

"PORTABLE SOUND REPRODUCING APPARATUS FOR USE
IN KARAOKE"

The present invention relates to a portable sound reproducing apparatus for use in karaoke having a microphone, a speaker, and means for accommodating a medium such as a magnetic tape on which sound has been recorded.

The apparatus in accordance with the present invention is used mainly for the purpose of so-called karaoke, i.e. singing to a cassette-recorded orchestral accompaniment of a tune.

A so-called karaoke apparatus is known which is adapted to reproduce a melody which has been recorded on a magnetic medium such as a magnetic tape and to allow a person to input his voice through a microphone formed as a separate member, thereby allowing the person to sing a song through the speaker while the accompaniment is reproduced from the said magnetic tape.

However, the known apparatus is very large in size and weighs at least several kilograms and is so heavy that an adult can barely carry it. Since it is used as a floor mounting type of apparatus, the known karaoke apparatus has been very inconvenient and difficult to carry.

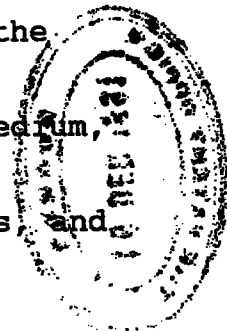
In addition, other apparatuses are known such as, on the one hand, a radio cassette tape recorder incorporating a radio and a cassette tape recorder, and, on the other hand, a portable cassette tape recorder which mainly has a reproducing function and the size of which is made small enough to allow the apparatus to be put in a pocket of a jacket or the like [e.g. a "Walkman" (a trademark of Sony Corporation)].

However, the radio cassette tape recorder is both large in size and heavy so that it is unsuitable to perform karaoke with the apparatus held in one hand, and is poor in terms of operational features and portability. On the other hand, the compact cassette tape recorder does not have a speaker which is capable of amplifying sounds in a relatively wide range for so-called karaoke or the like, and cannot therefore be used for the purpose of karaoke.

According to the present invention, there is therefore provided a portable sound reproducing apparatus for use in karaoke comprising accommodating means for accommodating a medium on which sound has been recorded; sound signal production means arranged to produce a signal in response to a recording on said medium; a microphone for receiving an external sound; a speaker for amplifying and reproducing the sound signals produced by the sound signal production means and/or by said microphone; and a grip portion by the sole means of which the whole apparatus is arranged to be supported by one hand only while performing karaoke; the microphone being secured in fixed relationship with the apparatus so as to be disposed at the upper end of the apparatus while the latter is supported solely by the grip portion.

In an apparatus according to the present invention, the microphone and the speaker are preferably spaced apart from each other such a distance that no howling occurs.

Furthermore, in an apparatus according to the present invention, the sound recording medium is preferably constituted by a magnetic recording medium, the sound signal production means is preferably constituted by magnetic recording detection means, and



the speaker preferably has a magnet, the speaker being preferably so disposed as to be spaced apart from the sound signal production means by a distance that does not impair the characteristics of the latter.

5 In addition, in an apparatus according to the present invention, the sound signal production means and the microphone may be disposed in the accommodating means, and the grip portion may be spaced apart from the accommodating means.

10 Thus, since the speaker for amplifying and reproducing the sound from the sound signal production means and/or from the microphone is formed integrally therewith, it is possible to arrange a compact and portable sound reproducing apparatus. Additionally, the
15 speaker may have a capacity sufficient to make the reproduced sound audible within a range of several meters therefrom so that the apparatus can be used for so-called karaoke.

20 If the microphone and the speaker are spaced apart from each other by such a distance that no howling occurs, the reproduced sound and input speech (voice) to the microphone can be reproduced satisfactorily.

25 In accordance with a preferred aspect of the invention, as the sound recording medium is constituted by a magnetic recording medium, and the sound signal
30 production means is magnetic in character, it is possible to use a magnetic tape or the like. When the sound is reproduced and amplified by a speaker provided with a magnet, as the speaker is spaced apart from the sound signal production means by a distance that does not impair the characteristics of the latter, the function of the magnetic sound signal production means (magnetic head or the like) is not impaired due to the magnet of the speaker.

