

# PATENT SPECIFICATION

859,031

DRAWINGS ATTACHED.

*Inventor*:—GEORGE RAOUL PONTZEN.



*Date of filing Complete Specification* : Sept. 29, 1959.

*Application Date* : Oct. 1, 1958. No. 31346/58.

*Complete Specification Published* : Jan. 18, 1961.

Index at Acceptance :—Class 40(4), G24(A4A : B1B), J(5D : 5E : 5S : 6F : 7K).

International Classification :—H04b, m.

## COMPLETE SPECIFICATION.

### Improvements in or relating to Microphones.

We, LUSTRAPHONE LIMITED, a British Company, of St. George's Works, Regent's Park Road, London, N.W.1, do hereby declare the invention, for which we pray that

5

a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to microphones.

10 According to the present invention there is provided microphone equipment comprising a microphone head having two microphones, four output wires, and a switch unit incorporating two switches, the switch unit

15 being arranged for selectively connecting the microphones to the output wires such that in one position of the first of the two switches the output voltage of one microphone is arranged to be applied to two of the wires

20 and the output voltage of the other microphone is arranged to be applied to the other two wires whilst in another position of the first switch the microphones are connected together in series to two of the wires, the

25 second switch serving for reversing the connections of one of the microphones so that when the first switch is in said one position operation of the second switch reverses the relative phasing of the output of the two

30 microphones and when the first switch is in said other position operation of the second switch is arranged to cause the output voltages of the microphones to be changed from reinforcing one another to opposing one another or *vice versa*.

35 For a better understanding of the invention and to show how the same may be carried into effect reference will now be made to the accompanying drawings, in which:—

40 Figure 1 is a diagrammatic front elevation of microphone equipment; and

[Price 3s. 6d.]

Figure 2 is a circuit diagram of the equipment of Figure 1.

The microphone equipment has a conventional stand 1 essentially comprising a base 2 and a vertical tubular rod 3 extending upwardly from the base. The upper end of the rod 3 merges into an enlarged cylindrical switch unit 4, which is coaxial with the rod. A microphone head 5 of upright cylindrical form has its lower end adapted for connection to the top of the switch unit 4, by means of a screw-type connector 6. The microphone head 5 consists of two identical ribbon velocity microphones 7, 8 mounted one on top of the other with the ribbons 9, 10 vertically in line. The housing of each microphone 7, 8 has a plurality of horizontally elongated apertures 7A, 8A, the ribbons 9, 10 being immediately behind the apertures. The upper microphone 7 is rotatable with respect to the lower microphone 8, the axis of rotation being vertical and the arrangement being such that the upper microphone 7 can be swung from a position where its ribbon 9 is coplanar with the ribbon 10 of the lower microphone 8 through an angle of approximately 100° to a position just past that where the planes of the ribbons 9, 10 are perpendicular to one another.

The ends of the ribbon 9 are connected to the primary winding of a transformer 11, the secondary winding of which is connected to contacts 12, 13 at the bottom of the head 5. The ends of the ribbon 10 are connected to the primary winding of a transformer 14 the secondary winding of which is connected to contacts 15, 16 also at the bottom of the head 5. The four contacts 12, 13, 15, 16 are arranged so as to connect with contacts 17, 18, 19, 20 at the top of the switch unit

Price 33p

Price 3s. 6d.

4 when the head 5 is secured to the switch unit 4. An output cable 21 having therein four wires 22—25 leads from the switch unit 4 through the rod 3 of the stand 1 to the base 2.

The switch unit 4 is provided with two switches 26, 27. The operating member 26A of the switch 26 projects from one side of the switch unit 4 and the operating member 27A of the switch 27 projects from the opposite side of the switch unit 4. The switches 26, 27 control the connections between the four contacts 17—20 at the top of the switch unit 4 and the four wires 22—25 in the cable 21. The contacts 17 to 20 are connected to wires 28 to 31 respectively. The wires 28 and 29 are connected to wires 32 and 33 *via* the switch 27 which is a switch having two operative positions in the first of which (that shown) the wire 28 is connected to the wire 33 and the wire 29 is connected to the wire 32. In the other position of the switch 27 the wires 28 and 29 are respectively connected to the wires 32 and 33. The switch 26 has three operative positions in the first of which (that shown) there is no connection between the wires 30 to 33 and the wires 22 to 25 so that the microphones 7, 8 in the head 5 attached to the switch unit 4 are switched off. In the second position of the switch 26 the operating member 26A is moved from the position shown in Figure 2, in the direction of the arrow A so that the wires 32, 33, 30, 31 are connected respectively to the four wires 22 to 25 in the cable 21 and in this position the microphones 7, 8 can be used for stereophonic purposes. In the third position of the switch 26 the operating member 26A is moved in the direction of the arrow B from the position shown in Figure 2 whereby the wire 31 is connected to the wire 25, the wire 30 is connected to the wire 33 and the wire 32 is connected to the wire 22. Thus only two of the wires of the output cable 21 are used, the microphones 7, 8 being connected together in series. When so connected the output voltage from one microphone either opposes or reinforces that of the other microphone.

