E. M. VAUGHAN.

AUTOMATIC CLOSURE FOR AUTOMOBILE RADIATORS AND THE LIKE.

APPLICATION FILED FEB. 10, 1916.

1,335,356. Patented Mar. 30, 1920.

4 SHEETS—SHEET 1.

Fig 1.

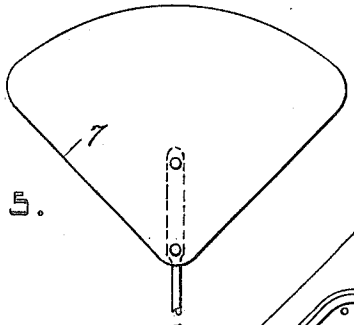
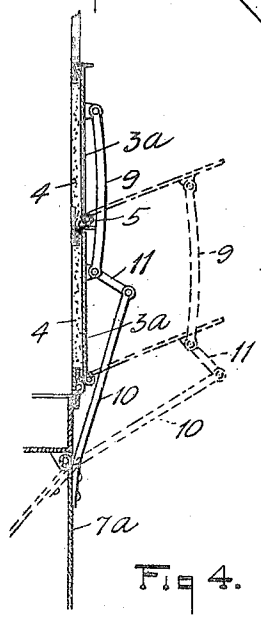



Fig 5.



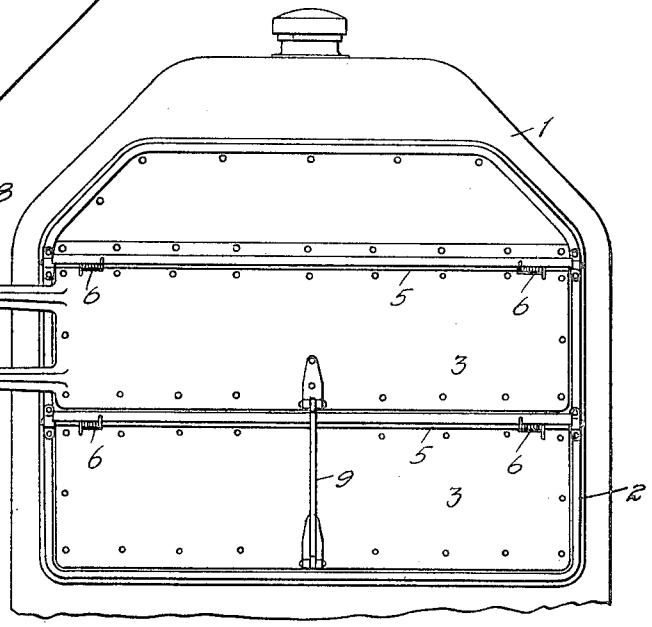




Fig 4.

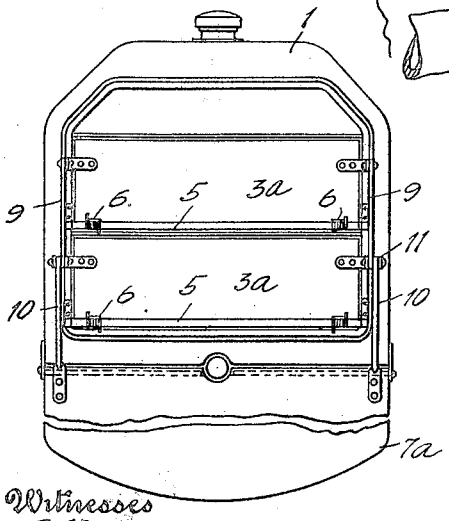



Fig 2.

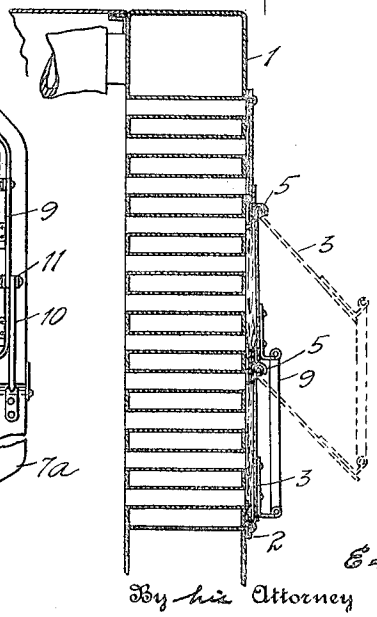
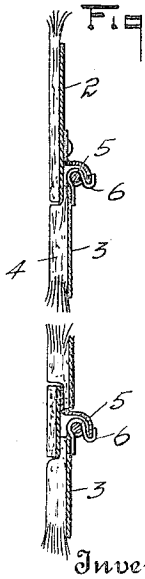



Fig 3.




