G. CONSTANTINESCO.

SOUNDING DEVICE ACTUATED FROM INTERNAL COMBUSTION ENGINES.

APPLICATION FILED FEB. 7, 1922.

1,432,743. Patented Oct. 24, 1922.

3 SHEETS—SHEET 1.

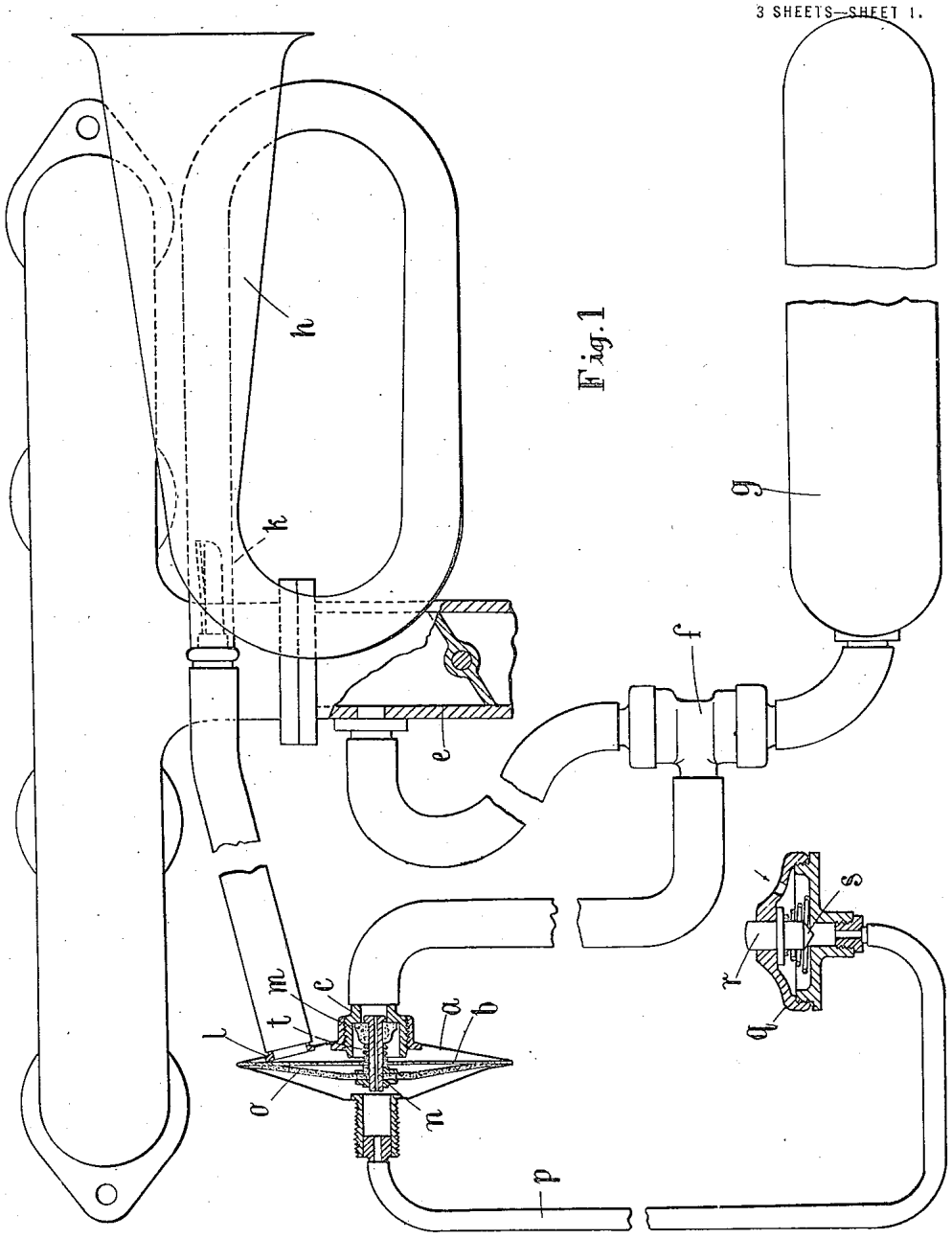

Fig. 1

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3 SHEETS—SHEET 2.

Fig. 4.

