

Nov. 28, 1961

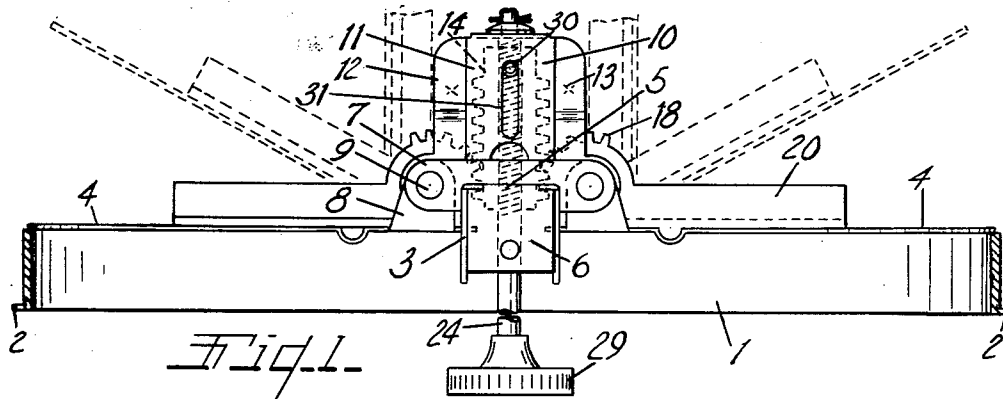
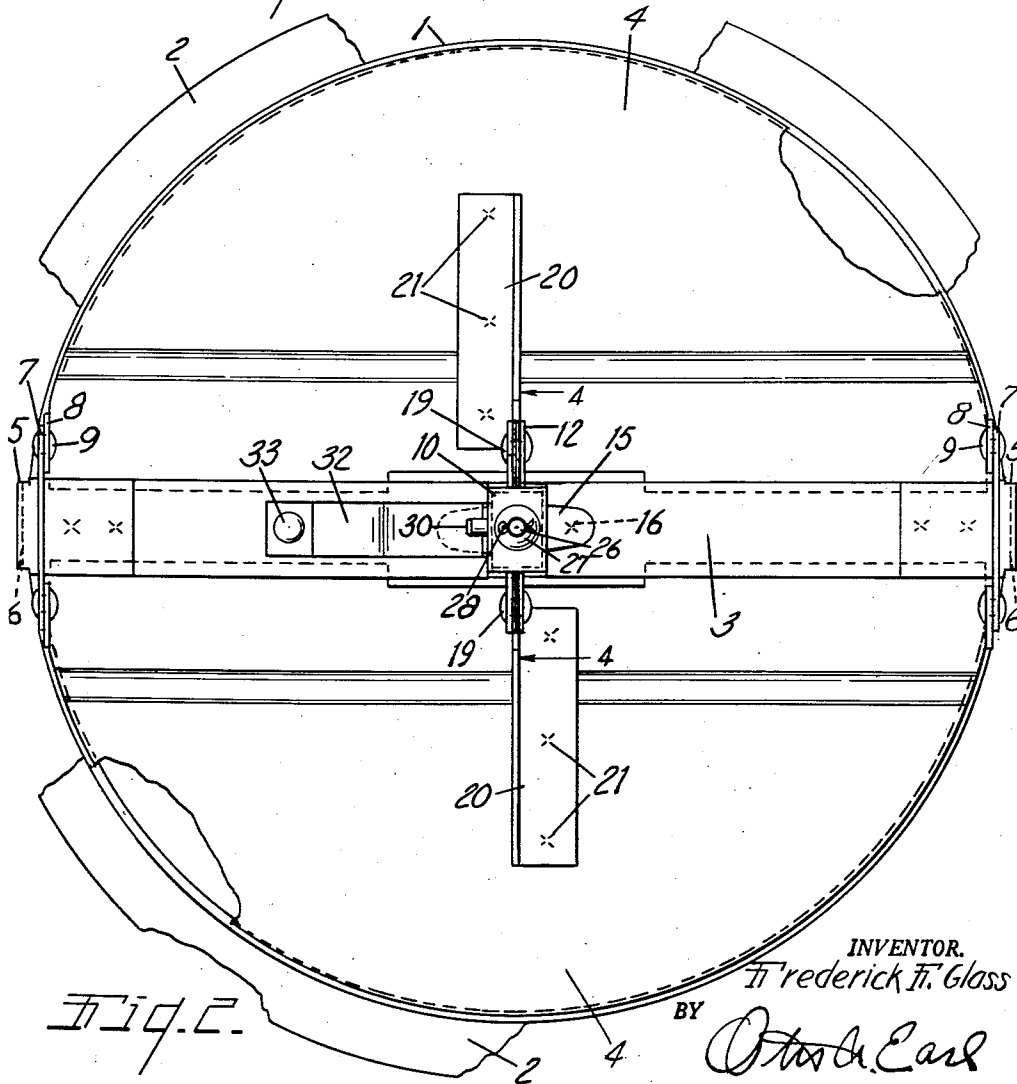
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3,010,381

