

May 14, 1929.

T. L. HIBBARD

1,713,337

SCREEN FOR INTERNAL COMBUSTION ENGINES

Filed Nov. 15, 1927

4 Sheets-Sheet 1

Fig. 7.

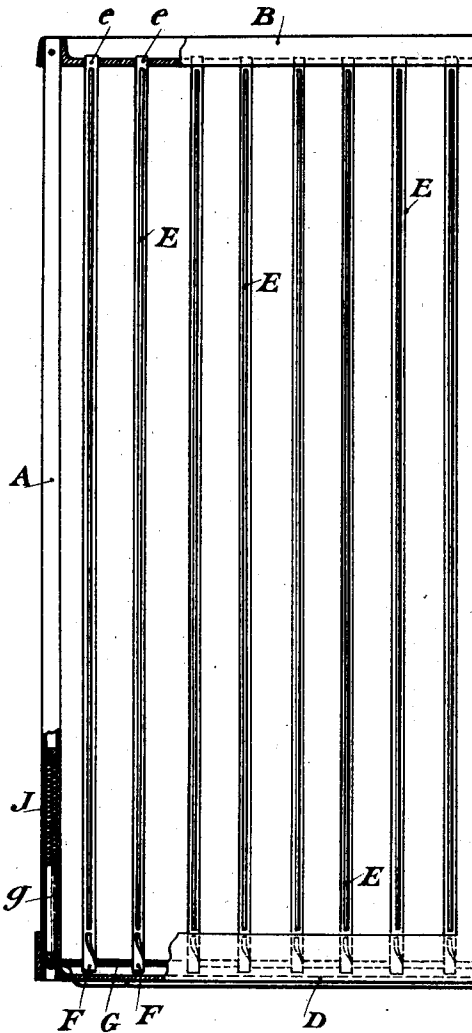


Fig. 1.

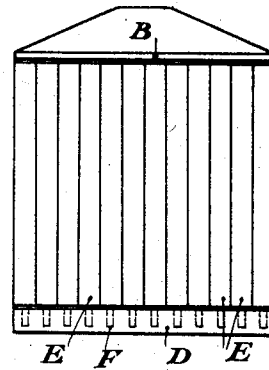


Fig. 2.

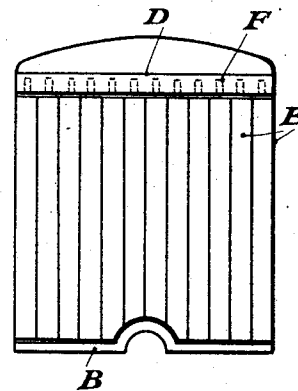


Fig. 4.

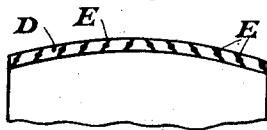
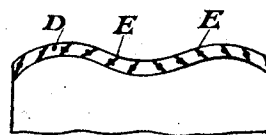


Fig. 5.



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Fig. 6.

