March 1, 1949. A. L. GUTHNER 2,462,862

SIREN

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Fig. 1.

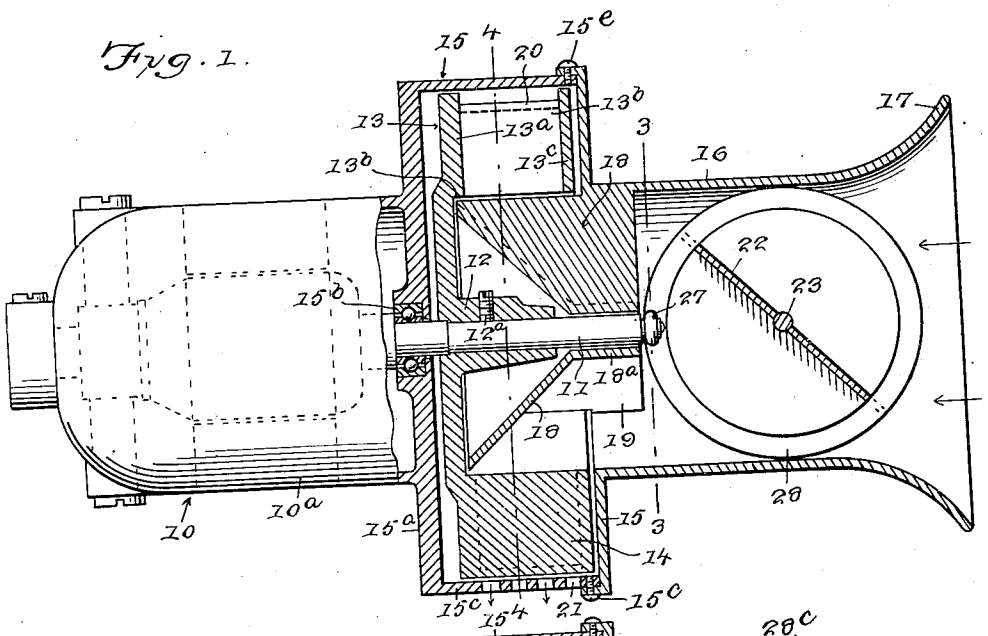
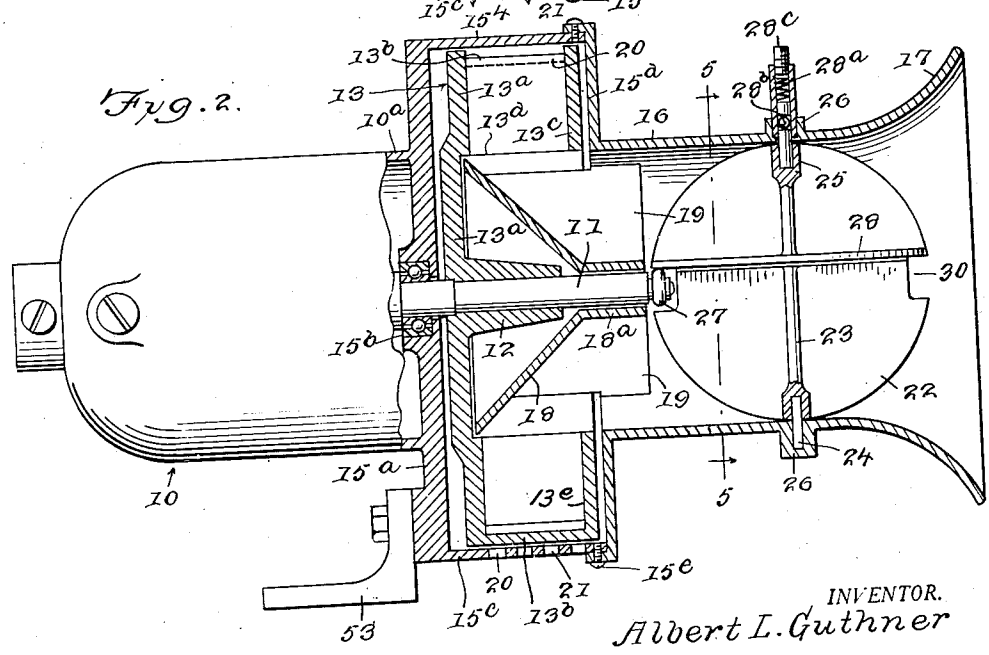


Fig. 2.



