A. FISCHER.

SOUND CONDUIT OR AMPLIFYING DEVICE FOR TALKING MACHINES AND THE LIKE.

APPLICATION FILED APR. 16, 1910.

1,029,002. Patented June 11, 1912

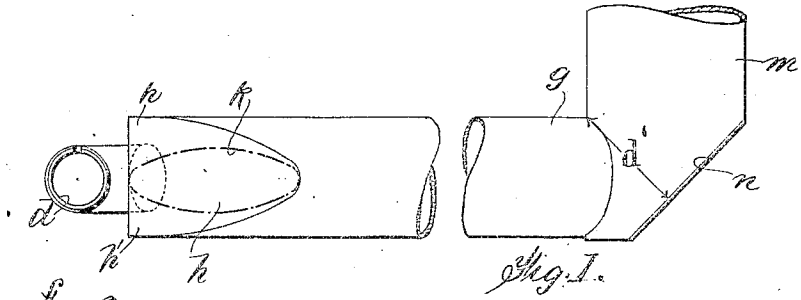

Fig. 1.

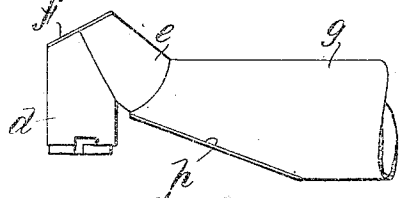

Fig. 2.

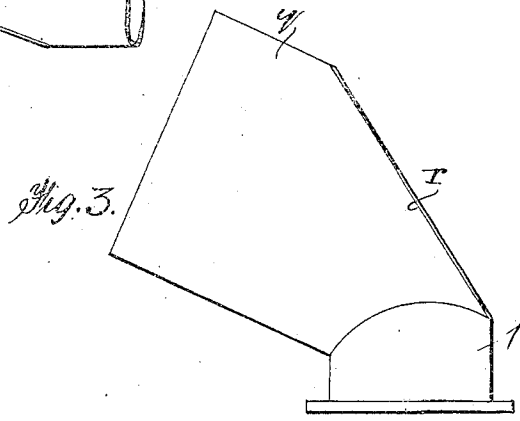

Fig. 3.

Witnesses:
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by Wickersham, Dixon & Whittemore
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UNITED STATES PATENT OFFICE.

ALEX FISCHER, OF WEST KENSINGTON, LONDON, ENGLAND.

SOUND-CONDUIT OR AMPLIFYING DEVICE FOR TALKING-MACHINES AND THE LIKE.

1,029,002. Specification of Letters Patent. Patented June 11, 1912.

Application filed April 16, 1910. Serial No. 555,776.

To all whom it may concern:

Be it known that I, ALEX FISCHER, a subject of the King of England, residing at 8 Maelise road, West Kensington, in the county of London, England, have invented certain new and useful Improvements in and Relating to Sound-Conduits or Amplifying Devices for Talking-Machines and the Like; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to sound conduits applicable to talking machines and the like in which one or more bends are formed for the purpose of directing the sound waves in the desired direction, and the object of my invention is to so form the bends that the sound waves may be passed through the conduit in straight lines without being compressed, intermingled or diffused and without being deflected against the side walls of the conduit.

In carrying out my invention each joint or bend in the conduit is provided with a reflecting surface which is inclined equally to the axes of both parts of the conduit on opposite sides of the bend so that the sound waves are reflected in straight lines parallel with the axis of the conduit. The cross sectional area of the conduit in the narrowest part of the bend is approximately the same as the cross sectional area of that part of the conduit from which the reflector receives the sound waves whereby such waves are transmitted without compression or diffusion. The reflecting surface is of such size as to receive all of the waves and directly transmit all of them to the next part of the conduit. The cross sectional area of the conduit at the narrowest part of the bend is approximately the same as the cross sectional area of that part of the conduit whence the sound waves proceed. The section of the conduit will in most cases consequently and relatively increase in size from the receiving to the discharge end in order to obtain the advantages above specified. By the construction explained, sound waves are transmitted without compression, deflection or diffusion, and these waves are discharged from the conduit with full volume of clear tone and of good quality.

In the accompanying drawings, Figure 1 shows a side elevation of a sound conduit with several bends made in accordance with my invention, such conduit being in this instance of suitable construction for the tone arm of a talking machine. Fig. 2 is a plan view of part of the conduit shown in Fig. 1. Fig. 3 shows an elbow joint suitable for connecting a tone arm with a trumpet.