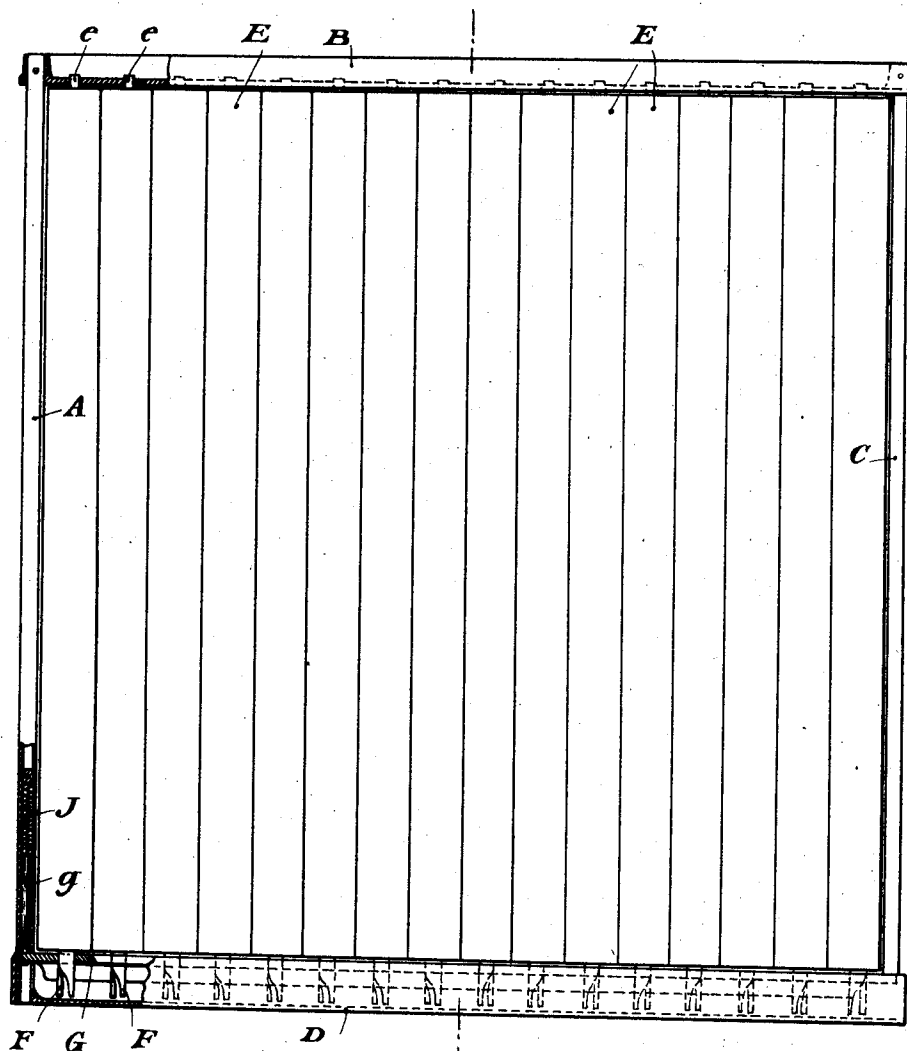
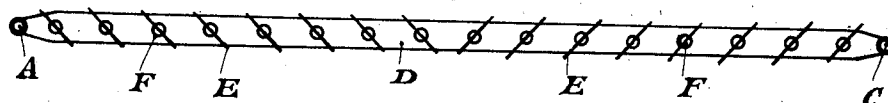


Fig. 3.



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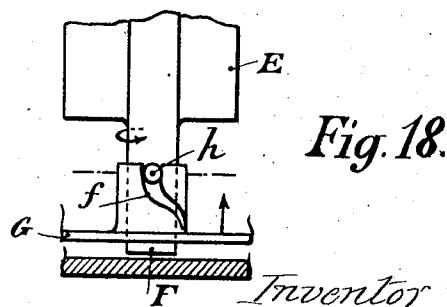
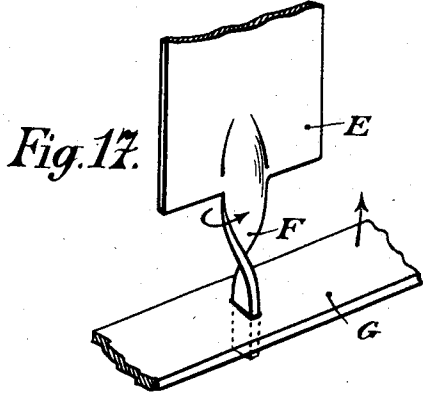
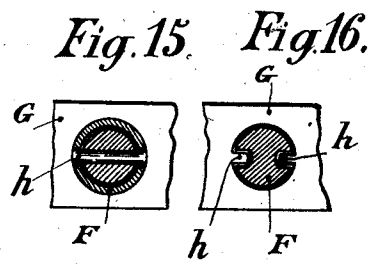
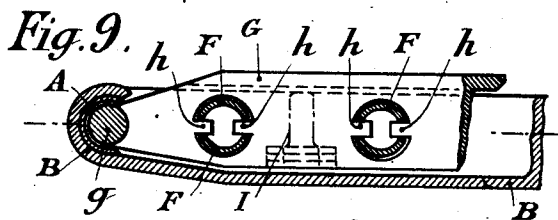
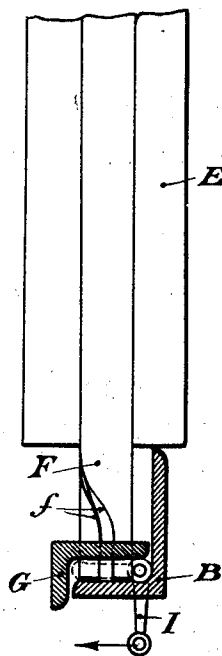
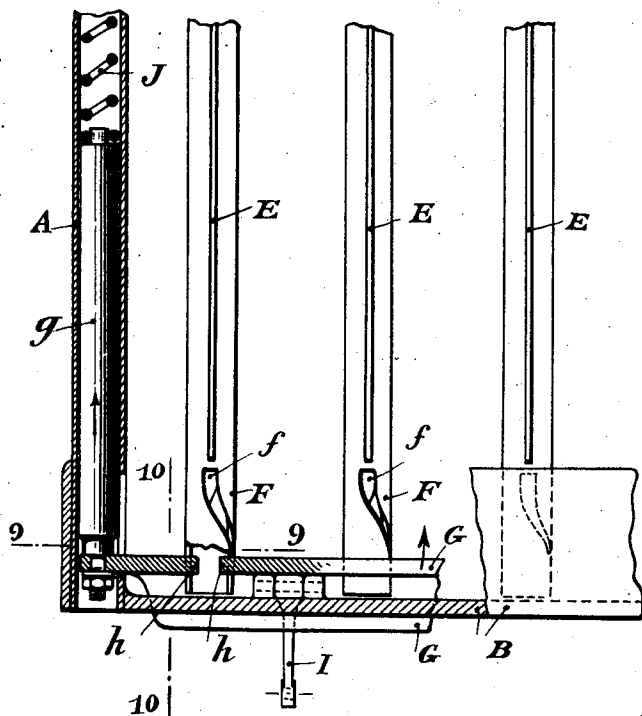
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Fig. 8.

