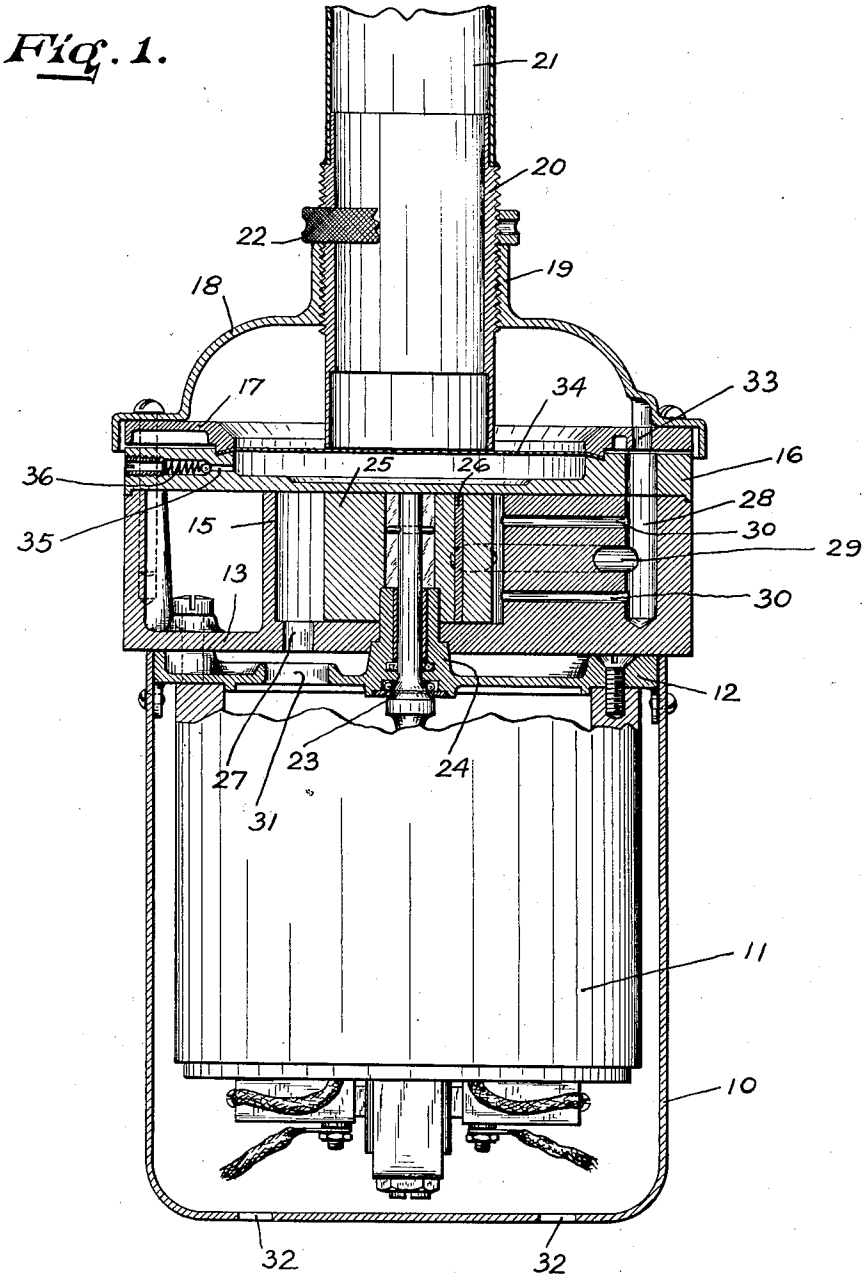
May 27, 1930. J. M. AUFIERO 1,760,295

PNEUMATIC HORN

Filed Aug. 3, 1929 2 Sheets-Sheet 1

Fig. 1.




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Filed Aug. 3, 1929 2 Sheets-Sheet 2

Fig. 2.