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Fig. 3.

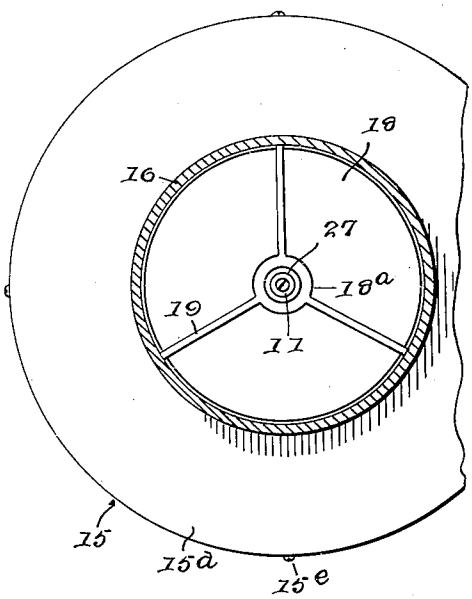


Fig. 4.

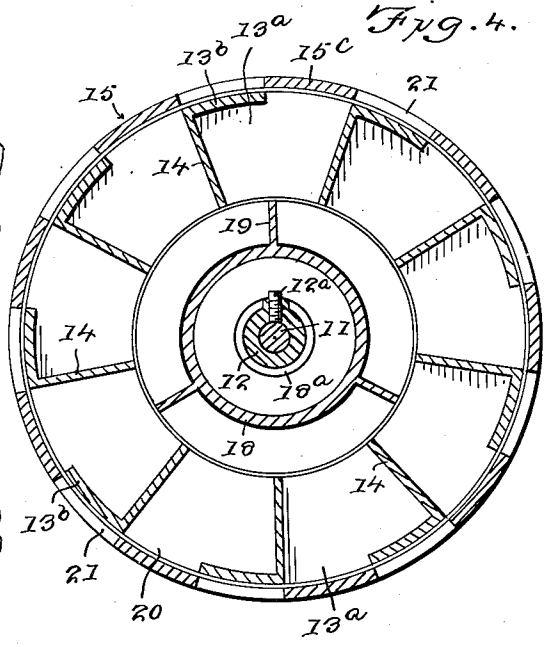


Fig. 5.

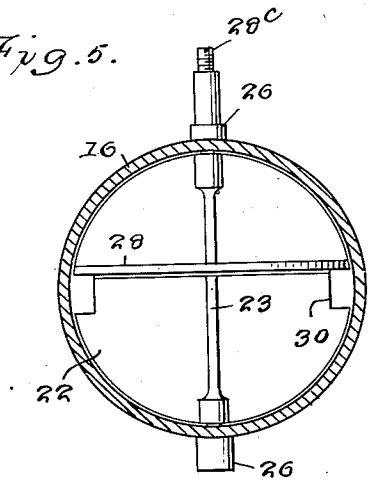
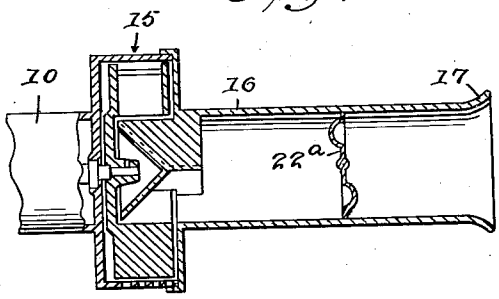


Fig. 10.



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Fig. 6.