Fig. 10.



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Fig. 11.

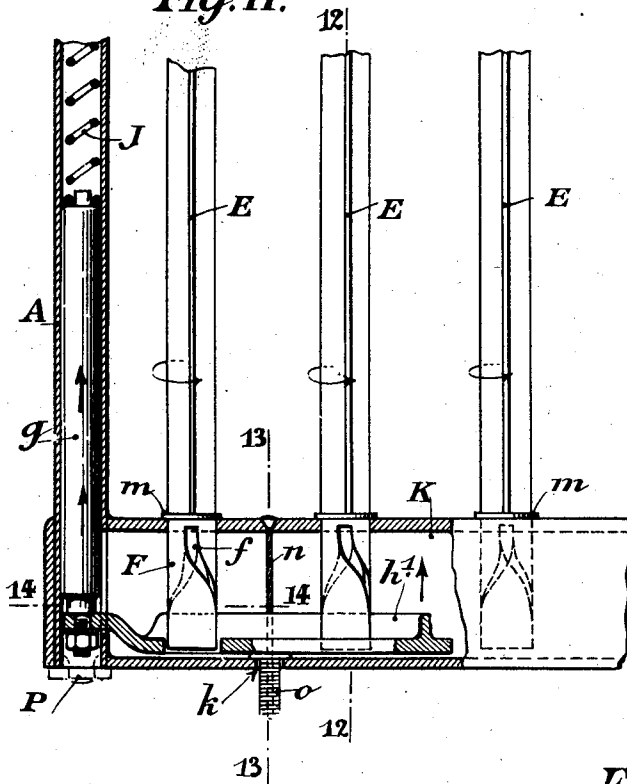


Fig. 12.

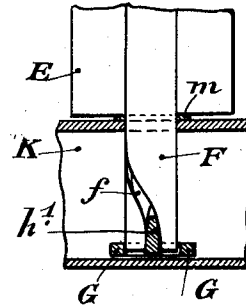


Fig. 13.

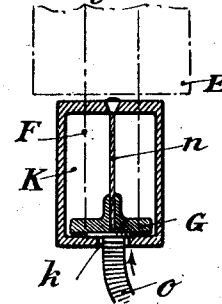


Fig. 14.

