March 17, 1931. R. M. CRITCHFIELD 1,796,887

SOUND SIGNAL

Filed May 28. 1929

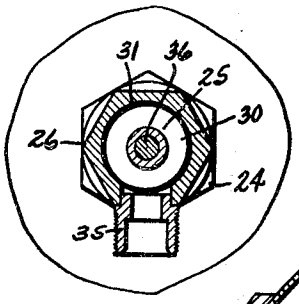


Fig. 2

Fig. 1

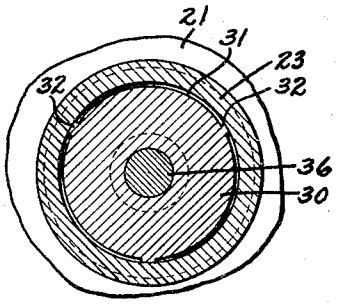


Fig. 3

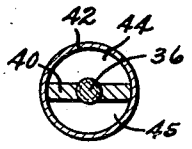


Fig. 4

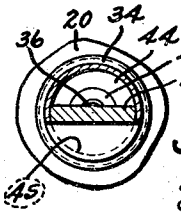


Fig. 5

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UNITED STATES PATENT OFFICE

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SOUND SIGNAL

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This invention relates to sound signals and is particularly adapted to that class of signals operated by fluid pressure means.

The main object of this invention is the production of a novel signalling device adaptable for use on automobiles and the like and capable of producing a comparatively loud signal that will carry long distance, and one that is of a musical tone or combination of musical tones, preferably of a harmonious character.

It is an object of this invention to provide a sound signal of the class described, which will be efficient in its operation and will produce a pleasing warning signal, and will be attractive in appearance.

It is a further object of this invention to provide a sound signal of the class described which is capable of mass production at a reduced cost.

It is a further object of the invention to provide a structure in which the relation between the reflector and tone element may be varied so as to produce the most efficient operation or the most desired warning signal, and so as to accomplish the niceties of tone inflection residual in a sound signal of this type.

Further objects and advantages of the present invention will be apparent from the following description, reference being had to the accompanying drawings, wherein a preferred embodiment of one form of the present invention is clearly shown.

In the drawings:

Fig. 1 is a longitudinal section through the improved sound signal.

Fig. 2 is a cross section through the windway and intake passage substantially as indicated by the line and arrows 2—2 of Fig. 1.

Fig. 3 is a sectional view through the foot of the sound producing element, disclosing the cross sectional relation of the windway tube and languette block, substantially as indicated by the line and arrows 3—3 of Fig. 1.

Figs. 4 and 5 are cross sections through the pipes or tone elements, substantially as indicated by the lines and arrows 4—4 and 5—5 respectively of Fig. 1.

With particular reference to the drawings, 20 refers to a reflector, preferably of a carabolic form, which is supported at the apex thereof by a bracket 21, by which it may be secured to an automotive vehicle. The reflector 20 is flanged at 22 to establish rigidity of the reflector and to lower the fundamental tone thereof. At the axis of the reflector and bracket, a tubular member 23 is secured by complementarily threaded portions, in axial apertures of the bracket and reflector, and the member 23, the threaded portion of the member 23 being relatively long so as to provide considerable adjustment of the member 23 in and out of the bracket and reflector. It will be noted from the illustration that the member 23 is threaded from the inner end or the end disposed within the reflector for a substantial distance throughout its length and that it supports exterior of the bracket 21 a lock nut 24, which functions to secure the member 23 and reflector in the adjusted position.

The member 23 in itself provides a windway 25 and while it is substantially cylindrical throughout the threaded portion thereof the portion exterior of the bracket 21 may be angular or polygonal in outside contour, as indicated at 26, so that a wrench or other instrument may be applied thereto for turning relative to the bracket 21. The extreme rear end 27 is threaded and provided with a special cap 28 disposed against a gasket 29 which closes this end of the member against air leakage. The tubular member is provided with the cylindrical bore which defines the windway 25, and provides a receptacle for a block 30 integrally joined with the cap member 28 by a sleeved extension or stem of the block.

The block 30 is substantially cylindrical in formation at the foreward part thereof, and of slightly less cross sectional diameter than the bore of the windway 25, so as to provide an annular passage between it and the inner wall of the member 23, as illustrated at 31 in Figs. 1 and 3. This annular passage is known as a flue, and in the present instance is substantially apportioned in three parts by means of the spacing lugs 32 positioned at points

about the block 30 as illustrated in Fig. 3. These spacing lugs 32 are of such dimension as to be firmly received within the bore of the windway, and to maintain the block in predetermined spaced relation with respect to the member 23.