In addition, if the grip portion is disposed between the speaker and the accommodating means where the sound signal means is disposed, the apparatus has excellent portability and howling is controlled.

5 The invention is illustrated, merely by way of example, in the accompanying drawings, in which:-

Figure 1 is a schematic diagram of one embodiment of a portable sound reproducing apparatus in accordance with the present invention;

10 Figures 2 and 3 are diagrams schematically illustrating another embodiment of the apparatus of the invention;

15 Figures 4(a) to 4(d) are diagrams schematically illustrating still another embodiment of the apparatus of the invention, in which Figure 4(a) is a diagram of its external appearance, Figure 4(b) is a cross-sectional view, and Figures 4(c) and 4(d) are diagrams illustrating a melody card used in the apparatus of the invention;

20 Figure 5 is a diagram schematically illustrating a further embodiment of the apparatus of the invention;

25 Figures 6(a) and 6(b) are diagrams schematically illustrating a still further embodiment of the apparatus of the invention, in which Figure 6(a) is an external view, while Figure 6(b) is a partial schematic diagram;

Figure 7 is a diagram schematically illustrating a further embodiment of the apparatus of the invention;

30 Figures 8(a) and 8(b) are diagrams schematically illustrating a further embodiment of the apparatus of the invention, in which Figure 8(a) is an external view, while Figure 8(b) is a cross-sectional view;

Figure 9 is a diagram schematically illustrating a further embodiment of the apparatus of the invention; and

Figure 10 is a diagram schematically illustrating a further embodiment of the apparatus of the invention.

Figure 1 is a schematic diagram of a first embodiment of a portable sound reproducing apparatus in accordance with the present invention.

The apparatus shown in Figure 1 has a grip portion 2 interposed between a speaker 3 and a magnetic recording medium accommodating portion 1 for accommodating a magnetic recording medium such as a magnetic tape 11. The magnetic tape 11 is placed in a cassette case 12 and can be detachably accommodated in the magnetic recording medium accommodating portion 1 together with the cassette case 12. Music (melody), voice or the like is recorded on the magnetic tape 11, and the recorded information is detected by a magnetic sound signal production head 13 which is responsive to a recording on the magnetic tape 11, its sound signals being reproduced and amplified by the speaker 3. A microphone (voice detecting means) 4 is provided in proximity to the magnetic recording medium accommodating portion 1. The voice input unit 4 can be used for the purpose of so-called karaoke, allowing voice to be input in tune with music when the musical information recorded on the magnetic tape 11 is amplified by the speaker 3 via the magnetic head 13, the voice being also amplified together with music by the speaker 3. Incidentally, it is desirable for the speaker 3 to have a size sufficient to allow the apparatus to be used for a small party or the like so that the sound can be heard over a wide range at least to a certain extent.

In addition, a fixed size is in practice also required for the magnetic recording medium accommodating portion 1 since the size of the magnetic tape 11 or the cassette case 12 accommodating the magnetic tape 11 is

fixed.

The grip portion 2 is interposed between the magnetic recording medium accommodating portion 1 and the speaker 3. Batteries 5 serving as a power source for the overall apparatus may be accommodated in this portion. In addition, in order to improve the operating efficiency, switches 21 may be provided for, among others, the turning on and off of the power source and fast forward, stop, and (fast) rewind of the tape, and the switching over of sounds from the magnetic tape 11 and/or the voice input unit 4 with respect to the sounds that are amplified through the speaker 3.

The magnetic tape 11 comprises a known tape in which information such as music is recorded magnetically on a coating of magnetic particles thereon.

