June 21, 1955 G. STEINEGGER 2,711,445

SOUND RECORDING AND REPRODUCING DEVICE

Filed March 27, 1951

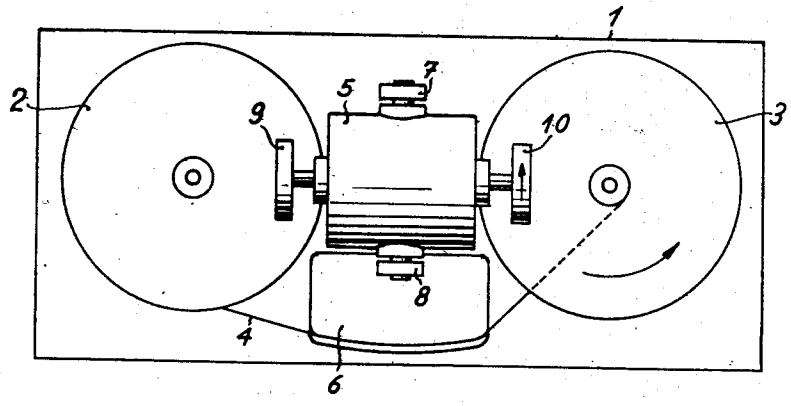


Fig. 1

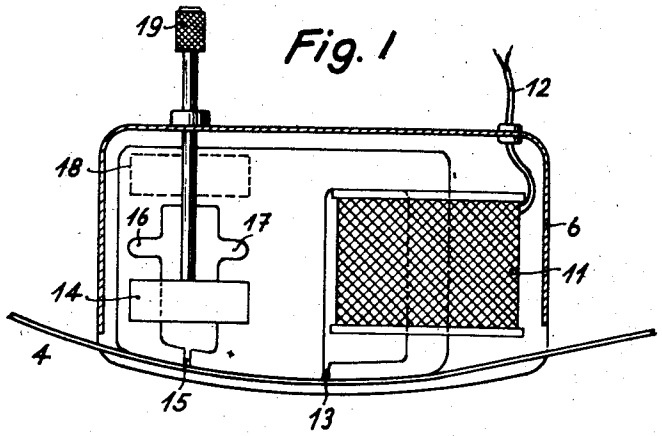


Fig. 2

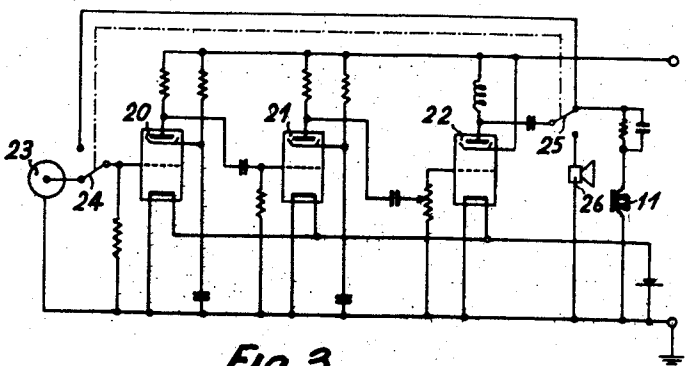


Fig. 3

INVENTOR.

Giovanni Steinegger

By Bryant & Lowry

Attys.

United States Patent Office 2,711,445
Patented June 21, 1955

2,711,445

SOUND RECORDING AND REPRODUCING DEVICE

Giovanni Steinegger, Aurigeno, Switzerland

Application March 27, 1951, Serial No. 217,709
3 Claims. (Cl. 179—100.2)

The invention concerns an improvement of the sound recording and reproducing device, pocket type, provided with miniature electronic valves. It is characteristic for this construction that the sound head is assembled with a cancelling magnet which is provided with a permanent magnet, movable on its supports.

The attached drawing shows diagrammatically a possible construction of the present invention.

Fig. 1 is a plan view of the steel sound recording and reproducing device, with the lid removed.

Fig. 2 is the electro-magnetic sound head, combined with the cancelling magnet.

Fig. 3 is the circuit diagram.