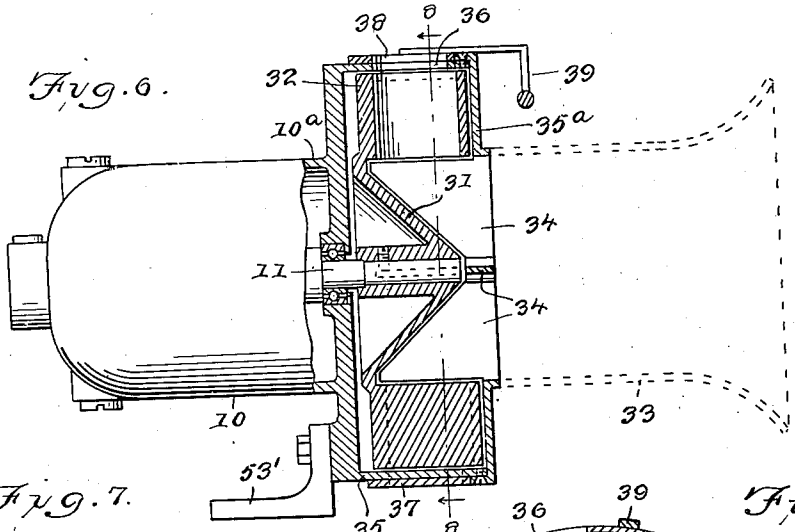


Fig. 7.

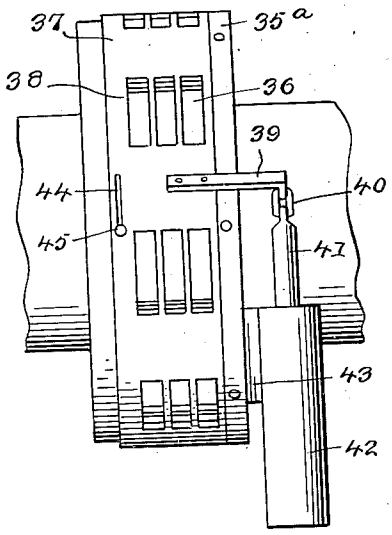
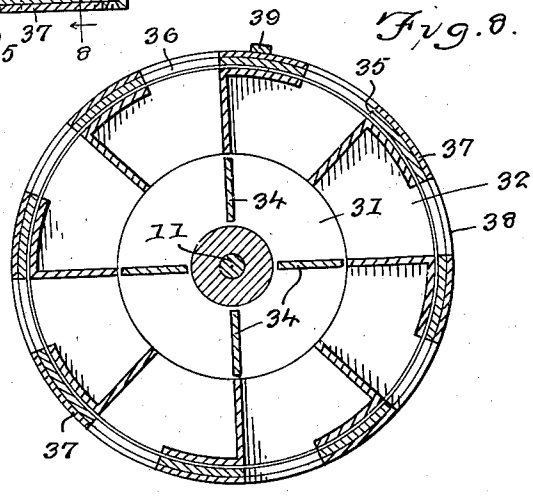


Fig. 8.



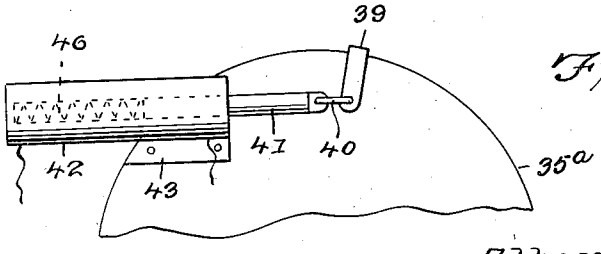


Fig. 9.

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Fig. 11.

