Oct. 21, 1930. J. E. BERGGREN ET AL 1,779,084

FAN APPARATUS

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FIG. 1.

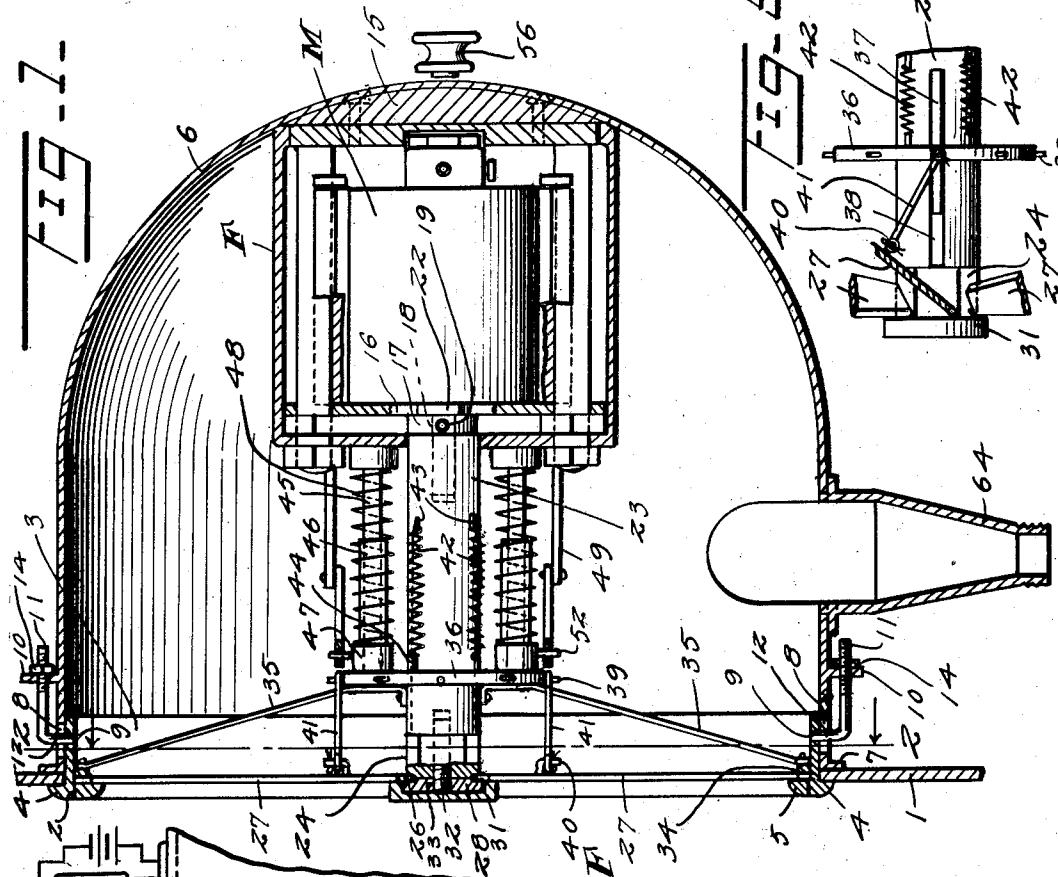


FIG. 5.

FIG. 3.

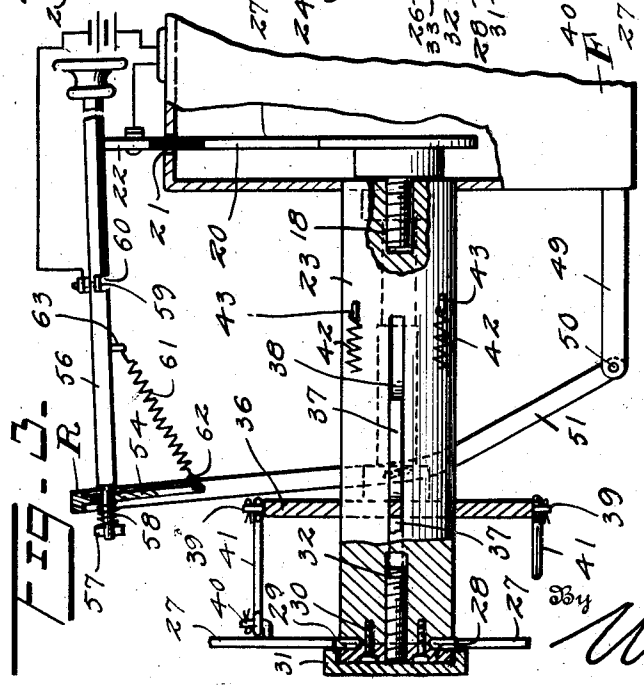
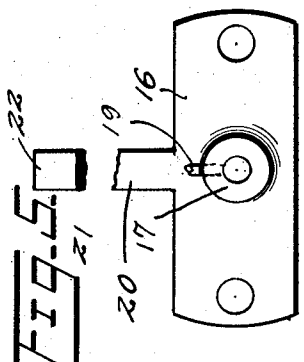


FIG. 4.