In addition, the magnetic head 13 is adapted to detect the magnetic information written on the magnetic tape, and may be such as is generally used for a (cassette) tape-recorder, a radio cassette tape-recorder or the like. There are cases where a magnetic head is weak in the presence of a powerful magnetic force, making the detection of magnetism inaccurate. In the embodiment of Figure 1, since the speaker 3 and the magnetic recording medium accommodating portion 1 having the magnetic head 13 are spaced apart from each other via the grip portion 2, it is ensured that the performance of the magnetic head 13 will not become inaccurate or deteriorate by virtue of the magnetic force generated by a powerful magnet provided in the speaker 3.

As the speaker, one which is similar to the one used for a tape-recorder or the like may be used. In other words, a powerful magnet and a diaphragm for vibrating the air are provided thereon.

The microphone used in the voice input portion may be one used for a radio cassette tape-recorder, a known microphone, or the like, the microphone having a diaphragm which vibrates when a voice or the like is inputted, the vibration being converted into an electrical signal, thereby allowing voice or the like to be inputted.

If the microphone 4 and the speaker 3 are provided in proximity with each other, a so-called howling occurs. However, since the speaker 3 and the voice input portion 4 provided on the magnetic recording medium accommodating portion 1 are spaced apart from each other via the grip portion 2, the so-called howling can be prevented.

The magnetic recording medium accommodating portion 1 and the speaker 3 require certain cross-sectional areas or greater in view of the size of the cassette and in order to maintain the amplification performance above a fixed level. However, since no such restrictions are imposed on the grip portion 2, it is possible to make its width and cross-sectional area smaller than those of the magnetic recording medium accommodating portion 1 and/or the speaker 3. In this arrangement, it is ensured that neither the accommodating portion 1 nor the speaker 3 is likely to be gripped inadvertently, with the result that a handling error is unlikely to occur.

The batteries 5 used as the power source for the apparatus, such as dry cells, may be accommodated in the grip portion 2. If the batteries 5 are accommodated therein, even if the grip portion 5 is gripped firmly, the compression is restricted by the batteries making it possible to prevent the apparatus from breaking.

A magnet is accommodated in the speaker 3, but, in

order to ensure that the voice input unit 4 will be properly disposed in use, it may be arranged that one end of the apparatus is made heavy by using a powerful magnet to secure the amplification performance of the speaker, and the magnetic sound recording medium accommodating portion 1 at the other end thereof is made light so that when the apparatus is carried by one hand for the purpose of karaoke, the speaker 3 is heavy and is naturally positioned downwardly, while the magnetic recording medium accommodating portion 1 is positioned upwardly.

In addition, if the overall apparatus is formed in an elongated configuration in such a way that the magnetic sound recording medium accommodating portion 1, the grip portion 2, and the speaker 3 are arranged linearly, it is possible to prevent a deterioration of the performance of the magnetic head due to the magnetic force of the magnet provided in the speaker as well as a howling occurring due to the voice input unit 4 being disposed in proximity to the speaker 3. If an arrangement is provided such that the apparatus is made difficult to stand when an attempt is made to set the magnetic sound recording medium accommodating portion 1 (or the speaker 3) upwardly with the speaker 3 (or the accommodating portion 1) set as the bottom, the apparatus can always be kept laid down when it is not being carried. This arrangement makes it possible to prevent the breakage of or damage to the apparatus which can occur when the apparatus falls if it is stood against something. In order to make the apparatus difficult to set upright, it suffices if the contacting area of the bottom is made small with the speaker 3 or the magnetic sound recording medium accommodating portion 1 as the bottom. For instance, the bottom may

be formed with a slightly pointed configuration or a round configuration.

Although in the above-described embodiment, a description has been given by citing a magnetic tape as the magnetic medium, a medium such as a magnetic record may also be used. In this case as well, a magnetic head is also naturally required.