The tube *d* is adapted to connect with a sound box of a talking machine and it joins a tube *e* which is arranged at an angle to the tube *d*. As shown, the axes of the two tubes are at an acute angle to each other. *f* is a reflecting surface between the two tubes. The tube *e* joins a tube *g* of larger diameter and at *h* is a reflecting surface which receives sound waves from the tube *e* and transmits them through the tube *g*.

In Fig. 1 the outlines of the projected surface, *i. e.* the surface upon which the sound waves passing from the tube *e* impinge, is shown by the dotted line *k*. This surface, while of sufficient size to receive all of the reflected waves, forms in this case a portion only of the larger surface opposite the tube *e*, the corners *h'* being left on the tube *g* to cheapen construction. The tube *g* is connected with a tube *m* of larger diameter and at right angles to the tube *g*, the reflecting surface *n* being set therefore at an angle of 45° to the axis of each of the tubes.

Referring to Fig. 3 the part *p* is adapted to connect with the part *m* in Fig. 1, and this part *p* connects with a part *q* of larger diameter, there being a reflecting surface *r* which receives all the sound waves passing out through *p* and transmits them through the part *q*. In each case the diameter of the two parts of the conduit on opposite sides of any joint or bend are of such relative size and the reflecting surface is of such proportions that the free space at the narrowest place between the angle of the bend and the reflector is about equal to the diameter of the smaller part of the conduit, *i. e.*, the part from which the sound waves pass on their way to the bend. For instance, as shown in Fig. 1, the part of the conduit indicated at *d'* is of the same or approximately the same cross sectional area as the part at *g*, and in all cases the construction is such that the sound waves, while being reflected in straight lines from one part of the conduit to the other, are never deflected in zig-zag lines against the side walls of the conduit, are never compressed by being passed through restricted parts thereof, nor

is the conduit so enlarged at the angles of the bends as to diffuse the sound waves unduly while they are having their directions changed by the reflectors.

It will be understood that the invention is applicable generally to sound conduits having a bend or bends or meeting at an angle, but in all cases the construction must be such that the smallest area at the bend, bounded by the tubes and the reflector, is about equal to the sectional area of the tube from which the sound is proceeding.

I claim as my invention:—

1. A sound conducting pipe, having a bend provided with a plane or flat reflecting surface inclined equally to the axes of both parts of the pipe on opposite sides of the bend so that the sound waves are reflected in straight lines parallel with the axis of the pipe, the free space or cross sectional area at the narrowest place between the angle of the bend and the reflector being approximately equal to the cross sectional area of that part of the pipe from which the sound waves pass on their way to the bend.

2. A sound conducting pipe, having a bend provided with a plane or flat reflecting surface inclined equally to the axes of both parts of the pipe on opposite sides of the bend so that the sound waves are reflected in straight lines parallel with the axis of the pipe, the parts of the pipe on opposite sides of the bend being of different diameters and the free space or cross sectional area at the narrowest place between the angle of the bend and the reflector being approximately equal to the diameter or cross sectional area of the smaller part of the pipe from which the sound waves pass on their way to the bend and such reflecting surface being of such dimensions as to receive all of the projected area from that part of the pipe from which the sound waves proceed.

3. A sound conducting pipe having a plurality of bends each of which bends is provided with a plane or flat reflecting surface inclined equally to the axes of both parts of the pipe on opposite sides of the bend so that the sound waves are reflected in straight lines parallel with the axis of the pipe, the free space or cross sectional area at the narrowest place between the angle of the bend and the reflector being approximately equal to the cross sectional area of that part of the pipe from which the sound waves pass on their way to the bend.

4. A sound conducting pipe having a plurality of bends, each bend being provided with a plane or flat reflecting surface inclined equally to the axes of both parts of the pipe on opposite sides of the bend so that the sound waves are reflected in straight lines parallel with the axis of the pipe, the parts of the pipe on opposite sides of the bend being of different diameters and the free space or cross sectional area at the narrowest place between the angle of the bend and the reflector being approximately equal to the diameter or cross sectional area of the smaller part of the pipe from which the sound waves pass on their way to the bend, and such reflecting surface being of such dimensions as to receive all of the projected area from that part of the pipe from which the sound waves proceed.

In testimony whereof, I affix my signature, in presence of two witnesses.

ALEX FISCHER.

Witnesses:
A. E. VIDAL,
L. SIMIND.