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Fig. 2.

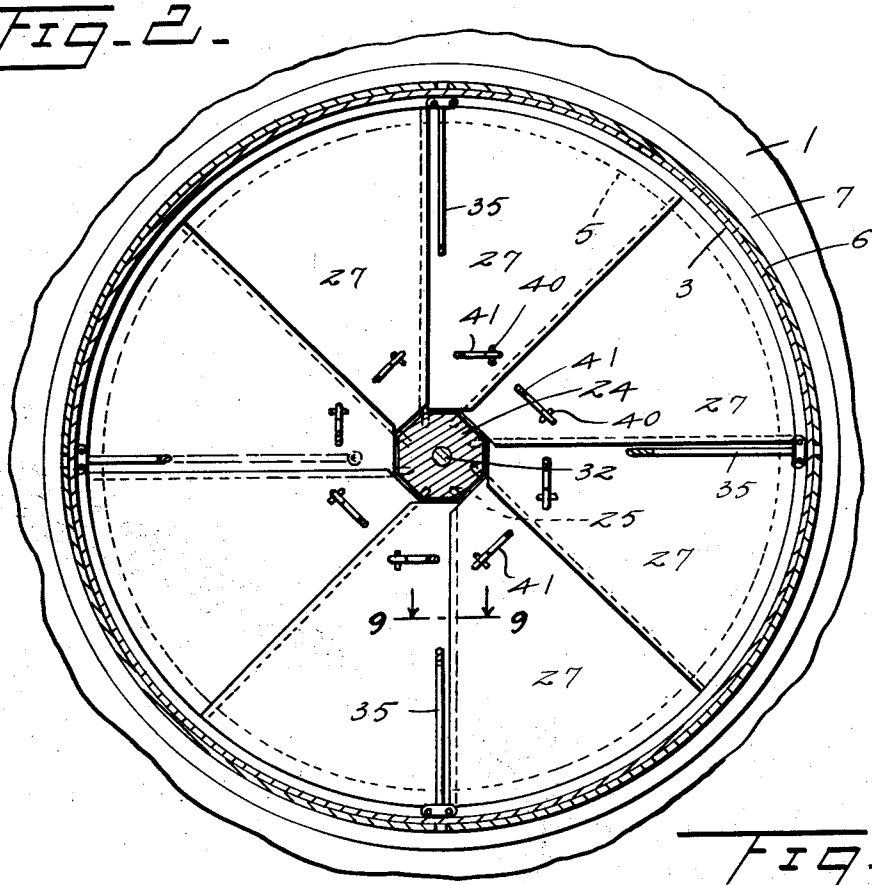


Fig. 7.

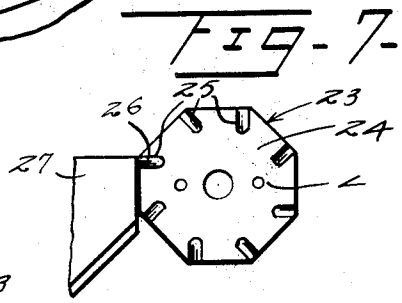


Fig. 4.

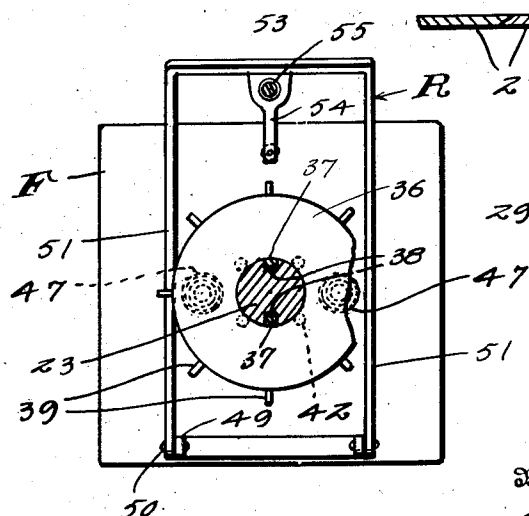
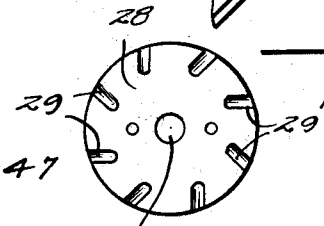


Fig. 9.