CIRCULATION CONTROL DAMPER

Filed Aug. 31, 1959

2 Sheets-Sheet 1



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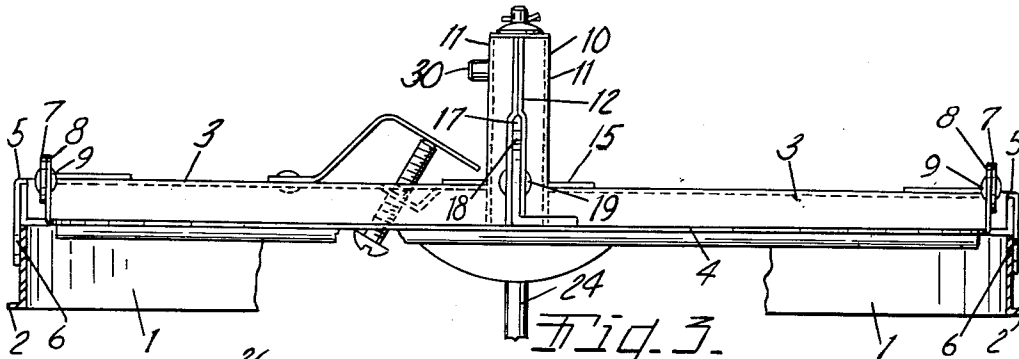
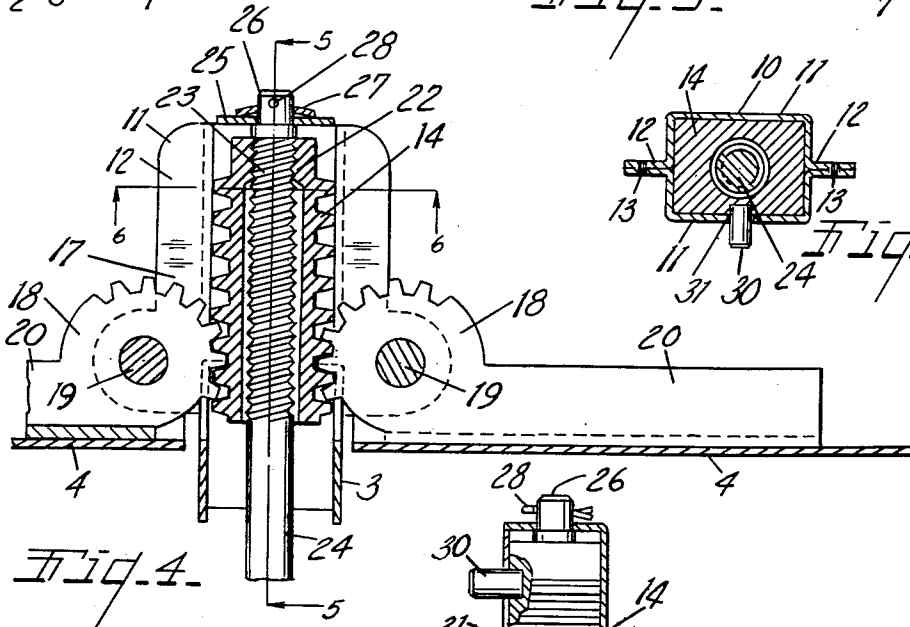
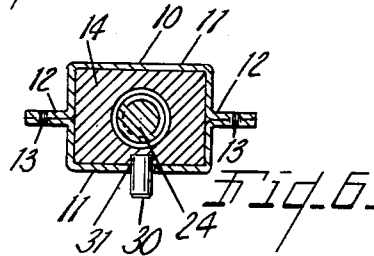
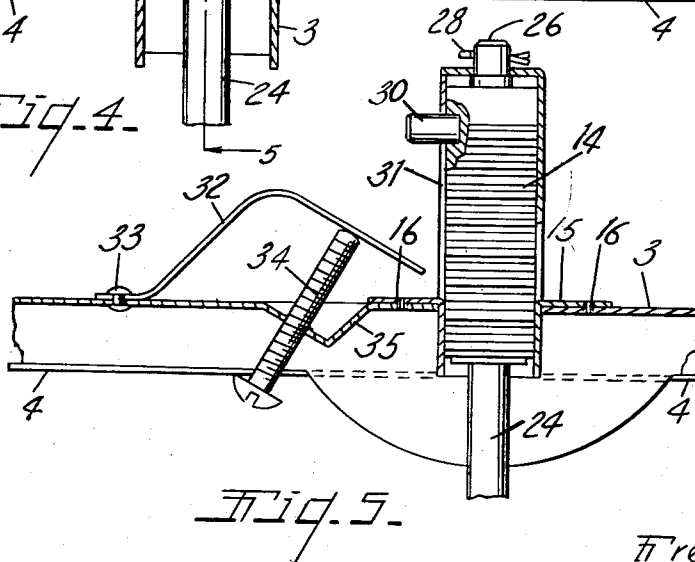
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CIRCULATION CONTROL DAMPER