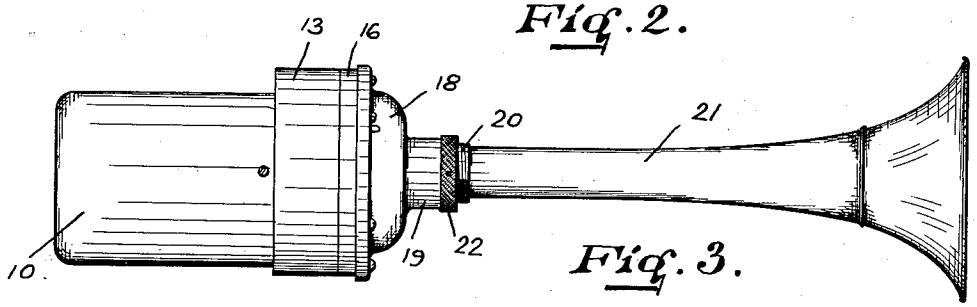
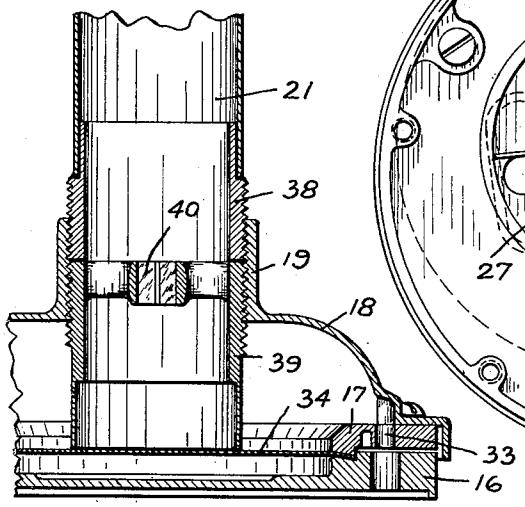
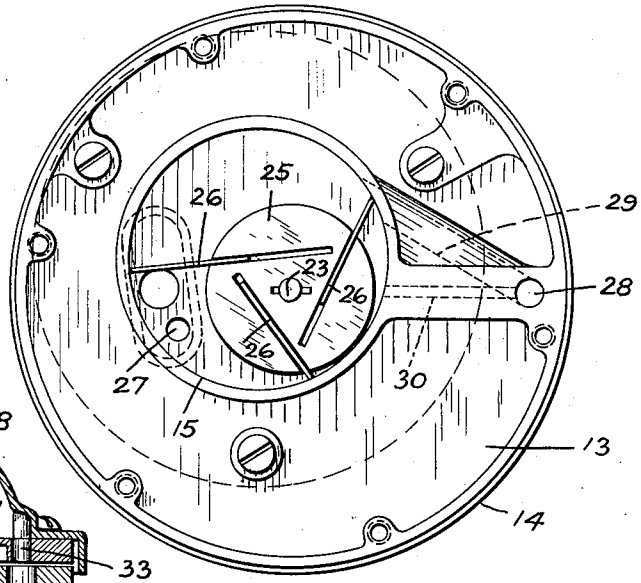



Fig. 3.

Fig. 5.



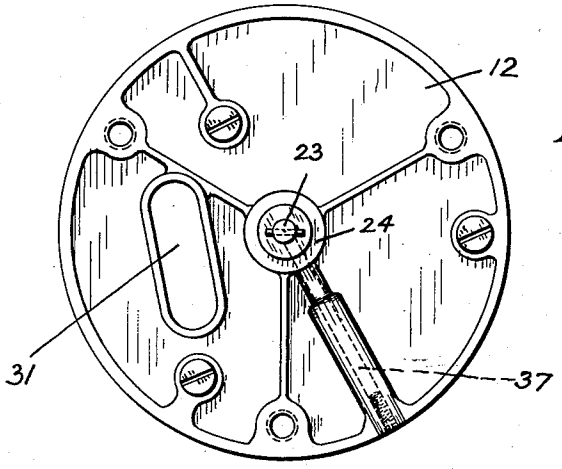




Fig. 4.

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# UNITED STATES PATENT OFFICE

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## PNEUMATIC HORN

Application filed August 3, 1929. Serial No. 383,266.

This invention relates to a warning signal capable of use in numerous different associations and of particular utility when applied to a vehicle.

It is an object of this invention to provide an acoustical signalling device by means of which a series of tone waves will be set up which will not be unpleasant nor startling to the ear but which will have great carrying power and also be capable of being heard over other sounds, thus providing an adequate warning signal.

A further object of the invention is that of furnishing a device of this type which will operate with minimum power and in which the parts may be adjusted to furnish a signal of just the strength and pitch desired.