Witnesses

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4 SHEETS—SHEET 2.

Fig 6a.

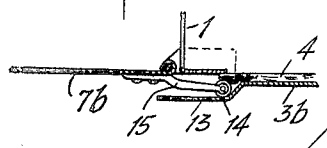



Fig 6.




Fig 8.

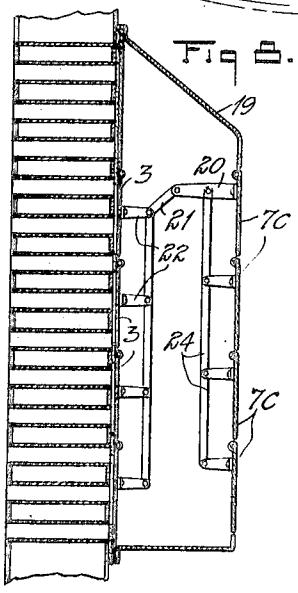



Fig 7.

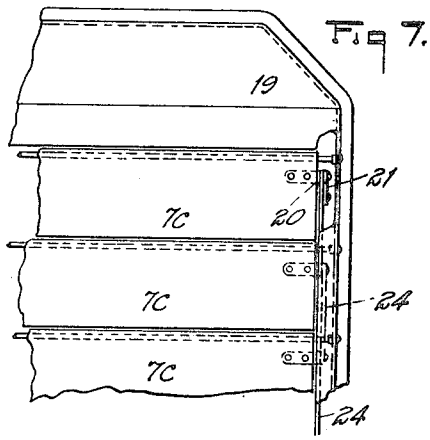
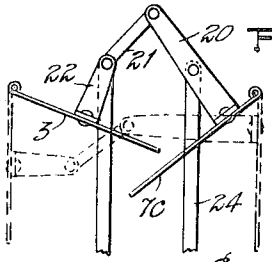



Fig 9.

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4 SHEETS—SHEET 3.

Fig 10.