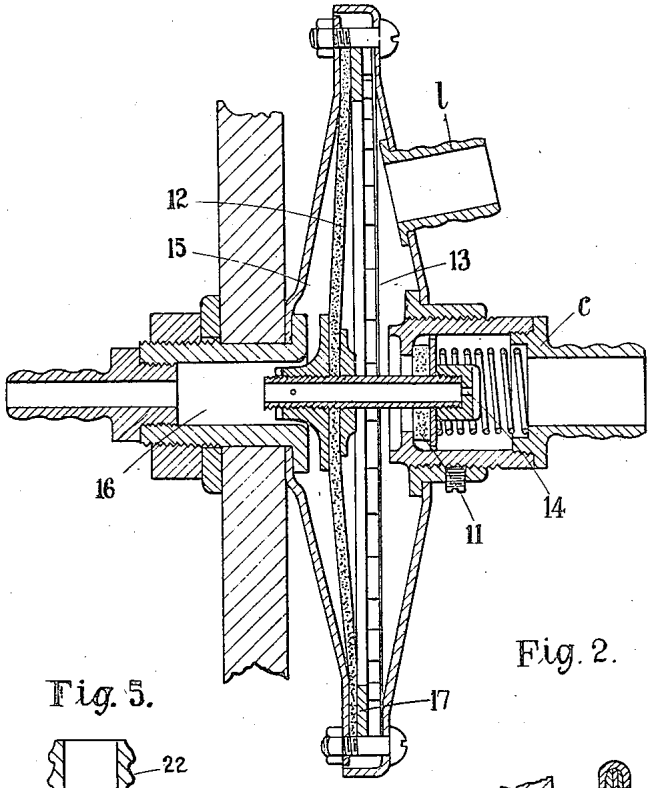


Fig. 2.

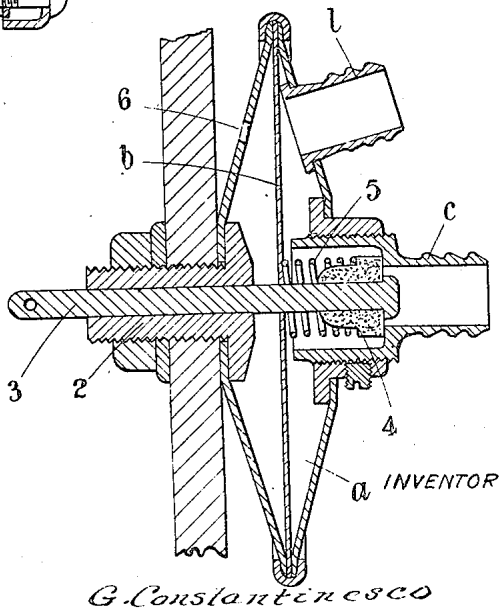
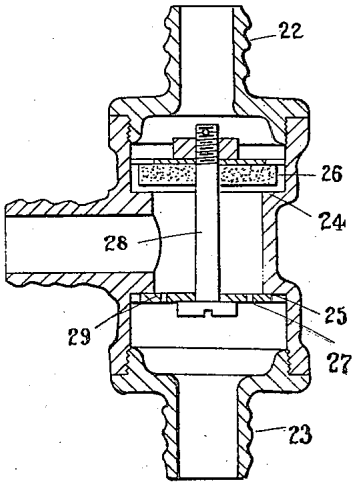


Fig. 5.