The invention contemplates the further object of providing an apparatus in which the parts will be so protected that their action will not be interfered with by the entrance of foreign particles or moisture.

Another object is that of furnishing an apparatus the parts of which will be relatively few in number and individually simple and rugged in construction, these parts being capable of manufacture largely by automatic machinery and being moreover capable of assemblage by relatively unskilled labor to provide an apparatus operating over long periods of time with freedom from electrical or mechanical difficulties.

With these and further objects in mind, reference is had to the attached sheet of drawings illustrating practical embodiments of the invention and in which:

Fig. 1 is a sectional side view of a signalling device;

Fig. 2 is a side elevation thereof;

Figs. 3 and 4 are transverse sectional views taken through the apparatus as shown in Fig. 1; and

Fig. 5 shows a form of adjustment which may be incorporated in lieu of that provided in Fig. 1.

In these views, the numeral 10 indicates a casing within which a motor 11 may be retained by being mounted upon a plate 12, the latter carrying the casing and in turn mounting a plate 13 from the face of which flanges 14 and 15 extend upwardly, the latter being eccentrically disposed within the former and providing a stator. Positioned beyond the plate 13 and bearing against the flanges 14 and 15 of the same is a cover 16, the latter mounting a clamping ring 17 beyond which a housing 18 is positioned and this housing terminates in a screw threaded collar 19 mounting the similarly threaded body of a tube 20 which may either form a part of or in turn support a trumpet 21, it being noted that movement between these parts is prevented as in Figs. 1 and 2 by a lock nut 22.

The motor includes a drive shaft 23 and extends through the plates 12 and 13 and beyond the latter. The plates in addition to being coupled by bolts may be brought to proper relative positions incident to the plate 13 being formed with a central recess which is counter-bored and which serves to accommodate a stud 24 forming a part of the plate 12.

Within the space defined by the stator flange 15 there is positioned a rotor. This member preferably includes a slotted body 25 coupled to the motor shaft and slidably accommodating a series of vanes 26 which have sliding engagement within the inner face of the flange.

The plate 13 is formed with a passage for the entry of air into the spaces between the vanes. This passage may take the form of a pair of different sized openings 27, it being thus obvious that as the rotor moves, an ample supply of air will be furnished. This plate—particularly as shown in Figs. 1 and 3—is formed with a transversely extending bore 28 with which a tangentially extending passage 29 communicates, it being noted that further passages 30 are also furnished which extend preferably in a line between the bore 28 and the motor shaft.

The plate 12 is formed with an opening 31 which when the parts are in position is in substantial line with the openings 27 and the motor casing 10 is also conveniently formed with openings 32 through which air may flow from the outside through the motor to cool the same and through the openings in

the plates 12—13 to the compressor from which it is expelled through the bore 28 into the space defined by the housing 18 through the opening 33 in the plate 16.

A diaphragm 34 of any desirable material is disposed between the ring 17 and the plate 16 and, if desired, the seat for this diaphragm may extend angularly as shown so that the diaphragm is flexed outwardly to bear intimately against the inner end of the tube 20. It will also be noted that the space within the plate 16 and below the diaphragm is preferably formed with a passage 35, the flow of air through which may be controlled by a spring pressed valve 36 which in any event prevents the setting up of material pressure within the space with consequent resistance to flexion on the part of the diaphragm. Additionally it is to be observed that the plate 12 is preferably formed with an opening or channel 37 communicating with the opening through which the motor shaft passes so that this shaft may be lubricated adequately at this point.

In operation, it will be understood that if the circuit through the motor is closed or if the shaft 23 is rotated in any other desirable manner, the vanes 26 under the action of centrifugal force will shift outwardly to bear intimately against the inner face of the flange 15 and in wiping contact therewith. The rotor will move in clockwise direction as shown in Fig. 3 and consequently air will be sucked through the motor to cool the latter and supply the compressor, which air will move into the bore 28, first through the passage 29 and then through the passages 30 thus avoiding an undue pulsation on the diaphragm and subjecting the latter to a substantially constant air pressure. The pressure within the housing 18 will now build up resulting in the diaphragm flexing and moving away from the inner edge of the tube 20. Immediately thereupon the pressure will drop and the diaphragm will tend to return to its normal position. This will be met by an increase in pressure which will again move the diaphragm away from the tube, this action of the parts being repeated indefinitely and resulting in a vibration of the diaphragm at acoustically perceptible frequencies with the consequent emission of sound waves from the trumpet to produce the results desired. If it is desired to adjust the parts, this may be done readily by simply shifting the trumpet to bear with a greater or less amount of intimacy against the outer face of the diaphragm thus decreasing or increasing the vibrational frequency of the latter.