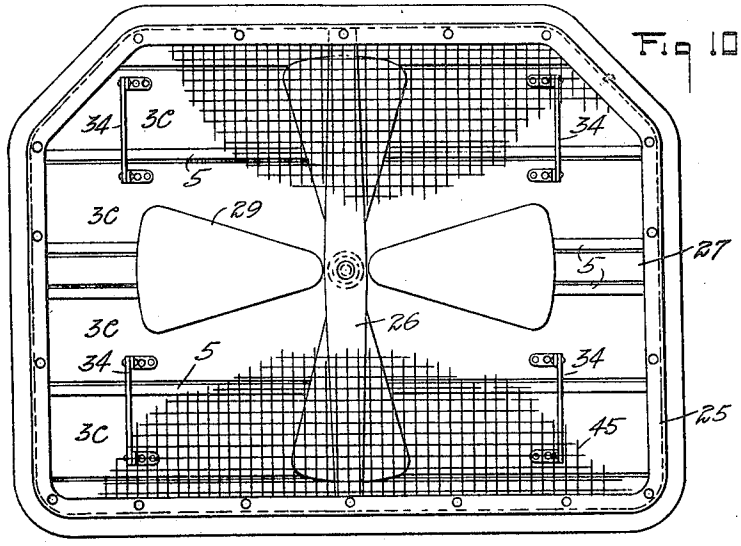



Fig 14

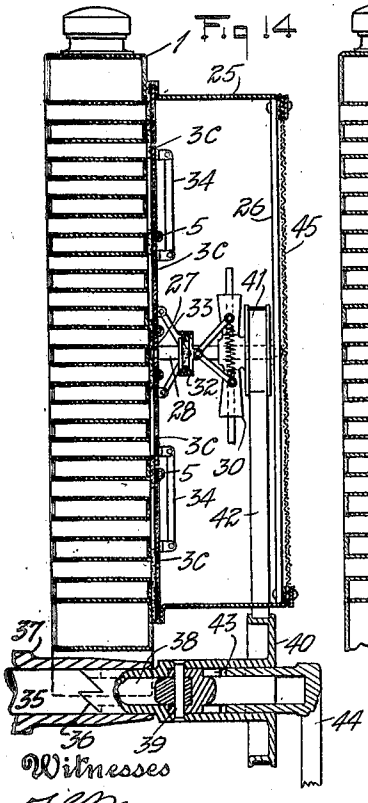



Fig 11.

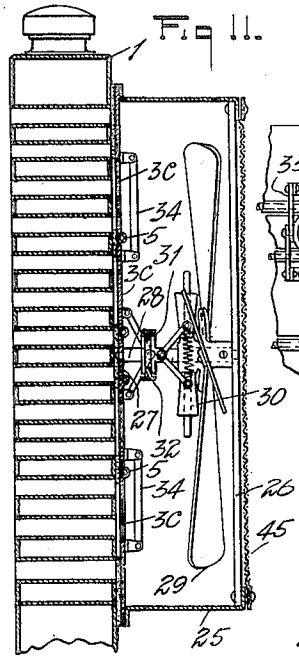



Fig 12.

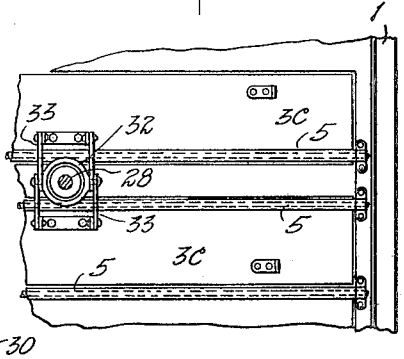
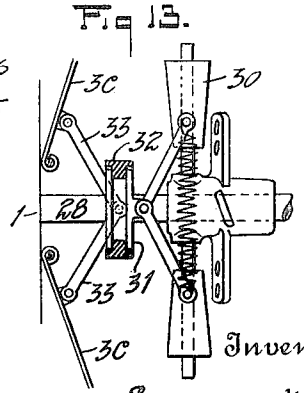



Fig 13.

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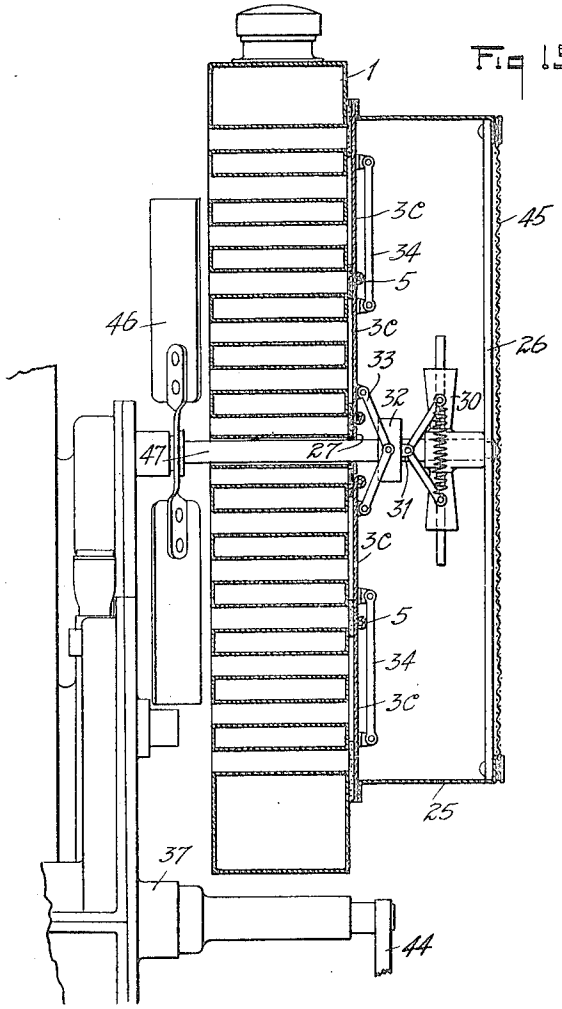
4 SHEETS—SHEET 4

Fig 15.