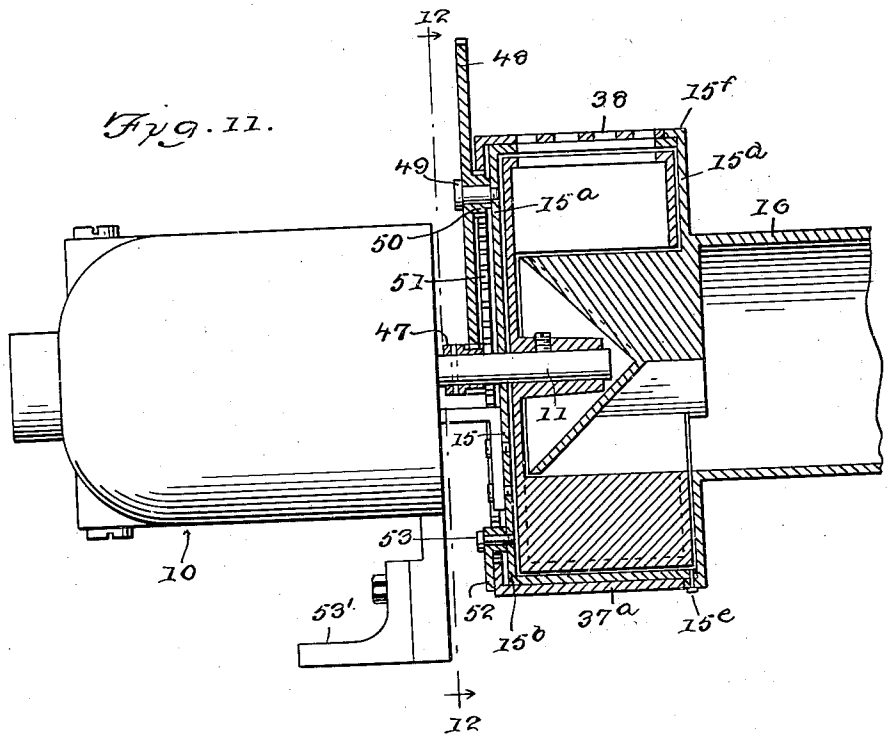
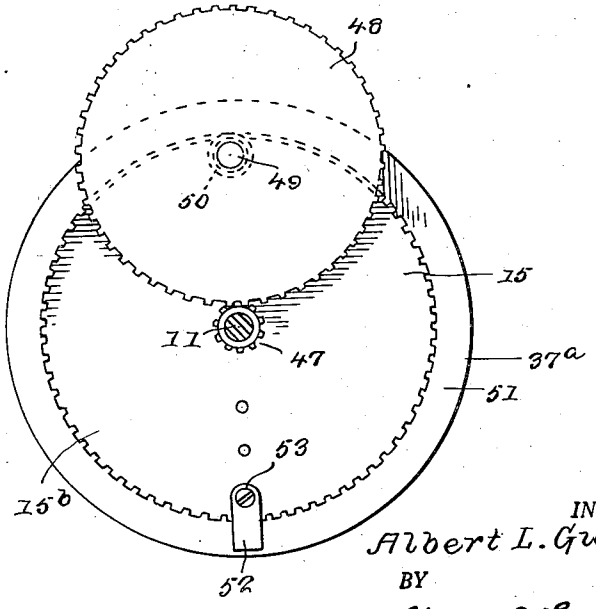


Fig. 12.



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2,462,862

UNITED STATES PATENT OFFICE

2,462,862

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Application April 1, 1944, Serial No. 529,178

13 Claims. (Cl. 116—147)

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The invention relates to a signalling device and more particularly to sirens.

The primary object of the invention is the provision of a siren wherein maximum audibility is attained and such signals as issued thereby can be regulated so as to give forth maximum tone qualities, the siren being constructed with a sounding cone to intensify the blast or signal impulses and also such siren is controllable so that the sounds issuing therefrom can be effected as code signalling.

Another object of the invention is the provision of a siren of this character wherein through rotation of a fly valve in the path of the sound waves, or by the rotation of a band valve, the siren will effect pulsating, vibrating noises thus giving to the sounds short intervals of blasts or pulsations and these having a greater commanding tone than if such valves were not present.

A further object of the invention is the provision of a siren of this character wherein the sounding cone is arranged to vary the production by reflection of the tone signals and in this manner intensifying the signalling qualities of the said siren.

A still further object of the invention is the provision of a siren of this character wherein the construction thereof is novel and such as to assure maximum efficiency in use and is automatic in the working thereof so that it can be utilized for signalling purposes, it being simple in construction and inexpensive to manufacture and install.

With these and other objects in view, the invention consists in the features of construction, combination and arrangement of parts as will be hereinafter more fully described in detail, illustrated in the accompanying drawings which discloses the preferred embodiment of the invention and pointed out in the claims hereunto appended.

In the accompanying drawings:

Figure 1 is a view partly in top plan and partly in horizontal section of a siren constructed in accordance with the invention.

Figure 2 is a view partly in side elevation and partly in vertical section of the siren.

Figure 3 is a sectional view taken approximately on the line 3—3 of Figure 1.

Figure 4 is a sectional view taken approximately on the line 4—4 of Figure 1.

Figure 5 is a sectional view taken approximately on the line 5—5 of Figure 2.

Figure 6 is a view similar to Figure 1, showing a slight modification of the siren.

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Figure 7 is a view in side elevation of the central portion of the siren shown in Figure 6.