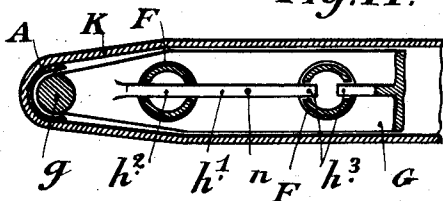
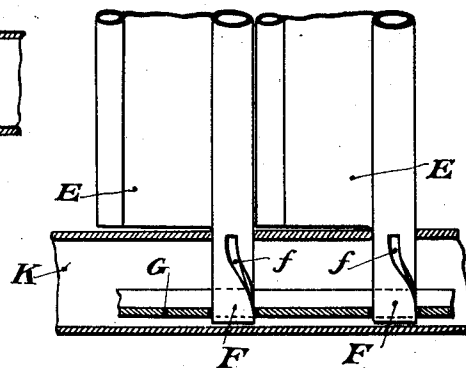


Fig. 19.



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SCREEN FOR INTERNAL-COMBUSTION ENGINES.

Application filed November 15, 1927, Serial No. 233,424, and in France December 23, 1926.

Internal combustion engines are generally cooled by means of a water circulation including, in the circuit of such circulation, a cooling radiator so placed that the air strikes normally against the active surfaces thereof.

It happens however in practice that, at the times of low temperature in winter or at high altitudes in aviation, the cooling frequently becomes exaggerated and interferes with the satisfactory working of the engine, or prevents starting up and acceleration of speed.

It has already been proposed to place a screen in front of the radiator, to shield it wholly or partially from too violent currents of air in winter. The screen, which may be flexible or rigid, has been composed of movable elements or flaps, which are pivotally mounted and adapted to be manoeuvred from a single control.

The object of the present invention is to improve the mechanism for operating these elements or flaps of a screen such as that indicated above.

By the use of the invention a mechanism can be produced in a very simple manner, suitable for the various forms of radiators peculiar to different makers.

The invention consists essentially in forming one of the pivots of each flap as a device furnished with one or more helicoidal grooves, with which grooves are adapted to mesh pins integral with an operating bar. This bar is movable in the direction of the axes of rotation of the flaps. Preferably, a single bar is utilized for the whole of the flaps, but in some cases the bar may be divided into sections and independent multiple controls provided.

It will of course be obvious that the reverse arrangement may be employed without departing from the principle of the invention, that is to say, the pivotal members of the flaps may carry the pin or pins, and the manoeuvring bar may be provided with socket having helicoidal grooves.

The axes of the flaps are preferably vertical, but they may be horizontal or inclined. Again, their rotation may be effected in a symmetrical fashion with respect to the plane of the longitudinal axis of the vehicle as illustrated hereafter.

The novel arrangement of operating mechanism is applicable to all kinds of radiator frames—more or less complicated or sinuous in form, and the flaps may be of any length

and the direction of the axes thereof any that may be suitable, without any alteration in the operating mechanism.

The said operating mechanism may be located either at the bottom or top of the radiator and it may be actuated even from the interior of the vehicle, for instance by a flexible or rigid transmission mechanism.

Various constructional embodiments of the said invention are shown, by way of example, in the accompanying drawings, in which:—

Figs. 1 and 2 are diagrammatic views, showing two constructions of radiators, with the multiple flaps closed, that is to say forming an entire closed screen.

Figs. 3, 4 and 5 are sectional plans showing the said flaps half open, that is to say turned through 45°.

Fig. 6 is an elevation, partly in section, of a first constructional embodiment of the operating mechanism in a very simple form, the flaps being in the completely closed position for intercepting the air current.

Fig. 7 is a similar view, showing only a portion of the mechanism with parts in section, the flaps being in the position of maximum opening for cooling the water circulation.

Fig. 8 is a detail, to a larger scale, corresponding to the lower left hand corner of Fig. 7.

Fig. 9 is a sectional plan on 9—9, of Fig. 8.

Fig. 10 is a transverse section on 10—10, of Fig. 8.

Fig. 11 illustrates a second constructional embodiment of the mechanism enclosed in a tight casing.

Fig. 12 is a transverse section on 12—12, of Fig. 11.

Fig. 13 is a similar section on 13—13, of Fig. 11.

Fig. 14 is another sectional plan on 14—14, of Fig. 11.

Figs. 15 and 16 illustrate constructional modifications of the pivots provided with helicoidal grooves.

Figs. 17 and 18 are constructional modifications of the axles showing means co-operating with the controlling grooves.

Fig. 19 is a part sectional elevation of another constructional modification in which the flaps have their axes of rotation towards one of the sides.

