

Jan. 20, 1925.

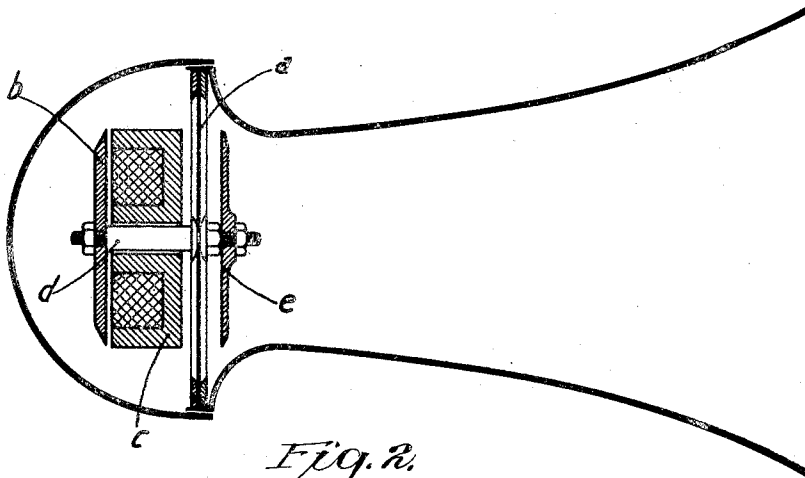
1,523,964

H. HÖRIG

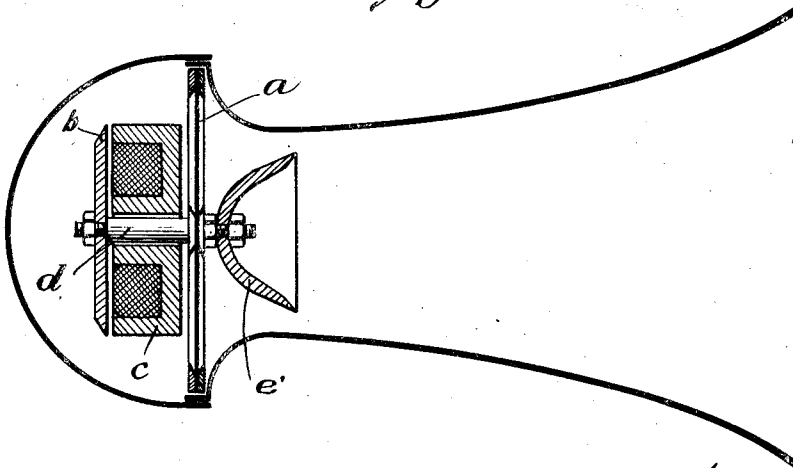
SIGNALING INSTRUMENT

Filed Dec. 26, 1922

*Fig. 1.*



*Fig. 2.*



*Inventor.*  
*Heinrich Hörig*  
*by Stewart & McKay*  
*attorneys*

# UNITED STATES PATENT OFFICE.

HEINRICH HÖRIG, OF STUTTGART, GERMANY, ASSIGNOR TO ROBERT BOSCH AKTIEN-GESELLSCHAFT, OF STUTTGART, GERMANY.

## SIGNALING INSTRUMENT.

Application filed December 26, 1922. Serial No. 609,059.

*To all whom it may concern:*

Be it known that I, HEINRICH HÖRIG, a citizen of Germany, residing at Stuttgart, Germany, have invented certain new and useful Improvements in a Signaling Instrument; 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 signaling instruments, especially for power vehicles, which have a directly vibrated diaphragm. The diaphragm can be actuated by electromagnetic, manual, or any other suitable means, and if actuated electromagnetically, the diaphragm itself can serve as the armature or it can be connected with the armature.

The fact has been discovered by this inventor that with such instruments the fullness of the tone and the sounding distance are materially improved if at the horn side of the diaphragm, at the place of its greatest oscillation, a vibratory body is so affixed that it is not in contact with the diaphragm, except at the point of connection with it. That vibratory body may either be rigid so as to be incapable of oscillations of its own, or it may be made a self-contained tone-producing member by a material and a shape that are suited to this purpose.

The simplest shape is that of a disk. A modification may consist of a plurality of disks which are affixed to a common carrier and are suitably spaced. Or the vibratory body may, if desired or preferred, be a hollow body which is open towards the horn. It may consist of metal or of an organic substance, such as hard rubber, galalith, fibre, pertinax, celluloid, and the like.

The peculiar manner of operation of that vibratory body is due to several causes. First of all, the increase of the weight of the diaphragm by the vibratory body plays a role. Besides, the vibratory diaphragm acts in the manner of a so-called piston-diaphragm, that is to say, the entire column of air present in front of the vibratory body

is pushed out at the greatest oscillation of the diaphragm so that the tone of the latter to which the vibratory body is attached is intensified. Furthermore, the air present in the space between the diaphragm, the vibratory body, and the wall of the horn, has a natural vibration which is apt to influence the color of the instrument's tone. It is clear from the above that free and unobstructed movement of the vibratory body is necessary for the device to operate successfully in the manner described. Although it is essential that the vibratory body oscillate out of contact with the walls of the conduit in which it is disposed, it is desirable for the vibratory body to occupy a large part of the cross-sectional area of the sound conduit at the portion thereof immediately adjacent said vibratory body, because by this arrangement the best effect of the vibratory body in intensifying and coloring sounds produced by the diaphragm and projecting them from the conduit is obtained. Furthermore, a column of air is thus held between the diaphragm and the vibratory body and this column of air, being set in vibration by the diaphragm and vibratory body, assists in coloring the tone of the instrument. The vibratory body overlies a large, and most desirably a major, portion of the diaphragm, as shown, in order to get the maximum effect of the reflections and counter-reflections of sounds from the diaphragm to the vibratory body and vice versa. With vibratory bodies with elastic natural vibrations the proportions may be so chosen that the vibratory body delivers harmonic upper tones with respect to the fundamental oscillation of the diaphragm. If the vibratory body is hollow and open towards the horn, then, finally, also the tone-producing effect of the air enclosed in the hollow space plays a rôle.