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# UNITED STATES PATENT OFFICE.

ERNEST M. VAUGHAN, OF BROOKLYN, NEW YORK.

## AUTOMATIC CLOSURE FOR AUTOMOBILE-RADIATORS AND THE LIKE.

1,335,356. Specification of Letters Patent. Patented Mar. 30, 1920.

Application filed February 10, 1916. Serial No. 77,427.

*To all whom it may concern:*

Be it known that I, ERNEST M. VAUGHAN, a citizen of the United States of America, and a resident of Brooklyn, in the city and State of New York, have invented certain new and useful Improvements in Automatic Closures for Automobile-Radiators and the like, of which the following is a specification.

My invention relates to means for automatically opening and closing the radiators of automobiles, aeroplanes and the like.

It is well known that in cold weather it is desirable to cover or close the radiators of automobiles, aeroplanes and the like, when the car or aeroplane is stationary, and particularly when the engine is stopped, in order to retain, so far as possible, the heat of the water or other liquid in the radiator, and for this purpose it is common to provide a cloth covering, which, however, must be raised by hand when the car or aeroplane is started, or when the engine is speeded up. Such closing of the radiator is desirable, not only to avoid freezing of the liquid in the radiator, but also to keep that liquid well heated so that the engine may operate with efficiency when started or speeded up. To raise the cover by hand is inconvenient, and moreover the raising of the cover is often neglected, inadvertently or otherwise, with the result that the liquid in the radiator boils. When, as is often the case in cold weather, the liquid in the radiator contains a highly volatile substance such as alcohol, much of the alcohol may be evaporated by this boiling, with the result that when the engine is again stopped, in cold weather, for any considerable length of time, the liquid in the radiator may freeze, with resulting rupture of the radiator. Repair of these radiators is a difficult and expensive operation.

My invention comprises an automatically opening and closing radiator damper or cover which, in certain forms, is caused to open by air pressure, such as is caused by forward motion of the automobile or aeroplane, while in other forms the rotation of the engine in itself causes the opening of such closure or damper or protector. In either case such closure or damper or protector closes automatically when the car comes to rest; and in the form in which the closure is controlled by rotation of the engine, such closure closes when the engine stops or when the speed of the engine becomes very slow. My invention consists in an automatically opening and closing radiator closure or protector such as described; and in means such as hereinafter described for effecting such automatic opening and closing; and generally, in the features hereinafter particularly pointed out in the appended claims.

The objects of my invention are to automatically open and close radiators such as referred to, to provide simple automatic means for effecting such opening and closure, either by wind pressure or by means affected by the speed of the engine, and to make the radiator protector readily applicable to existing radiators.

I will now proceed to describe my invention with reference to the accompanying drawings and will then point out the novel features in claims:

Figure 1 shows a front elevation of a typical automobile radiator provided with my improved automatic closure or protector or damper.

Fig. 2 shows a central vertical section of the said radiator and protector.

Fig. 3 shows on a larger scale a fragmentary central vertical section of the said closure or protector.

Fig. 4 is a view similar to Fig. 1, except that an alternative form of operating means for the closure or protector is shown.

Fig. 5 shows a fragmentary vertical section of the Fig. 4 construction.

Fig. 6 is a view similar to Fig. 1, except that a further alternative form of operating means is shown.

Fig. 6ª shows a detail horizontal section of a portion of the operating mechanism of Fig. 6.

Fig. 7 shows a fragmentary front elevation of a radiator fitted with a still further alternative form of automatic closure; and

Fig. 8 shows a central vertical section of the structure shown in Fig. 7; and

Fig. 9 shows a side elevation of the shutter-operating mechanism of the devices of Figs. 7 and 8.

Figs. 10, 11, 12 and 13 show damper operating mechanism operated by a windwheel; Fig. 10 showing a front view; Fig. 11 a central vertical section, Fig. 12 showing a fragmentary front elevation of the dampers, and Fig. 13 an elevation and partial

vertical section of the fly-ball mechanism driven by the wind wheel.