In Fig. 1, the number **1** indicates the casing of a steel sound recording and reproducing device, with the lid removed, so that two sound carrier spools **2** and **3**, which serve to coil and uncoil a sound carrier **4**, can be seen, as well as a motor **5** and a sound head case **6**. Motor **5** is pivoted on **7**, **8** in the centre of the stator and its shaft has at each end a rubber roller **9**, **10**. Fig. 1 shows sound carrier **4** coiled on sound carrier spool **2**. In order to coil it on sound carrier spool **3**, it is sufficient to swivel motor **5** so that the right hand rubber roller **10** drives the sound carrier spool **3** in the direction indicated by the arrow. It is obvious that when motor **5** is moved into the other position, sound carrier spool **2** is driven by the motor in a direction opposite to the the direction of rotation indicated for spool **3**. The sound carrier **4** moves in a guide in sound head case **6**, so that it moves always in a favourable position in front of a sound head inside the sound head case **6**.

Fig. 2 shows the sound head case **6** on a larger scale, with the lid removed. On the right hand side is a field coil **11** with terminal leads **12**. The air gap of the sound head is shown at **13**. In accordance with the present invention there is in the same case a cancelling magnet, provided with a movable permanent magnet **14**. Sound head and cancelling magnet may have two separate iron cores. It is however better to use for both components a continuous piece of metal plate. Fig. 2 shows the permanent magnet **14** in that one of its final positions where it is nearest to the air gap, or to the pole shoes of the cancelling magnet. The magnetic lines of force induced by the permanent magnet in the iron of the cancelling magnet are concentrated mainly in the pole shoes and the air gap **15**, as the punched openings **16**, **17** put a high reluctance into the path through the yoke of the cancelling magnet. Consequently, sound carrier **4**, which is moved closely in front of air gap **15**, will be magnetised by the magnetic lines of force of the cancelling magnet and the magnetic recordings on the sound carrier will be deleted. In the other final position of the permanent magnet, shown in dotted lines (**18**), it is over the yoke of the cancelling magnet, and the magnetic lines of force of the permanent magnet are concentrated mainly in the yoke iron. A relatively weak magnetic field in the air gap **15** produces merely a weak premagnetisation of sound carrier **4**.

The movement of the permanent magnet **14** is effected by hand, through handle **19**. It can also be made automatic if the permanent magnet is connected by known methods to the pivoted motor **5**, so that to each of the two positions of the motor corresponds one or the other position of the permanent magnet. The proportions could then be chosen so that when motor **5** drives carrier spool **2**, permanent magnet **14** is near air gap **15**, but that it is in position **18**, shown by dotted lines, when sound carrier spool **3** is driven.

Fig. 3 shows a circuit diagram of a three-stage amplifier, which is employed in the instrument which is the subject of the present invention. There is an already known type of amplifier in resistance-capacity coupling with three electronic valves **20**, **21** and **22**. To the input side of valve **20** a receiving microphone is connected, which can be connected through a change-over switch to the control grid of this valve. Another change-over switch **25** is connected to the output side of the amplifier and serves to connect either a loudspeaker **26** or the field coil **11** to the amplifier. The two change-over switches **24** and **25** are connected mechanically so that either microphone **23** is connected to the first control grid and the amplifier output and is connected to the field coil **11**, or the field coil **11** is connected to the first control grid and the amplifier output end is connected to the loudspeaker **26**. It is interesting to note, in connection with this wiring scheme, that the high frequency generator, which is usually provided to energise the cancelling magnet, is not required here, a simplification which is of special importance for a pocket instrument, as such a high frequency generator develops a large power output which considerably reduces the life of the dry batteries. The electronic valves are of the miniature type, which require only a small heating current and a small anode voltage. These connections are in a special compartment in the instrument, which is below the mechanical part of the instrument, shown in Fig. 1.

While the invention has been described in detail with respect to a now preferred example and embodiment of the invention it will be understood by those skilled in the art after understanding the invention, that various changes and modifications may be made without departing from the spirit and scope of the invention and it is intended, therefore, to cover all such changes and modifications in the appended claims.

Having thus described my invention, I claim as new and desire to secure by Letters Patent:

1. A magnetic transducer head for magnetic recorders and reproducers, comprising a magnetically permeable core structure defining a pair of air gaps, a field coil arranged to produce flux in one of said gaps, a permanent magnet arranged to produce an erasing flux in the other air gap, and means for moving said permanent magnet to a position away from said other air gap and in which latter position it is shunted by said core structure.

2. In a magnetic sound recorder, an erasing device comprising a magnetically permeable core defining a yoke portion and leg portions having an air gap therebetween, and a permanent erasing magnet movable from a position bridging said leg portions adjacent said gap to a position paralleling said yoke portion remote from said gap.

3. An erasing device in accordance with claim 2, in which at least one of said leg portions is of reduced cross-section at a point remote from said air gap, to provide a path of increased reluctance through said air gap when said magnet is positioned adjacent said yoke portion.

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