Fig. 8.



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UNITED STATES PATENT OFFICE

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FAN APPARATUS

Application filed May 21, 1929. Serial No. 364,826.

This invention relates to fan apparatus and it is primarily an object of the invention to provide a device of this kind especially designed and adapted for use in connection with a closed body of a motor driven vehicle.

Another object of the invention is to provide an apparatus of this kind including a revolving fan, the blades of which being disposed for swinging movement independently of the rotation of the fan and which blades, when the fan is still, serve as a closure member to prevent ingress of air.

A further object of the invention is to provide an apparatus of this kind including a rotating fan together with a motor therefor and wherein the blades of the fan are supported for swinging movement independently of the rotation of the fan, with means for adjustin; the blades into either operative or inoperative position, said means also serving to control the operation of the motor.

The invention consists in the details of construction and in the combination and arrangement of the several parts of our improved fan apparatus whereby certain important advantages are attained and the device rendered simpler, less expensive and otherwise more convenient and advantageous for use, as will be hereinafter more fully set forth.

The novel features of our invention will hereinafter be definitely claimed.

In order that our invention may be the better understood, we will now proceed to descrive the same with reference to the accompanying drawings, wherein:—

Figure 1 is a view partly in horizontal section and partly in top plan illustrating a fan apparatus constructed in accordance with an embodiment of our invention;

Figure 2 is a sectional view taken substantially on the line 2—2 of Figure 1 looking in the direction of the arrows;

Figure 3 is a fragmentary view partly in section and partly in side elevation illustrating the means herein embodied for regulating the operation of the motor and for adjusting the blades of the fan into either open or closed position;

Figure 4 is a fragmentary view partly in vertical section and partly in front elevation of the mechanism as illustrated in Figure 3, the line of section being in advance of the sliding collar as illustrated in Figure 2 with the blade connecting rods omitted;

Figure 5 is an elevational view of a front motor plate;

Figure 6 is a fragmentary view partly in top plan and partly in section on a reduced scale of the forward end portion of the shaft and certain of the parts associated therewith;

Figure 7 is a view in elevation of the outer end of the shaft with an associated fan blade in fragment in applied position with respect thereto, the blade holding plate and cap being omitted;

Figure 8 is an elevational view of the inner face of the blade holding plate;

Figure 9 is a fragmentary sectional view taken substantially on the line 9—9 of Figure 2.

Our improved apparatus as herein disclosed is especially adapted for use in connection with a closed body of a motor driven vehicle and as many of the apparatus may be used as the requirements of practice may prefer. Each of the apparatus is also adapted to be positioned as desired upon the car body but preferably at a point below the cowl and associated with a side wall 1 of the car body. In the accompanying drawings only a single apparatus is illustrated as this is believed to be sufficient for the purposes of disclosure.

The wall 1 of the car body at a desired location is provided with an opening 2 through which is inserted from without an annular barrel or sleeve 3, the outer marginal portion of which being defined by an outstanding bead or flange 4 abutting the outer face of the wall 1. Snugly fitting within the outer end portion of the barrel or sleeve 3 is a rotatable rim 5.

A casing 6 of desired dimensions and configuration is arranged at the inner side of the wall 1 and has its forward end open to telescopically receive the inner portion of the barrel or sleeve 3. This outer open end of the casing 6 is defined by an outstanding

flange 7 for contact with the inner face of the wall 1. At suitably positioned points the forward or open end portion of the casing 6 is provided in its wall with the slots 8 with each of which registers an opening 9 in the sleeve or barrel 3. Inwardly of each of the slots 8 the wall of the casing 6 is provided with an outstanding lug 10 through which is freely directed an end portion of a shank 11.

The outer portion of the shank 11 is continued by an inwardly disposed angular finger 12 to extend through the adjacent slot 8 and into the opening 9 whereby means are provided for effectively holding the casing 6 and the sleeve or barrel 3 in applied position with respect to the opening 2 in the wall 1. The shank 11 inwardly of the lug 10 has threaded thereon a tightening nut 14 whereby the desired locking of the casing 6 to the barrel or sleeve 6 is maintained and also the desired connection with the wall 1.

Anchored within the casing 6 to the central portion of the rear wall thereof is a block 15 providing a mounting for a motor frame F of desired configuration and dimensions. Suitably supported within the frame F is an electric motor M with which is associated a desired operating circuit.