The overall apparatus may be formed of a plastic or a metallic plate case. In such a case, if an arrangement is provided such that the overall apparatus can be largely split into two, it is possible to enhance the strength of the apparatus whose overall strength is small due to the provision of the elongated portion of the grip portion 2. In that case, the two split lines may be provided in such a manner that the respective portions of the magnetic sound recording medium accommodating portion 1, the grip portion 2, and the speaker 3 are split into two and, at the same time, the overall apparatus is split into two. Specifically, the overall apparatus is arranged to be split along a dividing line A shown in Figure 1. If this arrangement is adopted, moulding can be facilitated, and assembly can also be facilitated.

It should be noted that a circuit unit for effecting the reproduction and amplification of a magnetic recording can be provided on the rear side of the speaker 3 or in the accommodating portion 1, or it may be provided in the grip portion 2.

Thus, the apparatus shown in Figure 1 comprises the grip portion 2, the sound recording medium accommodating portion (magnetic recording medium accommodating portion) 1 provided above the grip portion 2, the voice input unit 4 which is provided above the accommodating portion 1, and the speaker 3.

provided below the grip portion 2.

As shown in the second embodiment of Figure 2, instead of a magnetic tape, a CD record 111 may be used as the sound recording medium. The detection of the recorded sound on the record 111 is effected by a detection head 130 which is adapted to detect irregular surfaces by being brought into contact with the record surface through application of a laser beam thereto and detection thereof. It should be noted that the insertion and withdrawal of the CD record 111 are effected through an insertion port 112 provided in a side portion of the accommodating portion 1.

As shown in the third embodiment of Figure 3, a card-type sound recording medium 211 constituted by an IC card incorporating a memory IC is used as the sound recording medium. An insertion port 212 for effecting insertion and withdrawal is provided for the IC card 212 in a side portion of the accommodating portion 1. A terminal 214 is provided in a side portion of the IC card, and is coupled with a corresponding terminal coupling portion of the apparatus at the time of insertion of the IC card, allowing the contents of the memory to be read. The IC card 211 is provided with a liquid crystal panel display 213, and the number of a tune is displayed thereon. The display 213 can be viewed through a transparent window 215 provided in the accommodating portion 1.

Figures 4(a) to 4(d) show a fourth embodiment of a portable sound reproducing apparatus using a melody card, in which Figure 4(a) is a diagram illustrating an outer appearance of the apparatus, Figure 4(b) is a side cross-sectional view, and Figures 4(c) and 4(d) are diagrams illustrating an obverse surface and a reverse surface of the melody card, respectively. As shown in

Figure 4(a), the apparatus is provided with the microphone 4 which is spaced apart from the speaker 3 by a fixed distance. The grip portion 2 is provided with an uneven surface such as one having grooves, thereby allowing the user to hold the grip portion 2 easily. The grip portion 2 also has within it the accommodating portion 1 for the batteries 5. An amplification circuit and the like are provided in a space on the rear side of the speaker 3. A melody card 6 is inserted into a melody card insertion case 66 provided on the rear surface of the accommodating portion 1. The melody card 6 is inserted in such a way that its obverse surface shown in Figure 4(c) faces the right-hand side of Figure 4(b). An IC 61 in which melodies are stored is mounted on the melody card 6, and a number is displayed on a number display 62 constituted by a liquid crystal panel as a number selection switch 63 is pressed in accordance with a number printed portion 65 which is printed on the reverse surface of the melody card 6. A power source constituted by a button-type battery or the like is also incorporated in the melody card 6. The melody card 6 is inserted from the speaker 3 side, and a terminal 65 is provided at a terminal portion thereof and is coupled with a terminal provided on the apparatus body.

In this embodiment, the melody card insertion case 66 may be provided in the accommodating portion 1 of the apparatus for accommodating the batteries 5.

In addition, a magnetic card may be used instead of the IC card.

As described above, the apparatus comprises the grip portion 2 which also has mounted within it the sound recording medium accommodating portion 1, the speaker 3 is provided above the grip portion 2, and the microphone 4 serving as the voice input unit is provided in an

extended portion above the speaker 3.