Figure 8 is a sectional view taken approximately on the line 8—8 of Figure 6.

Figure 9 is a detail elevation showing the electric magnet for controlling the band valve of this form of the siren.

Figure 10 is a view partly in side elevation and partly in vertical section showing a further modified form of the siren.

Figure 11 is a similar view of a still further modified form of the siren, and

Figure 12 is a sectional view taken on the plane indicated by the line 12—12 of Figure 11.

Similar reference characters indicate corresponding parts throughout the several views in the drawing.

Referring in detail to the drawings, 10 designates the electric motor of the siren and 11 the armature shaft of the motor. The casing 10a of the motor 10 is carried by the rear wall 15a of a cylindrical housing 15, and this wall of the housing is provided with a bearing 15b for the shaft 11. The annular wall 15c of the housing 15 is provided with ports 21. The front wall 15d of the housing 15 carries a horn 16 and is secured in place by screws 15e. The inlet or front end of the horn 16 is flared as at 17.

A rotor 13 of hollow cylindrical formation, is located within the housing 15, and is carried by the shaft 11. The rear wall 13a of the rotor 13 is provided with a hub 12 which is mounted on the shaft 11 and which is secured thereto by a set screw 12a. The annular wall 13b of the rotor 13 is provided with ports 20, and the front wall 13c of the rotor is provided with a central opening 13d. The rotor 13 is provided with radial blades 14 which are relatively spaced and which extend from the rotor wall 13a to the wall 13c and from the wall 13b to the opening 13d.

A conical shaped member 18 is located within the center of the rotor 13 with its small end facing the horn 16. The conical-shaped member 18 is stationary, and is supported from the horn 16 by vanes 19. The vanes 19 are arranged radially on the conical-shaped member 18, and may be formed integrally with the conical-shaped member 18 and with the horn 16. The conical-shaped member 18 is provided at its apex with a forwardly directed extension 18a which is of tubular formation and in which the forward end of the shaft 11 is loosely mounted.

Air drawn through the horn 16 by the rotor 13, impinges the conical-shaped member 18, and is equally distributed by the conical-shaped board

18 to the chambers 13e of the rotor 13. The air flows from the rotor chambers 13e through the ports 20 of the chambers and the ports 21 of the housing 15.

Within the horn 16 forwardly of the conical-shaped member 18 is a fly valve 22, preferably in the form of a disc. Its center axle 23 is at right angles to the driving axis of the rotor 13 and such axle has journal fiittings 24 and 25 mounted in bearings 26 carried by the horn 16. This fly valve 22 creates, during the operation thereof, a pulsating sound due to its interruption at regularly recurring intervals for brief periods of the flow of air through the horn 16. It may be operated by the air drawn through the horn 16 by the rotor 13, or in any other suitable manner. However, it may be desired to have the valve 22 positively driven and to effect this there is a traction wheel or roller 27 secured to the front end of the driving shaft 11. This wheel or roller 27 has tracking on a disc 28 carried by the fly valve 22 at right angles to its axis. The disc 28 is kept in contact with a roller 27, by spring 28a and antifriction ball 28b, the pressure of the spring being adjustable by screw 28c. The valve 22, in the path of the wheel or roller 27, is cut away, as at 30, to provide clearance for the wheel or roller 27 during the rotation of the valve 22. Thus it will be apparent that the fly valve 22 is positively driven directly from the motor 10. Any other suitable mechanical means may be employed to rotate the fly valve 22.

In Figure 10, the fly valve, which is here designated 22a, is shown of substantially S-form in vertical section at right angles to its axis, whereby to adapt it to be operated by the air flowing through the horn 16.

In Figures 6 to 9, inclusive, there is shown a slight modification of the siren wherein the conical-shaped member 31 is integrally formed with the rotor 32 while the housing wall 35a has formed therewith the air directing vanes 34. If desired, the horn, here designated 33 and shown in dotted lines, may be omitted.