The switch 27 is provided to reverse the connections of the microphone 7; thus, when the microphones 7, 8 are connected together in series by setting the switch 26 to said third position, operation of the switch 27 causes the output voltages to reinforce one another, or alternatively to oppose one another.

When the switch 26 is in said second position, operation of the switch 27, by virtue of reversing the connections of the microphone 7, reverses the relative phasing of the outputs of the two microphones.

When the switches 26, 27 are in the position where the two microphones 7, 8 are

connected together in series and the output voltages reinforce one another, the equipment operates as a straightforward ribbon velocity microphone of high sensitivity. When the microphones 7, 8 are connected together in series with the output voltages opposing one another, the equipment operates as a microphone which eliminates back-ground noise, the microphone responding only to a sound source close to the microphone head 5 and substantially closer to one microphone than the other.

#### WHAT WE CLAIM IS:—

1. Microphone equipment comprising a microphone head having two microphones, four output wires, and a switch unit incorporating two switches, the switch unit being arranged for selectively connecting the microphones to the output wires such that in one position of the first of the two switches the output voltage of one microphone is arranged to be applied to two of the wires and the output voltage of the other microphone is arranged to be applied to the other two wires whilst in another position of the first switch the microphones are connected together in series to two of the wires, the second switch serving for reversing the connections of one of the microphones so that when the first switch is in said one position operation of the second switch reverses the relative phasing of the output of the two microphones and when the first switch is in said other position operation of the second switch is arranged to cause the output voltages of the microphones to be changed from reinforcing one another to opposing one another or *vice versa*.

2. Microphone equipment as claimed in Claim 1, wherein said first switch has a third position in which no output from the microphones is applied to the output wires.

3. Microphone equipment as claimed in Claim 1 or 2, wherein the microphones are ribbon velocity microphones with the ribbons arranged in a line in end-to-end relationship, the microphones being relatively rotatable about an axis parallel to said line.

4. Microphone equipment as claimed in any one of the preceding claims, wherein the microphone head is detachably securable to the switch unit.

5. Microphone equipment substantially as hereinbefore described with reference to the accompanying drawings.

HASELTINE, LAKE & CO.,  
28 Southampton Buildings,  
Chancery Lane,  
London, W.C.2,  
Agents for the Applicants.

## PROVISIONAL SPECIFICATION.

## Improvements in or relating to Microphones.

We, LUSTRAPHONE LIMITED, a British Company, of St. George's Works, Regent's Park Road, London, N.W.1, do hereby declare this invention to be described in the following statement:—

This invention relates to microphones.

According to the present invention there is provided microphone equipment comprising a microphone head having two microphones, four output wires, and a switch unit incorporating two separate switches, the switch unit being arranged for selectively connecting the microphones to the output wires such that in one position of the first of the two switches the output voltage of one microphone is arranged to be applied to two of the wires and the output voltage of the other microphone is arranged to be applied to the other two wires whilst in the other position of the first switch the microphones are connected together in series to two of the wires, the second switch serving for reversing the connections of one of the microphones so that when the first switch is in said one position operation of the second switch reverses the relative phasing of the output of the two microphones and when the first switch is in said other position operation of the second switch is arranged to cause the output voltages of the microphones to be changed from reinforcing one another to opposing one another or *vice versa*.

For a better understanding of the invention, one constructional form thereof will now be described in greater detail.