Figure 5 illustrates a fifth embodiment of the apparatus in which a cassette-type magnetic tape or a CD record is used instead of the melody card used in the recording and reproducing apparatus shown in Figures 4(a) to 4(d). Although the overall arrangement is similar to the one shown in Figures 4(a) to 4(d), an accommodating portion 14 for accommodating a magnetic tape (or a CD record) and a driving portion 141 for driving the magnetic tape (or the CD record) are provided in the lateral direction of the apparatus having a small thickness, as illustrated in Figure 5.

Figures 6(a) and 6(b) illustrate a sixth embodiment in which the microphone 4 is provided on the rear side (shown in Figure 6(b)) of the speaker 3. Although the microphone 4 and the speaker 3 are disposed in proximity to each other, since the side where the microphone 4 is provided is the one which is remote from the side where the speaker 3 is provided, howling is unlikely to occur. The distal end portion of the microphone 4 is spherical in shape, and the microphone 4 is accommodated in a cavity 41 provided in the apparatus body and has an extent such that the distal end portion thereof is remote from the speaker 3.

Figure 7 illustrates a seventh embodiment in which the microphone 4, the speaker 3, and the magnetic tape 11 constituting the sound recording medium are incorporated in a box-shaped case having a substantially rectangular parallelepiped configuration. The grip portion is constituted by a central part of the apparatus. This arrangement helps to improve the stability of the apparatus.

The eighth embodiment shown in Figures 8(a) and 8(b) is arranged such that the microphone 4 and the

speaker 3 are spaced apart from each other, a space 100 is provided between the grip portion 2 and the accommodating portion 1 for accommodating a cassette-type sound recording medium such as a magnetic recording medium by providing the accommodating portion 1 with a curved surface so that the amplified sound from the speaker 3 reverberates for producing an acoustic effect. The batteries 5 are accommodated in the grip portion 2. Figures 8(a) and 8(b) illustrate the outer appearance and the internal structure, respectively.

As is apparent from the drawings, the apparatus comprises a bar-shaped grip portion 2 provided with the microphone 4, i.e., the voice input unit, at an upper end thereof as well as the sound recording medium accommodating portion 1 provided in such a way as to project forwardly of the grip portion 2. As described before, the speaker 3 is provided in front of the sound recording medium accommodating portion 1, so that the sound from the speaker 3 can be transmitted well in the forward direction. If the speaker 3 is disposed on the lower part of the accommodating portion 1, the microphone 4 and the speaker 3 can be spaced apart from each other, thereby making it possible to minimize the effect of howling or the like.

This apparatus can be operated by being held with one hand in the same manner as a beer mug is held.

If the bottom of this apparatus is made flat, the apparatus can be placed upright on a desk, a floor, a mat, or the like when not in use.

Conversely, if the bottom is made spherical or is made to project so that the apparatus cannot be placed upright, and is always laid down when not in use, it is possible to prevent any damage caused to the microphone 4 and the like due to the falling of the apparatus.

Figure 9 illustrates a ninth embodiment of the apparatus in accordance with the present invention. The microphone 4 and the speaker 3 are respectively disposed at the opposite ends of the apparatus. A sound recording medium such as a magnetic tape is accommodated in the accommodating portion 1 which is disposed obliquely. The grip portion 2 is held by, for instance, the left hand, and the switches 21 which are disposed on the side of the apparatus, are operated by a right-hand finger so as to effect the replay, rewind, fast forward, etc. of the tape.

As illustrated in the drawing, the apparatus of this embodiment comprises the grip portion 2, the recording medium accommodating portion 1 disposed forwardly and upwardly of the grip portion 2; the microphone 4, i.e. the voice input unit, disposed on an upper portion of the accommodating portion 1; and the speaker 3 disposed forwardly and downwardly of the grip portion 2.