Held against the forward face of the motor M is a horizontally disposed plate 16 having a forwardly disposed bearing 17 through which is directed an armature shaft 18 of the motor M. This bearing 17 has extending therethrough an oil line 19 leading from a suitable source of supply and whereby desired lubrication of the bearing 17 is assured.

The plate 16 is also provided with an upstanding arm 20 of a length to terminate above the motor frame F, the upper or outer end of said arm being insulated, as at 12, from the remaining portion to provide an electrical contact 22 interposed in the operating circuit for the motor M.

The armature shaft 18 is in threaded engagement or otherwise coupled to the fan shaft 23, said shaft being of a length to terminate closely adjacent to the outer end of the applied barrel or sleeve 3 at the axial center thereof.

The outer or free end portion 24 of the fan shaft is angular in cross section and preferably octagonal. An outer end face of said shaft 23 at substantially the junction of adjacent facets in its portion 24 is provided with recesses 25 each of which being adapted to receive a trunnion 26 carried by an end portion of a fan blade 27. A plate 28 is adapted to be applied over the outer end of the shaft 23 and said plate is provided with recesses 29 for registry with the recesses 25 whereby effective mounting is assured for the trunnion 26 of each of the blades 27. The plate 28 is maintained in applied position by holding screws 30 disposed through the plate 28 and engaged within the adjacent end face of the shaft 23. A slip cap 31 is placed upon the applied plate 28, said cap 31 at its axial center being provided with an inwardly extending shank 32 for threaded engagement within the outer end face of the shaft 23, the plate 28 at its axial center having an opening 33 to permit the requisite mounting of the cap 31. The cap 31 projects beyond the periphery of the shaft 23 thus providing a stop shoulder for limiting the closing or outward swinging movement of the blades 27.

The outer end portion of each of the blades 27 is in pivotal connection, with the rim 5 hereinbefore referred to. The rim 5 is connected for rotation with the shaft 23 through the medium of the interposed spoke members 35, the same being herein disclosed as disposed toward the shaft 23 on an incline inwardly of the applied casing 6.

Slidably mounted on the shaft 23 is a collar 36, the inner marginal portion of which at diametrically opposed points carrying the keys or arms 37 extending beyond opposite faces of the collar 36 and positioned within the grooves 38 extending lengthwise of the shaft 23. These grooves 38 are of a length greater than the keys or arms 37 and which is of particular advantage in permitting the collar 36 to have limited movement inwardly of the shaft 23.

The periphery of the collar 36 is provided with the outstanding pins 39 of a number equal to the number of blades 27 and operatively connected with each of the pins 39 and a blade 27, as at 40, is a rod 41 so that upon movement of the collar 36 along the shaft 23 the blade 27 will be swung into either open or closed position in accordance with the direction of travel of the collar 36.

The collar 36 is constantly urged inwardly to maintain the blades 27 in desired open position through the medium of the retractile springs 42 of desired tension, said springs at their inner ends being connected, as at 43, to the shaft 23 and having their opposite end portions connected, as at 44, to the collar 36.

At opposite sides of the shaft 23 the frame F is provided with forwardly disposed elongated members 45 with the outer end portion of each of which is in telescopical engagement an elongated tubular member 46. The outer portion of the member 46 carries a head 47 for contact from within or at the rear with the peripheral portion of the collar 36.

Surrounding each assembly of members 45 and 46 is an expansible spring 48 of a tension greater than that of a spring 42 so that each of the members 46 will have a tendency to constantly urge the collar 36 outwardly to maintain the fan blades 27 closed.

Extending forwardly from the motor frame F, and herein disclosed as below the shaft 23, are the arms 49 to the outer extremities of which are pivotally connected, as at

50, the free end portions of the side members 51 of a rocking frame R. This rocking frame R is substantially in the form of an inverted U and straddles the shaft 23. The side members 51 at desired points intermediate their ends are operatively connected, as at 52, with the heads 47 of the members 46 so that when the frame R is swung inwardly toward the frame F said heads 47 will be drawn away from the collar 36, thus permitting the springs 42 to function to move the collar 36 inwardly of the shaft 23 and adjust the blades 27 in desired open or working position. When the frame R is released the tension of the springs 48 will result in an outward movement of the heads 47, the resultant contact of which with the collar 36 returning the blades 27 to their closed position.

The intermediate portion 53 of the frame R is provided with the depending arm 54 having an opening 55 through which is freely directed an end portion of an operating rod 56. This rod 56 in advance of the arm 54 has threaded thereon a nut 57 and interposed between this nut 57 and the adjacent portion of the arm 54 and encircling the outer end portion of the rod 56 is a compression spring 58 of requisite tension.