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2 Sheets-Sheet 2



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3,010,381

CIRCULATION CONTROL DAMPER

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10 Claims. (Cl. 98-41)

This invention relates to circulation control dampers and ones which are well adapted for use either as inlet or outlet controls. The main objects of this invention are,

First, to provide an air damper which is well adapted for use as a circulation control damper and is capable of a wide range of adjustment and one in which the damper members are effectively retained in their adjusted positions.

Second, to provide an air circulation damper having these advantages in which the damper blades or members are supported in their adjusted position without chattering as a result of fluctuations in the air circulated through the same.

Third, to provide a damper having these advantages in which a pair of blades may be simultaneously adjusted and maintained in their adjusted position without locking means other than the adjusting means.

Fourth, to provide a damper embodying these several advantages which may be quite economically produced and one in which the operating parts are subjected to very little wear in use.

Objects relating to details and economies of the invention will appear from the description to follow. The invention is defined and pointed out in the claims.

A preferred embodiment of the invention is illustrated in the accompanying drawing, in which:

FIG. 1 is a fragmentary view of a damper embodying my invention with the damper blades shown in closed position by full lines and in fully open and partially open position by dotted lines.

FIG. 2 is a fragmentary plan view with the damper blades in closed position.

FIG. 3 is an elevational view from the left of FIG. 1 with the frame partially in section.

FIG. 4 is an enlarged fragmentary sectional view on a line corresponding to line 4-4 of FIG. 2.

FIG. 5 is a fragmentary view mainly in section on a line corresponding to line 5-5 of FIG. 4.

FIG. 6 is a horizontal section on a line corresponding to line 6-6 of FIG. 4.

In the accompanying drawing the damper illustrated is a circular damper, but it will be understood that the dampers embodying my invention are produced as both circular and rectangular dampers and that both forms are commercially used.

In the accompanying drawing the frame 1 is a cylindrical frame and is provided with an outwardly projecting attaching flange 2 at its lower edge. The damper support member, designated generally by the numeral 3, is adapted for use in either rectangular or cylindrical dampers, the only variations being in the shape of the frame and the peripheral shape of the blades 4. The support member 3 is of downwardly facing channel section and is provided with terminal members 5 terminating in the downwardly projecting arms 6 which embrace and are secured to the outer side of the frame 1. The support member 3 is provided with laterally projecting ears 7 to which the upwardly projecting ears 8 on the damper blades are connected by the pivots 9. The bracket 10 in the embodiment illustrated is formed of two sections 11 having laterally projecting flanges 12 which are disposed in side by side relation and fixedly connected as by a spot welding indicated at 13, see FIG. 6. This bracket

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as illustrated is of rectangular cross section and serves as a housing and slideway for the double toothed rack 14. The bracket is provided with laterally projecting attaching members 15 which are disposed upon and fixedly secured to the damper support member by means of spot welding indicated at 16 in FIG. 2.

The bracket flange members 12 are spaced at their lower ends to provide a slot 17 opening to the interior of the bracket, the flanges being spaced to receive the gears 18 pivotally mounted at 19 on the housing and fixedly secured to the dampers by means of the arms 20 which are, in the embodiment illustrated, of angular cross section and are secured to the damper blades by means of welds indicated at 21. The gears 18 in the embodiment illustrated are segmental and are of such dimensions as to permit the adjustment of the damper blades from fully open to fully closed position.

The rack 14 is provided with a nut portion or internally threaded portion 22 at its upper end supportingly engaged with the threads 23 of the rod-like adjusting member 24, which is rotatably supported at its upper end on the top 25 of the bracket member, being shouldered at 26 to engage the inner side of the top and provided with a washer-like support member 27 keyed to the adjusting member by the pin 28. At its lower end the adjusting screw is provided with a hand piece 29. With this arrangement the rotation of the screw raises and lowers the rack 14 consequently opening and closing the dampers.