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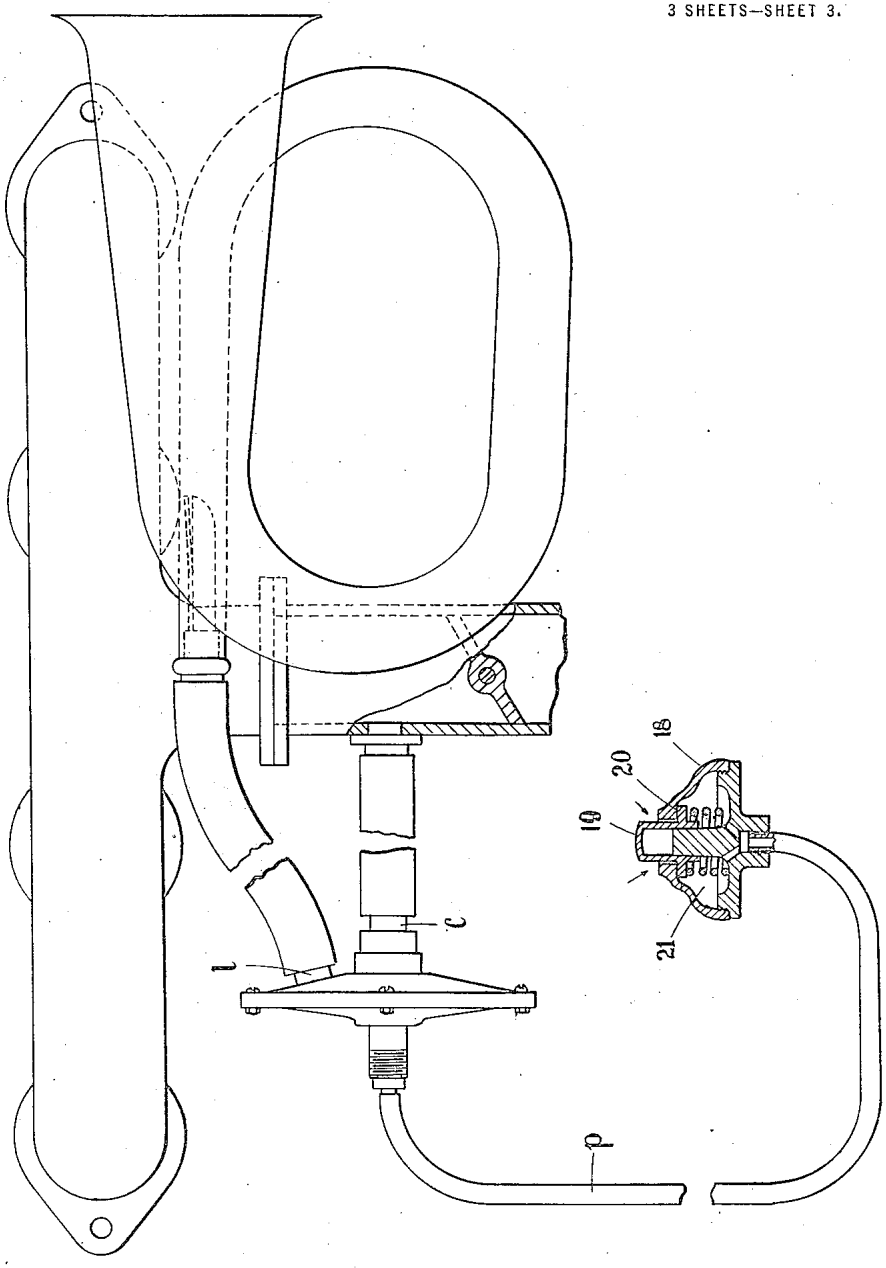
3 SHEETS—SHEET 3.

Fig. 3.



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Patented Oct. 24, 1922. 1,432,743

UNITED STATES PATENT OFFICE.

GEORGE CONSTANTINESCO, OF WEYBRIDGE, ENGLAND.

SOUNDING DEVICE ACTUATED FROM INTERNAL-COMBUSTION ENGINES.

Application filed February 7, 1922. Serial No. 534,750.

To all whom it may concern:

Be it known that I, GEORGE CONSTANTINESCO, a subject of the King of Great Britain and Ireland, residing at "Carmen Sylva," Beechwood Avenue, Oatlands Park, Weybridge, in the county of Surrey, England, have invented certain new and useful Improvements in Sounding Devices Actuated from Internal-Combustion Engines, of which the following is a specification.

The present invention relates to sounding devices such as motor horns operated by the suction of internal combustion engines.

In such sounding devices an ordinary horn with a reversed reed may be employed operated by the air suction produced by the engine.

The object of the invention is to provide improved means for sounding such horns from any convenient position.

The invention consists in providing means by which the area of the passage by which air is drawn from the horn to the engine is automatically controlled so that the suction actually produced at the horn never exceeds that at which the reed or the like operates effectively.

The invention further consists in a controlling device for the horn comprising a chamber having a perforated diaphragm dividing it into two parts, the connections to the engine and to the horn being placed on one side of the diaphragm, while the other side of the diaphragm is open to atmospheric pressure, the actuating valve by which the horn is sounded being mounted on a spindle passing through the diaphragm and being held on its seat by the suction of the engine, with or without a light spring to return it to its seat when the suction is insufficient for the purpose.

The invention further consists in operating the controlling valve of a controlling device of this kind pneumatically from any convenient position.