The housing 35 for the rotor has the peripheral ports 36 which are for the purpose similar to that for the ports 21. Surrounding the housing 35 exteriorly thereof, and rotatably mounted thereon, is an annular or band valve 37. This valve has ports 38 for registering with the ports 36 of the housing 35 and this valve is operated to impart vibrating or pulsating sound emissions in the working of the siren. The band valve 37 has thereon an arm 39 which has linkage at 40 to the movable core or armature 41 of an electromagnet 42 bracketed at 43 on the housing 35. This magnet 42 is arranged in an electric circuit which includes a current interrupter, these not being shown. The purpose of the magnet 42 and the current interrupter is to give to the band 37 intermittent turning movement for effecting the pulsating of signals issuing from the siren. The circuit and the interrupter (not shown) can be controlled or regulated in any desired manner to effect the proper pulsating sound to the siren.

The band valve 37 has provided therein a limit slot 44 in which is projected a stop pin 45 fixed to the housing 35 and the purpose of this construction is to limit the throw of the band 37 when being turned or rotated on the said housing 35 of the siren.

The electric magnet 42 is of any conventional kind having the movable armature 41, a spring 46 being fitted within the magnet 42 to act upon the armature 41 so that when current is interrupted the said armature 41 will be thrown outwardly for a setting of the band valve 37 with relation to the housing 35 of the siren, as will be clearly apparent.

If desired, the band valve may be mounted for continuous rotation and rotated by any suitable means, such as a train of gears or a belt connecting the valve to the shaft 11 or by a separate motor geared to the band valve. This is shown in Figures 11 and 12, wherein the band valve is designated 37a. The train of gears for rotating the band valve 37a comprises a pinion 47 mounted on and fixed to the motor shaft 11, and a gear 48 rotatably mounted, as at 49, on the housing 15 and engaging the pinion 47. The gear 48 carries at its added center a pinion 50 which meshes with a ring gear 51 carried by the band valve 37a. The band valve 37a is held on the housing 15 against axial displacement by the flange 15f of the front wall 15b of the housing 15 and by a keeper 52 fixed, as at 53, to the rear 15a of the housing 15 and contacting with the outer side of the ring gear 51.

The vanes 19 located in advance of the conical-shaped member 18 direct the air drawn in through the horn in such manner as to cause them to pass through the horn directionally in such manner as to effect their distribution equally to the chambers 13e of the rotor. As hereinbefore stated, the conical-shaped member 18 may be stationary or connected to the rotor for rotation therewith, and the siren may or may not be equipped with a horn. The siren may be secured to any suitable support by a bracket 53 secured to the rotor housing 15 below the motor casing 10.

From the foregoing, it is thought that the construction and manner of operation of the siren will be clearly understood and therefore a more extended explanation has been omitted, excepting that by the provision of the fly valve 22 or the band valve 37 or both in association with the siren, the latter is operative for the issuing of pulsating sounds while the conical-shaped member cone intensified such sounds for signalling purposes.

What is claimed is:

1. A device for producing a continuously modulated sound signal comprising in combination, a cylinder having a plurality of openings around the periphery thereof, a rotor device having vanes attached thereto and rotatably mounted in said cylinder, means carried by said rotor for opening and closing said openings as said rotor rotates, inlet means for admitting fluid to said rotor device, a conical-shaped member in said inlet means and axially aligned with said rotor deflecting the flow of fluid radially toward said rotor vanes, and means in said inlet means continuously varying the volume of fluid passing through said inlet means.

2. A device for producing a continuously modulated sound signal comprising in combination, a cylinder having a plurality of openings around the periphery thereof, a rotor having vanes attached thereto and rotatably mounted in said cylinder, a first means carried by said rotor for opening and closing said openings as said rotor rotates, a second means supplying fluid to said rotor vanes, an air-stream deflector deflecting the flow of fluid passing through said rotor vanes and a third means in said second means continuously varying the volume of fluid being deflected by said air-stream deflector.

3. A device for producing a continuously modulated sound signal comprising in combination, a

cylinder having a plurality of openings around the periphery thereof, a rotor having vanes attached thereto and rotatably mounted in said cylinder, means carried by said rotor for opening and closing said openings, means supplying fluid to said rotor vanes and means in said last-mentioned means continuously varying the volume of fluid supplied to said vanes.

4. In a siren of the character described, a horn, a rotor housing associated with said horn and having outlets, a driven rotor within the housing, a conical-shaped member arranged within the horn relative to the said rotor for intensifying the sound emissions from the said housing, a band rotatably fitting the housing exteriorly thereof and having openings for regulating and effecting sound pulsations emitted from the housing outlets, means imparting movement to the rotor, and means imparting movement to the said band relative to said housing.