Figure 10 illustrates a tenth embodiment of the apparatus in accordance with the present invention. Although the apparatus shown in the drawing is similar to the one shown in Figure 1 in that the microphone 4 and the speaker 3 are provided at the opposite ends of the apparatus, a protruding shaft portion 200 is provided which extends from the accommodating portion 1 to the speaker 3. This shaft portion 200 serves to reinforce the grip portion 2 so that the apparatus will not be bent or broken at the grip portion 2.

In those embodiments described above, in which a grip portion for carrying the apparatus is provided between the magnetic recording medium accommodating portion and the speaker, the apparatus has excellent portability, and it is possible to prevent so-called howling and to prevent deterioration in the performance.

of the magnetic head.

As the cross-sectional area of the grip portion is made smaller than those of the speaker and the magnetic recording medium accommodating portion, it is possible to secure a sufficient accommodating area for the magnetic medium, thereby making it possible to provide various characteristics such as the reproduction and amplification of sounds above the level of fixed qualities.

If the speaker is made heavier than the magnetic medium accommodating portion, when the apparatus is carried, the user is prevented from mistaking the position of the voice input unit disposed in proximity to the accommodating portion.

If the apparatus is so arranged that it is difficult to stand with the speaker or the magnetic recording medium accommodating portion set at the bottom, when the apparatus is temporarily placed on a desk, a floor, or the like, it is possible to prevent the apparatus from being placed in an unstable state, thereby preventing any damage to the apparatus.

If the grip portion is disposed between the microphone and the speaker, the apparatus has excellent portability, and the howling can be controlled.

CLAIMS

1. A portable sound reproducing apparatus for use in karaoke comprising accommodating means for accommodating a medium on which sound has been recorded; sound signal production means arranged to produce a
5 signal in response to a recording on said medium; a microphone for receiving an external sound; a speaker for amplifying and reproducing the sound signals produced by the sound signal production means and/or by said microphone; and a grip portion by the sole means of
10 which the whole apparatus is arranged to be supported by one hand only while performing karaoke; the microphone being secured in fixed relationship with the apparatus so as to be disposed at the upper end of the apparatus while the latter is supported solely by the grip portion.
- 15 2. Apparatus as claimed in claim 1 in which the apparatus is substantially symmetrical about a centre line extending longitudinally through the grip portion.
3. Apparatus as claimed in claim 1 or 2 in which the microphone and speaker are disposed at opposite ends
20 of the apparatus.
4. Apparatus as claimed in any preceding claim in which the distance between the microphone and the speaker is such that, in use, substantially no howling occurs.
- 25 5. Apparatus as claimed in any preceding claim in which the grip portion is disposed between the speaker and microphone.
6. Apparatus as claimed in any preceding claim in which the width of the grip portion is less than of
30 either the accommodating means or the speaker.
7. Apparatus as claimed in any preceding claim in which a battery is housed in the grip portion.



8. Apparatus as claimed in any preceding claim in which switch means for operating the sound signal production means are disposed on the side of the apparatus.

5 9. Apparatus as claimed in any preceding claim in which the bottom of the apparatus is not flat.

10. Apparatus as claimed in any preceding claim wherein said sound recording medium is constituted by a magnetic sound recording medium, said sound signal production means is constituted by magnetic sound signal production means, and said speaker has a magnet, said speaker being spaced apart from said sound signal detection means by a distance that does not impair the characteristics of the latter.

15 11. Apparatus as claimed in any preceding claim in which the accommodating means is disposed in the grip portion.

12. Apparatus as claimed in any of claims 1, 3, 4 and 5 in which the apparatus has a bar-shaped grip portion provided with a microphone at an upper portion thereof; and a sound recording medium accommodating means disposed so as to project forwardly of said grip portion.

20 13. Apparatus as claimed in claim 12 in which a battery accommodating portion is provided in said grip portion.

14. Apparatus as claimed in claim 12 or 13 in which the speaker is provided forwardly of said sound recording medium accommodating means.

30 15. A portable sound reproducing apparatus for use in karaoke substantially as herein described with reference to and as shown in any of the accompanying drawings.