The invention also consists in a controlling device comprising a chamber and perforated diaphragm of the type described having a controlling valve with a hollow stem, itself controlled by a second diaphragm one side of which is normally exposed to suction, air being admitted on this side of the diaphragm when it is desired to open the valve and sound the horn.

The invention also consists in combining with the engine operated sounding device a reservoir communicating both with the engine and with the sounding device controlled by a valve which is constructed so that during normal running a vacuum is produced in the reservoir by drawing air through small apertures, while when the suction from the engine to the horn is insufficient the valve opens giving a passage of sufficient area to actuate the sounding device by the suction in the reservoir.

The invention further consists in a valve of the fluid-operated type controlling the passages from the engine to the sounding device and from the reservoir to the sounding device arranged so that when the suction in the engine is normal the valve between the engine and sounding device is open and the valve between the reservoir and sounding device is closed, small apertures being provided in the latter valve by which air is exhausted from the reservoir by the engine suction.

The invention further consists in the improved controlling means for sounding devices operated by the suction of the engine hereinafter described.

Referring to the accompanying drawings:—

Figure 1 is a general arrangement partly in section of one form of apparatus for carrying the invention into effect;

Figure 2 shows a modified form of controller adapted to be actuated by a chain or the like;

Figure 3 shows a general arrangement of the invention partly in section in which the horn is sounded by admitting atmospheric pressure into a space in which vacuum is normally maintained and in which no extra reservoir is employed;

Figure 4 is an enlarged view of the controller shown in Figure 3.

Figure 5 is a section through a special form of controlling valve.

In the example of the invention shown in Figure 1, the controlling device is in the form of a flattened conical chamber *a* having a central perforated diaphragm *b*. On one side of this chamber a connection *c* is fitted in a central position and may lead either to the induction pipe *e* of the engine direct or, as illustrated, to a valve 28 of the type hereinafter described.

The valve (see Figure 5) is in the form of a cylindrical chamber *f* having at one end a connection 22 to the induction pipe *e* of the

engine, and at the other end a connection 23 to a reservoir *g*. Two inwardly-projecting shoulders 24, 25 are provided in the cylinder forming valve seats, and the two valves 26, 27 mounted on a single spindle 28 are controlled by air pressure. When the suction in the engine is normal the valve 26 between the engine and horn is drawn off its seat and the valve 27 between the trumpet and reservoir is in contact with its seat. The suction of the engine is thus available at the trumpet and also serves to draw air from the reservoir through the small apertures 29 in the reservoir valve. Should the vacuum in the pipe leading to the engine fall, for example, when the throttle is fully opened, the valve between the engine and horn closes down on its seat and the valve between the reservoir and horn opens, so that the reservoir vacuum is available at the trumpet. By this means it is ensured that whatever may be the momentary suction produced by the engine, there is always a reservoir by which air can be drawn through the horn to sound it for the desired period.

In this case the horn can either be blown by direct suction from the engine or by suction from the reservoir *g*. The horn *h* having a reversed reed *k* is connected to the chamber *a* through the connection *l*. The valve *m* controlling the connection to the engine has a hollow stem *n* so that suction through the connection *c* is communicated to the rear side of a flexible diaphragm *o* by which the valve is actuated. A pipe *p* is attached to the connection at the back of the chamber and leads to the actuating device *q*. This device consists of a press button *r* having at its end a valve *s* adapted to close the aperture leading from atmosphere to the pipe *p*. When the button *r* is in the position illustrated the pressure at the rear of the diaphragm *o* is atmospheric, only a small leak occurring through the valve spindle *n* compared with the area of the passage *p*. When the button is pressed, the suction through the valve spindle causes a rearward movement of the diaphragm *o* which opens the valve thus admitting suction to the horn.

Should the suction become excessive the perforated diaphragm *b* is pulled towards the opening leading to the engine, thus limiting the suction. A light spring *t* may be provided between the diaphragm *b* and valve.

In the form of the invention shown in Figure 2 the flattened conical chamber *a* is provided with a central perforated diaphragm *b* and the connections to the engine and to the horn are as described above. The connection *c* can be screwed into or out of the wall of the chamber, so that its end opening into the chamber can be adjusted and locked at any desired distance from the diaphragm. The wall of the chamber at the other side of the diaphragm is provided with a suitable bolt 2 and nut for attachment to any suitable part of the car, and a central hole is formed through the bolt through which the valve spindle 3 passes. The rubber valve head 4 is attached in any suitable manner to the spindle, and a light spring 5 may be employed to return the valve to its seat when suction is not sufficient for this purpose. An aperture 6 is formed in the wall of the chamber at the rear of the diaphragm by which atmospheric pressure can act on this side. Any suitable means such as a chain may be attached to the spindle for the purpose of pulling the valve open to sound the horn.