5. In a siren of the character described, a horn, a rotor housing associated with said horn, a driven rotor within the housing, a conical-shaped member having an opening arranged within the horn and axially aligned with said rotor said rotor having a shaft extending through said opening, a driven fly valve rotatably located within the horn forwardly of said conical-shaped member and means between said shaft and said fly valve for driving the latter by the former.

6. In a siren of the character described, a horn, a rotor housing associated with said horn, a driven rotor within the housing, a conical-shaped member arranged within the horn relative to the said rotor, a fly valve located within the horn forwardly of the conical-shaped valve, and means for transferring motion imparted to the rotor to the said fly valve.

7. In a siren of the character described, a horn, a rotor housing associated with said horn, a driven rotor within the housing, a conical-shaped member arranged within the horn relative to the said rotor for directing the flow of air-stream to said rotor, a fly valve located within the horn forwardly of the conical-shaped member, means for transferring motion imparted to the rotor to the said fly valve, and wings formed on the fly valve and disposed at substantially right angles to each other.

8. In a siren of the character described, a horn, a rotor housing associated with said horn, a driven rotor within the housing, a conical-shaped member arranged within the horn relative to the said rotor for directing the flow of air-stream to said rotor, a fly valve located within the horn forwardly of the conical-shaped member, means for transferring motion imparted to the rotor to the said fly valve, and wings formed on the fly valve and disposed at substantially right angles to each other, the said rotor and housing being formed with sound emitting slots cooperative with each other.

9. In a siren of the character described, a horn, a rotor housing associated with said horn, a driven rotor within the housing, a conical-shaped member arranged within the horn relative to the said rotor for directing the flow of air-stream to said rotor, a fly valve located within the horn forwardly of the conical-shaped member, means for transferring motion imparted to the rotor to the

said fly valve, wings formed on the fly valve and disposed at substantially right angles to each other, the said rotor and housing being formed with sound emitting slots cooperative with each other, and vanes formed on the sounding board cone and the said rotor respectively.

10. In a siren of the character described, a cylindrical housing having an inlet opening in a side wall thereof and outlet openings in its peripheral wall, a rotor within the housing having radial chambers communicating at their inner ends with said inlet opening, the rotor chambers having openings at their outer end moving into and out of registration with the peripheral openings of the housing during the operation of the rotor, means for operating the rotor, a conical-shaped member located within the rotor inwardly of the rotor chambers with its apex facing the inlet opening of the housing, an apertured band valve mounted upon the housing for movement with relation thereto to cause its apertures to move into and out of registration with the outlet openings of the housing, and means for operating the band.

11. A siren of the character described in claim 10, wherein the conical-shaped member is stationary, and wherein stationary vanes are arranged radially with respect to the conical-shaped member and located between the same and the inlet opening of the housing.

12. A siren as described in claim 10, wherein the conical-shaped member is rotatable with the rotor, and wherein stationary vanes are arranged radially with relation to the conical-shaped member and between the same and the inlet opening of the housing.

13. A siren as described in claim 10, wherein the apertured band valve is mounted upon the housing for rotation with relation thereto to cause its apertures to move into and out of registration with the outlet openings of the housing, and a pinion driven by the means for operating the rotor, a gear rotatably mounted on the housing and engaging the pinion, said gear being provided at its center with a pinion, and a ring gear carried by the band valve and engaging said second pinion.

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REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,143,389	Hecht	June 15, 1915
1,143,703	Hecht	June 22, 1915
1,175,656	Northey	Mar. 14, 1916
1,324,784	Barr	Dec. 16, 1919
1,351,904	Hartman	Sept. 7, 1920
1,520,225	Cosgrove et al.	Dec. 23, 1924
1,534,016	Northey	Apr. 14, 1925
1,618,210	McClure	Feb. 22, 1927
1,624,587	Decot	Apr. 12, 1927
1,828,608	Mack	Oct. 20, 1931
1,866,019	Eshbough	July 5, 1932
2,114,654	Ekman	Apr. 19, 1938
2,354,684	Jones	Aug. 1, 1944
2,367,233	Millard	Jan. 16, 1945