The dimensions of the cap 28 and the windway member 23 and the block 30 are such that, when these parts are assembled by threading the member 23 through the member 28 as shown, the right angular spaces of the block 30 will be flush with or in planar alignment with the extremity or lip 34 of the member 23, the block 30 thus forms a languette which cooperates with the tone pipes to be described. The windway 25 has provision for connection with a source of fluid pressure by means of a threaded nipple 35 which may be secured thereto in any convenient manner, or position as indicated in Figs. 1 and 2.

In the present instance the cap 28 and block 30 support centrally thereof, a stud 36 threaded at each end as at 37 and 38. The threaded end 37 is provided with a nut 39 which is disposed against the outside of the cap 28, and the end 38 is threaded into the partition wall 40 of the tone producing element, a spacer 41 being disposed between the end of the partition and the languette or block 30. When the stud 36 has been assembled with the stated elements, the nut 39 is run up to clamp the parts tightly together, and in order to rigidly support the pipes.

The tone producing element is substantially of tubular formation, and in the present instance comprises a cylinder 42 with a portion thereof cut away as at 43. The partition member 40 is disposed substantially diametric thereof and extends throughout the entire length thereof as illustrated in Fig. 1. The partition member 40 is secured in place within the cylinder 42 by means of solder or other preferred means, and divides the cylinder 42 into a pair of substantially semi-cylindrical pipes 44 and 45. The remote ends of these pipes are closed by members 46 and 47 respectively, as illustrated in Fig. 1 and the pipes differ in length, an equivalent to the cut away portion 43. The forward end of each pipe terminates in a squared end, and situated in substantially the same plane which is practically parallel to the plane of the languette 33 and lip 34. The terminating edge of the cylinder 42 is chambered or bevelled to provide two semi-cylindrical lips 48 and 49 on the open end of the pipe adjacent the languette 33 and flue 31 with which it is designed to cooperate. By reference to Fig. 1 it will be noted that when the elements are assembled in the relation stated, that the tone element or pipes and the windway assembly supporting the tone element, are in fixed spaced relation end to end and so that the lips 48 and 49 are disposed in operative alignment with the flue 31 by means of the interposed spacer 41. This structure provides an embouchure of annular form about the spacer 41, and between the lips 48 and 49 of the pipes and the lip 34 surrounding the languette 33. On the other hand, it may be said that the embouchure is arc like or substantially semi-cylindrical, when speaking with reference to the pipes 44 and 45 by themselves.

While I have illustrated the device with a single spacer 41 disposed between the tone element and the windway, I do not propose that this showing determines the exact dimension or relative size of the spacer with respect to the elements with which it is assembled. In practice I find it preferable to provide a plurality of spacers 41 varying in thickness so that the relation between the lips of the pipe and the languette may be varied by using one or another of the spacers, or by using them in various combinations as may be desired. In other words, the magnitude of the embouchure may be varied as conditions may require, or notions of the operator may deem advisable. Further, by the long threaded portion 23 of the windway means are provided for altering the relation of the embouchure of the pipes relative to the focal point of the reflector 20, it being clear that this may be accomplished by loosening the lock nut 24, and rotating the reflector relative to the windway tube until the desired result is obtained, and then resetting the lock nut 24 to maintain the parts in predetermined relation.

In the operation of this sound signal fluid under pressure is admitted to the windway 25 by way of the nipple 35, and from thence the fluid exits under pressure through the flues 31 across the embouchure where it strikes the lips 46 and 47 setting the pipes 44 and 45 into vibration. The tones produced will be determined in main by the length of the pipes 44 and 45 and the magnitude of the embouchure across which the fluid currents flow and eddy against the languette 33. The sound thus produced being substantially at or near the focal point of the reflector will be picked up by the reflector and be reflected substantially along the axis thereof, so that the sound produced may be heard at some distance in front of the signal device.

While the form of embodiment of the present invention as herein disclosed, constitutes a preferred form, it is to be understood that other forms might be adopted, all coming within the scope of the claims which follow.

What is claimed is as follows:

1. In a sound signal the combination comprising, a reflector, a bracket supporting said reflector and a fluid pressure tone element coaxial of said reflector and supported by said

bracket, said tone element comprising a pair of semi-cylindrical closed pipes, a cylindrical windway enclosing a cylindrical languette and means securing said pipes and languette in spaced relation.