In operation when the valve is pulled open by the chain the diaphragm will occupy a position nearer or farther from the open end of the connection to the engine, according to the suction produced in the forward side of the diaphragm. The vacuum in the space of the chamber which is connected to the horn is thus controlled, and cannot become excessive.

In the form of the invention illustrated in Figure 3 the valve is operated to sound the horn by admitting atmospheric pressure to a space in which there is normally a vacuum. No reservoir for providing an alternative vacuum is illustrated, but the reservoir may be employed with this modification also if desired. In this modification the valve 11 is fitted on the forward side of its seating, and is connected to a rubber diaphragm 12 placed at the rear of the perforated diaphragm 13. Atmospheric pressure is admitted to the space between the two diaphragms through suitable apertures around the edge of the chamber. These apertures may be conveniently provided by fitting a ring 17, flat on one side, and having corrugations or slots on the other side between the two diaphragms with its flat side against the flexible diaphragm 12. A small aperture 14 is provided through the valve cap leading to the space 15 at the back of the rubber diaphragm 12, so that the suction of the engine is communicated to this space, thus tending to draw the diaphragm in the rearward direction to pull the valve down on its seat although the valve itself is subjected to the suction of the engine. From the passage 16 at the rear of the diaphragm any suitable pipe of considerably larger diameter than that of the aperture through the valve is provided leading through a pipe *p* to the actuating device 18. This comprises a press button 19 having a flange 20 pressed upwards by a spring and closing apertures around the button leading into the chamber 21, which is in communication with the pipe *p*. Normally there is a vacuum in the space 15, pipe *p* and chamber 21. On pressing the button 19 atmospheric pressure is admitted

and acts on the diaphragm 12, opening the valve and so admitting suction from the engine to the horn.

I claim:—

1. In a sound producing instrument operated by the suction of an internal combustion engine a controlling device comprising in combination a chamber, a perforated diaphragm dividing said chamber, connections to said engine and said instrument from said chamber on one side of said diaphragm and an actuating valve controlling the passage of air through said chamber normally held on its seat by the suction of said engine.

2. In a sound producing instrument operated by the suction of an internal combustion engine a controlling device comprising in combination a chamber, a perforated diaphragm dividing said chamber, connections to said engine and said instrument from said chamber on one side of said diaphragm, an actuating valve controlling the passage of air through said chamber and a flexible diaphragm adapted to actuate said valve by air pressure.

3. In combination an internal combustion engine, a sounding device, a reservoir and means whereby said sounding device may be operated by the suction of said engine or from the vacuum in said reservoir, said means including a valve of the fluid operated type controlling passages from the engine to the sounding device and from the reservoir to the sounding device, arranged so that when the suction of the engine is normal the passage through the valve between the engine and the sounding device is open and the passage in the valve between the reservoir and the sounding device is closed, means being provided in the valve by which air is exhausted from the reservoir by the engine suction.

4. In combination an internal combustion engine, a sounding device, a reservoir and means whereby said sounding device may be operated by the suction of said engine or from the vacuum in said reservoir, said means including a valve of the fluid-operated type controlling the passages from the engine to the sounding device and from the reservoir to the sounding device arranged so that when the suction in the engine is normal the passage between the engine and the sounding device is opened and the passage between the reservoir and the sounding device is closed, small apertures being provided in the valve by which air is exhausted from the reservoir by the engine suction.

5. In a sound producing instrument operated by the suction of an internal combustion engine, a controlling device comprising in combination, a chamber, a perforated diaphragm dividing said chamber, connections to said engine and said instrument from said chamber on one side of said diaphragm, a valve controlling the passage of air through said chamber, a flexible diaphragm adapted to actuate said valve by air pressure, a small aperture through the spindle of said valve, a passage of larger section than said aperture adapted to admit air, and means for cutting off the air from said passage, in order to produce suction on said flexible diaphragm to actuate said valve.

In testimony whereof I affix my signature.

GEORGE CONSTANTINESCO.

Witnesses:
W. TYLER ADAMS,
J. WATT.