Fig. 14 shows a central vertical section of a radiator fitted with damper operating mechanism of the fly-ball type driven from the crank shaft of the engine.

Fig. 15 is a similar view showing fly ball damper-operated mechanism driven by the fan shaft of the engine.

Referring first to Figs. 1, 2 and 3: Numeral 1 designates the radiator itself, which may be of any usual construction, the construction shown being one familiar cellular type of radiator. The protector, closure or damper comprises a frame 2 secured to the front of the radiator 1 in any suitable manner, and having pivoted to it a plurality of swinging flaps or shutters 3, preferably covered on their rear sides with felt, asbestos, or other suitable sealing material 4, which, with the shutters 3 in closed position, will lie against the front surface of the radiator, so closing that radiator somewhat tightly. 5—5 designate the pivot rods for the dampers 3, and 6—6 designate springs tending to hold such dampers in closed position. In the construction shown in Fig. 1, these dampers 3 are arranged to be opened by air pressure, such as may be caused, for example, by the motion of the vehicle carrying the radiator, such air pressure acting upon a vane 7 connected by a rod 8 to one of the dampers 3, said damper 3 being connected to the other damper by a link 9.

It will be apparent that when the car moves forward, so creating air pressure against this vane 7, that vane will swing backward, so raising the damper 3 to which it is connected, the other damper 3 being raised by the link 9; and that when the car comes to rest the springs 6 will close the dampers.

In the arrangement shown in Fig. 4, the actuating vane, instead of being located above and to one side of the radiator, is located beneath the radiator, such vane being indicated in Fig. 4 by reference character $7^a$. This vane $7^a$ is connected to one of the dampers (which dampers in Fig. 4 are designated by numeral $3^a$) by arms 10 and links 11 (see Fig. 5); the two dampers $3^a$ being connected by a link 9 as in Fig. 4. In the construction of Figs. 4 and 5 the dampers $3^a$ are pivoted at the bottom instead of at the top, as in Fig. 1.

In the construction shown in Figs. 6 and $6^a$ wind-vanes $7^b$ are provided, but these wind-vanes are at the sides of the radiator, and have vertical pivotal axes 12. The dampers $3^b$, mounted and spring actuated as in Fig. 1, are provided with projecting ears 13 against which ears friction rollers 14 press, these friction rollers being carried by arms 15 secured to the wind-vanes $7^b$. It will be apparent that as these wind-vanes $7^b$ swing backward the dampers $3^b$ are raised. In Fig. 6 I have indicated in dotted lines the head lights 16 of the car, the mud guards 17 and the front axle 18. The wind-vane $7^b$ will be well in rear of the head lights, and therefore will not obscure these head-lights; also owing to the usual approximately parabolic form of the head lights, these head lights will not interfere materially with the action of air currents on the wind-vanes.

In the construction shown in Figs. 7, 8 and 9, a frame 19, having the general form of a box, is secured to the front of the radiator. This frame has dampers 3 arranged substantially as in Fig. 1, to close or open the radiator. The frame has also other shutters or wind-vanes $7^c$ located at the front of the said frame or box 19, one of which shutters $7^c$ is provided with arms 20 connected by links 21 to arms 22 carried by one of the dampers 3. The shutters $7^c$ are connected by links 24. As indicated particularly in Fig. 9, the linkage 20—21—22 is such that movement of the shutters $7^c$ will cause somewhat greater angular movement of the dampers 3. It is apparent that wind pressure acting upon the shutters $7^c$ will cause the opening of the dampers 3.

In the arrangement shown in Figs. 10, 11, 12 and 13, a frame 25 is secured to the front of the radiator. This frame comprises a vertical front center bar 26 and a rear horizontal center bar 27, on which bars a shaft 28 is rotatably mounted and carries a wind-wheel 29 provided with an ordinary sliding-weight centrifugal fly-ball mechanism 30 actuating a sliding grooved collar 31 on shaft 28. On this grooved collar 31 is a ring 32 engaging the groove of the collar and provided with links 33 connected to middle dampers $3^c$. Each middle damper is connected to another damper $3^c$ by a link 34. It will be apparent that as wind pressure causes the wind-wheel 29 to rotate, the centrifugal fly-balls will cause the dampers to open; and as the speed of the wind-wheel decreases, the fly-ball mechanism will cause such dampers to close.

