at the lower end of reed 7 in order for spring 3 to receive sufficient vibration intensity from reed 7 to set up a sustained vibration strong enough to cause cartridge 4 to generate an electrical impulse of sufficient strength. When a signal of high intensity is fed into coil 2, it causes reed 7 to vibrate spring 3 to a point that a sustained oscillation occurs that feeds on itself and a loud squeal results. To eliminate the objectionable feed back, damper 6 is raised to a point along reed 6 where the objectionable oscillations are damped out and only the desired vibrations from spring 3 are transmitted to cartridge 4 and changed into a usable electrical impulse. Damper 6 also regulates the vibration period of spring 3.

In order to maintain the proper tension between damper 6 and reed 7, spring 8 is fastened to the lower end of screw 5 and to bracket 9. The lower end of screw 5 passes through a slightly elongated hole in the bottom of the mounting means 11 in order that screw 5 and damper 6 can have freedom of movement back and forth and have the proper damping action on reed 7 and spring 3.

As various changes could be made in the above described construction without departing from the scope of the invention, such as changing the vibrating elements in shape and material or other changes, it is intended that all matter contained in the above description or shown in the accompanying drawing shall be interpreted as illustrative and not in a limiting sense.

I claim:

1. An electrical signal delay device comprising an electromagnet adapted to be energized by electrical signals of varying intensity of audio frequency, said electromagnet having a central pole, a flexible elongate reed of magnetic material extending transversely across said pole in spaced relation therewith, said reed having one of its ends fixed relative to said electromagnet, means operatively connecting the other end of said reed to a mechanico-electric transducer, a damper disposed to engage said reed at a predetermined location intermediate its ends, and means for adjusting said damper longitudinally of said reed.

2. The device defined by claim 1 including means for resiliently urging said damper into engagement with said reed.

3. An electrical signal delay device comprising an electromagnet having a central pole surrounded by an energizing coil, support means for said electromagnet, an elongate resiliently flexible reed of magnetic material disposed transversely across an end of said pole to function as an armature for vibratory activation by said electromagnet, said reed having one end fixed relative to said electromagnet, means operatively connecting the other end of said reed to a mechanico-electric transducer for activating the same, and a helically coiled spring having one end attached to said support means and its opposite end attached to said reed adjacent the said other end thereof, said spring being adapted to be vibrated by said reed to provide a reverberation effect as an addition to the vibrations of the reed produced by said electromagnet.

4. The device defined by claim 3 including a damper to engage said reed intermediate its ends, said damper being adjustable longitudinally of said reed.

5. The device defined by claim 3 wherein the reed is a flat strip having one face opposed to the ends of said pole.

6. The device defined by claim 5 wherein a damper is provided to engage the reed intermediate its ends, and wherein the damper is disposed to engage the other face of said reed and is adjustable longitudinally of the reed.

7. An electrical signal transmission device comprising an electromagnet adapted to be energized by electrical signals of varying audio frequency, support means for said electromagnet, an armature arm mounted for vibratory activation by said electromagnet, means operatively connecting said armature arm to a mechanico-electric transducer for direct actuation thereof in response to said signals, and a helically coiled vibratory spring extending in a direction corresponding to a component of the motion of said arm and having one end attached to said support means and its opposite end attached to said

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armature arm, whereby the vibration of said spring will add a time delayed signal to the primary signal produced by the electromagnetic actuation of the armature arm.

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