My invention is illustrated, by way of example, in the accompanying drawings in which

Fig. 1 shows diagrammatically in longitudinal section a motor car horn embodying this invention, and

Fig. 2 is a similar view of a modified form of the invention.

A diaphragm *a* which is firmly held at its rim and which may be flat, as shown in the drawings, or which may be undulated, is rigidly connected by a rod *d* with the armature *b* of an electromagnet *c*. An extension of the rod *d* which is directed towards the horn has affixed to it a vibratory body *e* which, as shown in Fig. 1, has the shape of a disk. It will be seen that the disc is connected with the diaphragm only at the region of greatest oscillations, and that the aforesaid extension of rod *d* by which the disc is thus connected to the diaphragm also serves to space the disc from said diaphragm. In the embodiment of the invention illustrated in Fig. 2, the vibratory body *e'* is hollow or cup-shaped and has an open end extending toward the exit of the sound conduit or horn.

I claim:

1. A signaling instrument, especially for power vehicles, comprising the combination, with a sound-producing diaphragm, means for oscillating the same, and a sound conduit leading from said diaphragm, of a vibratory body disposed in said conduit and connected with the diaphragm solely at the region of greatest oscillations of said diaphragm by means spacing it from the diaphragm, said vibratory body occupying a large part of the cross-sectional area of the immediately adjacent portion of said conduit but being arranged to oscillate out of contact with the walls of said conduit.

2. A signaling instrument, especially for power vehicles, comprising the combination, with a sound-producing diaphragm, means for oscillating the same, and a sound conduit leading from said diaphragm, of a rigid vibratory body disposed in said conduit and connected with the diaphragm solely at the region of greatest oscillations of said diaphragm by means spacing it from the diaphragm, said vibratory body occupying a large part of the cross-sectional area of the immediately adjacent portion of said conduit but being arranged to oscillate out of contact with the walls of said conduit.

3. A signaling instrument, especially for power vehicles, comprising the combination, with a sound-producing diaphragm, means for oscillating the same, and a sound conduit leading from said diaphragm, of a tone-coloring vibratory body disposed in said conduit and connected with the diaphragm solely at the region of greatest oscillations of said diaphragm by means spacing it from the diaphragm, said vibratory body occupying a large part of the cross-sectional area of the immediately adjacent portion of said conduit but being arranged to oscillate out of contact with the walls of said conduit.

4. A signaling instrument, especially for power vehicles, comprising the combination, with a sound-producing diaphragm, means for oscillating the same, and a sound conduit leading from said diaphragm, of a disc-shaped vibratory body disposed in said conduit and connected with the diaphragm solely at the region of greatest oscillations of said diaphragm by means spacing it from the diaphragm, said vibratory body occupying a large part of the cross-sectional area of the immediately adjacent portion of said conduit but being arranged to oscillate out of contact with the walls of said conduit.

5. A signaling instrument, especially for power vehicles, comprising the combination, with a sound-producing diaphragm, means for oscillating the same, and a sound conduit leading from said diaphragm, of a tone-coloring vibratory member disposed within said conduit and connected with said diaphragm solely at the region of greatest oscillations of said diaphragm by means spacing it from the diaphragm, said vibratory member being located between said diaphragm and the sound exit of said conduit and being arranged to oscillate wholly out of contact with the walls of said conduit, said vibratory body occupying a large part of the cross-sectional area of the immediately adjacent portion of said conduit.

6. A signaling instrument, especially for power vehicles, comprising, in combination, a sound-producing diaphragm, means for oscillating the same, a sound conduit leading from said diaphragm, and a vibratory body disposed in said conduit and connected to said diaphragm solely at the region of greatest oscillations of said diaphragm by means spacing it from the diaphragm, said body overlying a major portion of said diaphragm but being free to oscillate in said conduit without contacting the walls thereof.

7. A signaling instrument, especially for power vehicles, comprising the combination, with a sound-producing diaphragm, means for oscillating the same, and a sound conduit leading from said diaphragm, of a vibratory body disposed in said conduit and connected with said diaphragm solely at the region of greatest oscillations of said diaphragm by means spacing it from the diaphragm, the cross-sectional areas of said vibratory body, said diaphragm, and that part of the sound conduit in which said vibratory body is disposed approximating each other in extent, said vibratory body being arranged to oscillate out of contact with the walls of said conduit.

8. A signaling instrument, especially for power vehicles, comprising, in combination, a sound-producing diaphragm, means for oscillating said diaphragm, a sound conduit, and a vibratory body disposed in said conduit and connected with the diaphragm

70

75

80

85

90

95

100

105

110

115

120

125

130

solely at the region of the greatest oscillations of said diaphragm by means spacing it from the diaphragm, said vibratory body comprising a hollow body having an open end extending toward the exit of said sound conduit and arranged to oscillate out of contact with the walls of said conduit.

In testimony whereof I have hereunto affixed my signature.

HEINRICH HÖRIG.

In the presence of:

MAURICE W. ALTAFFER,  
ERIC W. SPITZ.