The apparatus comprises a rigid frame A—B—C—D, which may be in rigid con-

nection with or independent of the radiator proper. The transverse member B constitutes the bearing for the upper pivots *e* of the rotary flaps E.

5 In the construction according to the invention, the transverse member D simply forms the seating for the lower pivots F, the bearings for which are in a transverse bar G.

10 This bar G carries at each end a sliding guide *g* adapted to slide in the vertical up-rights A and C of the frame, part of which is constituted by tubes. These guides might be constituted by tubes on the outside of hollow or solid standards.

15 The bar G also carries pins *h*, engaging in helicoidal grooves on the pivots F of the flaps.

An operating device I is provided including levers, cams, flexible cables or the like, allowing for the raising upwards of the bar 20 G, the said bar being constantly impelled in the downward direction by return springs J.

When the bar G is moved upwards, for instance by means of an appropriate single operating device, which may be united to two 25 elements I, the pins *h* integral with the bar, slide in the grooves *f* in the pivots F, and communicate to these latter a motion of rotation corresponding to the height to which the bar is moved. Conversely, when the lifting 30 mechanisms are brought back to their initial position, the springs J lower the bar G and cause an opposite rotation of the flaps E.

35 It is to be observed that the return springs J might be omitted, and the mechanism I might be connected to the bar G by means of connecting links.

40 Figs. 11 to 14 show similar elements, but of different shape and suitable for arrangement in a casing K which replaces the lower member B of the framework of the apparatus, and is adapted to protect the reciprocating mechanism from the dust.

The operating bar G in place of being 45 shaped as previously, has a middle reinforcing rib *h*¹ which acts as a single engaging pin or element *h*², or a double pin or element *h*³ (as seen clearly at Fig. 14), engaging in a helicoidal groove *f* in the pivots F.

50 The elements on which the pivots are seated may be constituted by washers *m* coming at the base of the flaps E and forming cover plates on the joint with the casing.

55 The operation of the bar G is in this instance effected by means of a flexible transmission mechanism, the cable *n* being fixed to the upper portion of the casing and passing through the said bar G. The sheath *o* raises the latter by means of a washer which covers 60 the opening *k* in the casing.

The closure may in some cases be completed by a stopper P, Fig. 11.

The operation of the mechanism is exactly similar to that first described and such mechanism may be adapted for employment at the 65 top; bottom or sides of the radiator.

As will be seen at Figs. 15 to 18, the axles of the flaps may be of any suitable shape including means for transforming, by means of helicoidal grooves or other inclined sur- 70 faces, the rectilinear movement of reciprocation of the operating bar into a rotary movement of the flaps. These latter may be adapted to be rotated about their geometrical axes, or in some cases about one of their sides, 75 as indicated at Fig. 19.

What I claim and desire to secure by Letters Patent of the United States of America is:—

1. In screens of the type described for the 80 radiators of internal combustion engines, a construction including a framework, flaps carried by spindles mounted in the said framework, a bar provided with perforations through which the said spindles pass, means 85 for reciprocating the said bar in the direction of the axes of the said spindles, helicoidal grooves on the said spindles and pins carried by the said bar and meshing in the said grooves for causing the spindles to turn and to 90 open or close the flaps as the bar is reciprocated, for the purposes set forth.

2. In screens of the type described for the radiators of internal combustion engines, a construction including a framework, flaps 95 carried by tubular spindles mounted in said framework, a bar adapted to reciprocate in the direction of said tubular spindles, helicoidal slots in said tubular spindles and a middle reinforcing rib carried by said bar 100 and engaging said slots for causing the spindles to turn as the bar is reciprocated.

3. In screens of the type described for the radiators of internal combustion engines, a construction including a framework, flaps 105 carried by spindles mounted in the said framework, a casing into which the spindles pass at one end, a bar adapted to reciprocate in the direction of the axes of the said spindles and within the said casing, means for reciprocating the said bar, said means including a flexible transmission mechanism of and comprising a cable fixed to the upper portion of the casing and passing through said bar, and a flexible sheath for said cable, said sheath 115 being adapted to bear on the under side of said bar through the medium of a washer, and co-operating helicoidal means between said bar and the spindles of the flaps for causing the latter to turn as the bar is reciprocated. 120

In witness whereof I affix my signature.

THOMAS LAURENCE HIBBARD.