This rod 56 is of a desired length to terminate in close proximity to the occupant of the body of the vehicle so that the same may be readily manipulated to effect the desired opening of the blades 27 when it is desired to have the apparatus function.

At a desired point therealong the rod 56 carries a contact 59 interposed in the operating circuit for the motor M, said contact 59 being herein disclosed as arranged within the base portion of an undernotch 60 in the rod 56. When the rod is pulled inwardly or rearwardly to permit the blades 27 to assume an open position, when said blades 27 are in substantially full open position, the contact 22 will be engaged within the notch 60 and the resultant engagement between the contacts 22 and 59 will effect a closing of the operating circuit for the motor M. This contact is maintained, as herein disclosed, by a retractile spring 61 connected at one end, as at 62, to the lower portion of the arm 54 and having its opposite end portion connected, as at 63, to the rod 56 at a desired point inwardly of the arm 54.

When the rod 56 is moved forwardly to permit the blades 27 to close it is necessary that the locking engagement between the rod 56 and the upper portion of the arm 20 or the contact 22 thereof be released, thus resulting in a breaking of the operating circuit of the motor M with the consequent stopping of the fan proper. Therefore, it will be readily noted that when the fan is not in operation the blades 27 will assume a position to close the opening 2 in the wall 1 to prevent ingress of air, but that when the fan is in rotation it is assured that the blades 27 thereof will be in desired open position.

It is to be stated that should it be desired to use our apparatus for heating purposes the open end or face of the casing 6 may be arranged for communication within the hood of the vehicle or any other desired source of heated air. The current or blast of air created by the fan blades 27 is drawn within the casing 6 and discharged out through the nozzle or air funnel 64. The outer end portion of this funnel 64 is adapted to have coupled thereto a suitable hose or conduit leading to the desired point of discharge and at which discharge may be arranged a register or air spreading device of any desired type or construction.

From the foregoing description it is thought to be obvious that a fan apparatus constructed in accordance with our invention is particularly well adapted for use by reason of the convenience and facility with which it may be assembled and operated, and it will also be obvious that our invention is susceptible of some change and modification without departing from the principles and spirit thereof and for this reason we do not wish to be understood as limiting ourselves to the precise arrangement and formation of the several parts herein shown in carrying out our invention in practice except as hereinafter claimed.

We claim:—

1. A fan apparatus comprising a shaft, means for rotating the same, blades rotating with the shaft, means for supporting the blades for movement into open or closed position, a collar mounted upon the shaft for movement lengthwise thereof, an operative connection between each of the blades and the collar for moving such blade into open or closed position upon movement of the collar along the shaft, a member supported for sliding movement toward or from the collar, a spring for urging said member into contact with the collar and to move the collar along the shaft in a direction to close the blades, means for moving said member away from the collar to permit the collar to have movement along the shaft in a direction to open the blades, and a spring coacting with the collar and shaft to impart said last named movement to the collar, said last named spring being of less tension than the first named spring.

2. A fan apparatus comprising a casing having an induction and an eduction opening, an operating member mounted in the casing, fan blades secured to the operating member and adapted for rotation therewith, spring pressed means for swinging the fan blades into operative position, and manually controlled spring pressed means for urging the blades into closed position against the

tension of said first named spring pressed means.

3. A fan of the character described comprising a casing having an induction and an eduction opening, a motor mounted in the casing, an elongated shaft secured to the motor, a plurality of blades swingably secured to the shaft, resilient means engaging the blades and the shaft for constantly urging the blades into open position, a manually controlled switch for said motor, spring pressed closure means for urging the blades into closed position, and means connected to the switch and said spring pressed closure means for holding the closure means against operation upon closing of the switch.

4. A fan of the character described comprising a casing, a motor mounted in the casing, an elongated shaft secured to one end of the motor and adapted for rotation therewith, a plurality of swingable fans secured to said shaft and adapted for rotation therewith, a slidable member positioned on said shaft, means connecting said slidable member to said blades whereby to swing said blades upon movement of said slidable member, resilient means connected to said shaft and said slidable member whereby to constantly urge said blades into open operative position, a manually operable switch for said motor, a plurality of spring pressed members positioned about said shaft and engaging said slidable member whereby to constantly urge said slidable member forwardly and coactively urge said blades into closed position, and means connected to said manually operable switch and engaging said spring pressed members whereby to hold said spring pressed members in inoperative position while simultaneously closing the switch and permitting the slidable member to swing said blades into operative position.

In testimony whereof we hereunto affix our signatures.

JOHN E. BERGGREN.
GRANT W. BERGGREN.