Instead of operating centrifugal governor mechanism such as described by a wind-wheel, I may operate it by means driven by any suitable rotatable member of the car mechanism; for example, by the crank shaft. This is indicated in Fig. 14, wherein 35 designates the usual stub shaft projecting forward from the crank shaft, and to which, ordinarily, the starting crank is applied; said stub shaft having the usual clutch teeth 36. It is common to surround such stub shaft with a sleeve 37. I have shown a shaft 38 fitting into this sleeve 37 and engaging the teeth of the stub shaft 35, such shaft 38 being retained in place by any suitable means as for example a pin 39,

and I have shown this shaft 38 as provided with a belt pulley 40, the governor mechanism 30 being provided with another belt pulley 41, a driving belt 42 connecting the two pulleys. It will be apparent that when the engine starts the fly ball mechanism 30 will cause the dampers to open, and when the engine stops or slows down to low speed, the fly ball mechanism will cause the dampers to close.

The construction shown in Fig. 14 has the advantage that its operation is dependent entirely upon the speed of the engine, and occasion for opening of the radiator dampers arises only when the engine speed becomes considerable; moreover the degree of opening of the dampers is substantially directly proportional to the speed of the engine. When the car is standing, with its engine operated idly at low speed, little or no opening of the damper is required; but when the engine is speeded up, whether the car remains stationary or not, the dampers should open.

To permit the application of the starting crank I have shown the shaft 38 as held and provided with clutch teeth 43 which may be engaged by the starting crank 44 in the ordinary manner.

Preferably the front of the frame 25 in Figs. 11 and 14 is provided with a protecting foraminous shield 45 preventing interference with the wind-wheel 29 or fly ball mechanism 30.

Fig. 15 shows another damper-operating mechanism operated, in this case, from the shaft driving the ordinary radiator fan. 46 designates the ordinary radiator fan, which may be driven from the engine in any usual manner, and is mounted upon a shaft 47 which, in this case, extends through a central opening in the radiator 1, and carries at its front end fly-ball mechanism similar to that shown in Figs. 11, 13 and 14. The operation is the same as described with reference to Fig. 14.

What I claim is:

1. The combination with a movable vehicle having a radiator such as described, of automatic wind-influenced means for opening and closing such radiator.

2. The combination with a movable vehicle having a radiator such as described, of damper mechanism for opening and closing such radiator and automatic wind-influenced means for operating said damper mechanism.

3. The combination with a movable vehicle having a radiator such as described, of a closure for the radiator and automatic wind-operated means for opening such closure.

4. The combination with a movable vehicle having a radiator such as described, of a closure for the radiator comprising movable dampers fitting the front of the radiator closely, and automatic wind-operated means for opening and closing such dampers.

5. The combination with a movable vehicle having a radiator such as described, of damper mechanism for opening and closing such radiator, and means, operated by varying wind pressure, for operating such damper mechanism.

6. The combination with a movable vehicle having a radiator such as described, of damper mechanism for opening and closing such radiator, and means operated by varying wind pressure and comprising rotary centrifugal means for operating such damper mechanism.

7. The combination with a radiator such as described of damper mechanism for the radiator, and automatic means comprising rotary centrifugal mechanism for opening and closing such damper mechanism.

8. A radiator-closing attachment for automobile radiators and the like comprising means adapted to be attached to a radiator and comprising automatic wind operated means adapted for regulating passage of air to a radiator to which the device may be attached.

9. A radiator-closing attachment for automobile radiators and the like comprising means adapted to be attached to a radiator and having a plurality of swinging dampers adapted according to position to obstruct passage of air to said radiator or to permit free passage of air to such radiator, and automatical centrifugal means for operating such dampers.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

ERNEST M. VAUGHAN.

Witnesses:
H. M. MARBLE,
PAUL H. FRANKE.