If, in lieu of the diaphragm adjustment aforedescribed, a different adjustment is desired, this may be achieved readily by for example splitting the tube 20 into sections 38 and 39 as shown in Fig. 5. By this expedient, it will never be necessary to shift the trumpet but the section 39 may be moved towards and away from the diaphragm by simply engaging the cross bar 40 thereof with a long handled screw driver or other suitable instrument inserted through the other end of the trumpet.

From the foregoing, it will be understood that among others, the several objects of the invention are achieved. It will, moreover, be appreciated that numerous changes in construction and rearrangements of the parts might be resorted to without departing from the spirit of the invention as defined by the claims.

Having described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. A warning signal including, in combination, a motor, a plate mounting said motor, a compressor unit affixed to said plate and including a flange extending adjacent its outer edge, said plate and unit being formed with openings for the passage of air, a clamping ring connected to said unit, a diaphragm retained by said ring and adapted to be acted upon by air compressed by said unit, a housing mounted by said ring, and a tube mounted by said housing and having its inner end extending in contact with said diaphragm.

2. A warning signal including, in combination, a motor, a plate mounting said motor, a compressor unit affixed to said plate and including a flange extending adjacent its outer edge, said plate and unit being formed with openings for the passage of air, a plate positioned upon said flange and closing the face of said unit, a diaphragm positioned upon said plate, a clamping ring mounted upon said plate to secure said diaphragm thereto, both said plate and ring being formed with openings for the passage of compressed air from said unit, a housing mounted by said ring, and a tube carried by said housing and extending adjacent said diaphragm.

3. A warning signal including, in combination, a motor, a plate mounting said motor, a compressor unit affixed to said plate and including a flange extending adjacent its outer edge, said plate and unit being formed with openings for the passage of air, a plate positioned upon said flange and closing the face of said unit, said plate being formed with a recess, a diaphragm positioned upon said plate and above said recess, a clamping ring mounted upon said plate to secure said diaphragm thereto, both said plate and ring being formed with openings for the passage of compressed air from said unit, a housing mounted by said ring, and a tube carried by said housing and extending adjacent said diaphragm, and said plate being formed with a passage extending from said recess to the outer atmosphere.

4. A warning signal including a casing formed with an opening for the passage of

air, a motor positioned within the same, a plate mounting said motor, a compressor unit affixed to said plate and driven by said motor and formed with an opening through which air passing through said motor passes, a diaphragm and means for directing the air from said unit against said diaphragm to cause the latter to vibrate at acoustical frequencies.

5. A warning signal including a casing formed with an opening for the passage of air, a motor positioned within the same, a plate mounting said motor, a compressor unit affixed to said plate and positioned beyond the end of said motor and being formed with an intake opening whereby air may pass through the casing openings of said motor to cool the latter and subsequently under said unit, a diaphragm positioned beyond said unit and said unit being formed with passages to conduct air under pressure to said diaphragm to cause the latter to vibrate at acoustical frequencies.

6. A warning signal including a casing formed with an opening for the passage of air, a motor positioned within the same, a plate mounting said motor, a compressor unit affixed to said plate and driven by said motor, said unit being formed with passages for the intake and expulsion of air, a member beyond said unit and presenting a recess, a diaphragm positioned above said recess and adapted to be subjected to the action of air under pressure from said unit to cause said diaphragm to vibrate at acoustical frequencies and said recessed member being formed with a passage extending from said recess to the outer atmosphere to relieve the pressure within said recess.

7. A warning signal including a casing formed with an opening for the passage of air, a motor positioned within the same, a plate mounting said motor, a compressor unit affixed to said plate and driven by said motor, a diaphragm, means providing a seat for said diaphragm, a clamping ring cooperating with said diaphragm to press the same against said seat and said seat and ring presenting angularly extending cooperating faces to flex said diaphragm outwardly, and a tube against the inner end of which said diaphragm is flexed.

In testimony whereof I affix my signature.

JOHN M. AUFIERO.