The microphone equipment in this constructional form has a conventional stand essentially comprising a base and a vertical tubular rod extending upwardly from the base. The upper end of the rod merges into an enlarged cylindrical switch unit, which is coaxial with the rod. A microphone head of upright cylindrical form has its lower end adapted for connection to the top of the switch unit, by means of a screw-type connector. The microphone head consists of two identical ribbon velocity microphones mounted one on top of the other with the ribbons vertically in line. The upper microphone is rotatable with respect to the lower microphone, the axis of rotation being vertical and the arrangement being such that the upper microphone can be swung from a position where its ribbon is coplanar with that of the lower microphone through an angle of approximately 100° to a position just past that where the planes of the ribbons are perpendicular to one another.

A wire leads from the end of each ribbon

through a transformer connection to an associated contact at the bottom of the microphone head. The four contacts on the head are each arranged so as to connect with an associated contact at the top of the switch unit when the head is secured to the switch unit. A four-wire output cable leads from the switch unit through the rod of the stand to the base thereof.

The switch unit is provided with two switches. The operating member of the first of these two switches projects from one side of the switch unit and has three operative positions. The operating member of the second switch projects from the opposite side of the switch unit and has two operative positions. The switches control the connections between the four contacts at the top of the switch unit and the four wires in the cable. In the first of the three positions of the operating member of the first switch, the contacts are disconnected from the wires so that the microphones in the head attached to the switch unit are switched off. In the second position of the operating member the switch unit contacts are connected one to each of the four wires in the cable so that the microphones can be used for stereophonic purposes. In the third position of the operating member of the first switch the switch unit contacts are connected to the wires of the output cable so that only two of the wires are used, the microphones being connected together in series. When so connected the output voltage from one microphone either opposes or reinforces that of the other microphone.

The second switch is provided to reverse the connections of one of the microphones; thus, when the microphones are connected together in series by setting the first switch to the third position, operation of the second switch causes the output voltages to reinforce one another, or alternatively to oppose one another.

When the first switch is in the second position, operation of the second switch, by virtue of reversing the connections of one of the microphones, reverses the relative phasing of the two microphones.

When the switches are in the position where the two microphones are connected together in series and the output voltages reinforce one another, the equipment operates as a straightforward ribbon velocity microphone of high sensitivity. When the microphones are connected together in series with the output voltages opposing one another, the equipment operates as a micro-

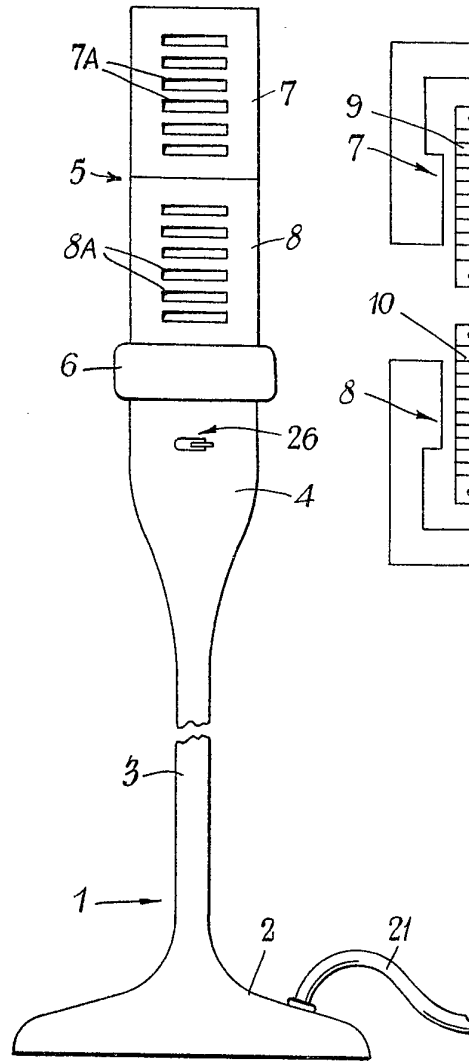
phone which eliminates background noise,  
the microphone responding only to a sound  
source close to the microphone head and  
substantially closer to one microphone than  
5 the other.

HASELTINE, LAKE & CO.,  
28 Southampton Buildings,  
Chancery Lane,  
London, W.C.2,  
Agents for the Applicants.

---

Abingdon : Printed for Her Majesty's Stationery Office, by Burgess & Son (Abingdon), Ltd.—1960.  
Published at The Patent Office, 25, Southampton Buildings, London, W.C.2,  
from which copies may be obtained.

*Fig. 1.*



*Fig. 2.*