2. In a sound signal the combination comprising, a reflector, a bracket for said reflector, a cylindrical windway central of said bracket and reflector, a cylindrical languette within said windway and supporting a pair of closed pipes, said languette and pipes defining a sound source substantially at the focal point of said reflector.

3. In a sound signal the combination comprising, a reflector, a bracket supporting said reflector, a tubular windway adjustably secured in the bracket at the axis of said reflector, and a pair of pipes secured in operative relation with said windway and disposed along the axis of said reflector, said windway providing flues for cooperation with the lip of each pipe.

4. In a sound signal the combination comprising, a reflector, a bracket supporting said reflector, a windway coaxial of said reflector and secured to said bracket, means closing one end of said windway and providing a languette near the focal point of said reflector, a pair of pipes secured to said languette so as to present their lips in operative relation with the flue defined by said languette and windway, said windway and bracket being relatively movable so as to vary the position of the sound source relative to the focal point of said reflector.

5. In a sound signal the combination comprising, a reflector, a bracket supporting said reflector, a tubular windway adjustably secured in the bracket at the axis of said reflector, a cap for closing one end of said windway and integrally connected with a block within said windway, said block formed to provide a languette adjacent the other end of said windway and arranged substantially at the focus of said reflector, a plurality of pipes secured to said languette to present their lips in cooperative relation with the flue defined by said languette and windway.

6. In a sound signal having a reflector, a bracket supporting said reflector and a fluid pressure tone element, the combination comprising, a tubular windway secured axially of said reflector, a cap closing one end of said windway and providing a cylindrical block within and at the other end of said windway, said block being of similar shape and of but little less in cross sectional area than the cross section of said windway, the periphery of said block being provided with spacing lugs to maintain predetermined spaced relation between said block and the wall of said windway, and to define arc like flues, a stud provided by said block and supporting a plurality of pipes in conjunctive relation with said flues, said pipes being closed at one end and lipped adjacent the block so as to produce a sound source substantially at the focal point of the reflector.

7. In a sound signal having a reflector, a bracket supporting said reflector and a fluid pressure tone element, the combination comprising a cylindrical windway adjustably secured to the bracket and lying along the axis of the reflector, means closing one end of said windway, and a languette within said windway substantially closing the other end thereof, said languette supporting a plurality of open ended pipes and arranged in close juxtaposition to the walls of said windway to provide flues for said pipes, and one end of said pipes being lipped and positioned for cooperation with said flues.

8. In a sound signal having a reflector, a bracket supporting said reflector and a fluid pressure tone element, the combination comprising, a cylindrical windway adjustably secured to said bracket and providing one end thereof near the focal point of said reflector, means closing the rear end of said windway and providing a languette at the other end thereof, said languette lying within said windway and providing arc like flues therebetween, a cylindrical pipe provided with a partition dividing the pipe into chambers of various dimensions, a stud threaded into said partition and securing said pipes to said languette, and a spacer disposed between said languette and pipes.

9. In a sound signal having a reflector, a bracket supporting said reflector and a fluid pressure tone element, the combination comprising, a tubular windway secured at the axis of said reflector and providing a languette substantially at or near the focal point of said reflector, a pair of pipes secured to said languette and a spacer disposed between said pipes and languette to provide an annular embouchure between the lip of said pipe and the flue defined by said cylindrical windway and languette.

10. A sound signal having a reflector, a bracket supporting said reflector and a fluid pressure tone element, said tone element comprising a pair of pipes of semi-cylindrical formation providing tone chambers of different length, a common wall between said pipes, a stud secured to said common wall and providing a support for said pipe, a windway provided at the axis of said reflector and supporting said pipes, and means for altering the relation of said reflector and windway, so as to predetermine the position of said tone element with respect to said reflector.

11. In a fluid pressure sounding signal, the combination of a windway, a tone element supported thereby, and a reflector therefor, with means for altering the relation of said reflector and tone element.

12. The combination set forth in claim 11 in which the windway comprises a tubular member supported axially of said reflector and providing a languette to which is secured a pair of pipes.

13. The combination set forth in claim 11 in which the windway comprises a tubular member supported axially of said reflector and providing a languette to which is secured a pair of pipes, a spacing member disposed between said languette and pipes for determining the embouchure between the lip of said pipe and the flue between the languette and windway.

In testimony whereof I hereto affix my signature.

ROBERT M. CRITCHFIELD.