The dampers may be very accurately adjusted to meet particular conditions or requirements and they are effectively supported in adjusted position against the thrust of air in either direction or when subject to wide variation in pressure as frequently occurs in many installations.

To prevent chattering in the connections when subjected to such variations and to limit the opening movement of the damper blades, I provide the rack with a stop member 30 which projects through a vertical slot 31 in the side of the bracket to coact with the adjustable stop 32 which, in the embodiment illustrated, is formed as an angled springable blade, one end of which is mounted at 33 on the support member 3 with its free end projecting into the path of the stop member 30 on the rack. The stop member 32 is adjustably supported by the manually adjustable screw 34 which is threaded into the offset portion 35 of the support member 3. The stop member 32 is desirably springable as illustrated so that the stop member 30 may be brought into engagement therewith under some pressure, thereby preventing any fluttering of the damper blades which might result in chattering-like noise. However, the rack member is desirably a sliding fit within the bracket so that without this springable stop feature there is little likelihood of noise. The main function of the stop member is to limit the opening of the damper. With this arrangement of parts it is possible to very accurately and easily adjust the blades to the desired position, and they are maintained in that position under wide variations of air thrust or current in either direction relative to the blades.

The damper of my invention is well adapted for use in connection with louvers which conceal the blades and the mechanism, but I have not illustrated such louvers as they are known in the art and may be of various types or designs. The adjusting mechanism and connected parts of my invention are effectively counterbalanced, that is, the operating strains or stresses thereon are effectively counterbalanced so that ease of operation results as well as minimum wear on the parts. It will be understood that in some installations the dampers are frequently adjusted, so that ease and accuracy in adjustment are important factors.

I have illustrated and described my invention in a very

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practical embodiment thereof. I have not attempted to illustrate or describe other embodiments or adaptations as it is believed that this disclosure will enable those skilled in the art to embody or adapt my invention as may be desired.

Having thus described the invention, what is claimed as new and desired to secure by Letters Patent is:

1. A damper comprising a supporting frame, a damper support member supportedly connected at its ends to said frame and having laterally projecting pivot ears adjacent the ends thereof, damper blades disposed on opposite sides of said support member and provided with pivot ears pivotally connected to said pivot ears on said support member, a chambered bracket of rectangular section fixedly mounted on said support member centrally thereof to project upwardly therefrom and having a vertically disposed rectangular slideway therein open at its lower end, said bracket having pivot ears thereon disposed transversely relative to said support member, a rack member slidably mounted within and laterally supported by said slideway and having racks thereon which face laterally relative to said support member, gears fixedly connected to said dampers and pivotally mounted on said pivot ears on said support member in meshing engagement with the adjacent rack and with their pivots in axial alignment with the pivots connecting said dampers to said support member, an adjusting screw for said rack member having threaded engagement therewith and rotatably mounted on said bracket above said rack member, a stop on said rack member projecting laterally therefrom, said bracket having a vertical slot therein through which said stop projects, an adjustable and springable stop member mounted on said support member to coact with said stop on said rack member, and an adjustable thrust sustaining screw for said adjustable stop having threaded engagement with said support member and projecting therefrom for manual manipulation.

2. A damper comprising a supporting frame, a damper support member supportedly connected at its ends to said frame and having laterally projecting pivot ears adjacent the ends thereof, damper blades disposed on opposite sides of said support member and provided with pivot ears pivotally connected to said pivot ears on said support member, a chambered bracket of rectangular section fixedly mounted on said support member centrally thereof to project upwardly therefrom and having a vertically disposed rectangular slideway therein open at its lower end, said bracket having pivot ears thereon disposed transversely relative to said support member, a rack member slidably mounted within and laterally supported by said slideway and having racks thereon which face laterally relative to said support member, gears fixedly connected to said dampers and pivotally mounted on said pivot ears on said support member in meshing engagement with the adjacent rack and with their pivots in axial alignment with the pivots connecting said dampers to said support members, an adjusting screw for said rack member having threaded engagement therewith and rotatably mounted on said bracket above said rack member, a stop on said rack member projecting laterally therefrom, said bracket having a vertical slot therein through which said stop projects, and an adjustable stop member mounted on said support member to coact with said stop on said rack member.

3. A damper comprising a supporting frame, a damper support member supportedly connected at its ends to said frame and having laterally projecting pivot ears adjacent the ends thereof, damper blades disposed on opposite sides of said support member and provided with pivot ears pivotally connected to said pivot ears on said support member, a chambered bracket of rectangular section fixedly mounted on said support member centrally thereof to project upwardly therefrom and having a vertically disposed rectangular slideway therein open at its lower end, said bracket having pivot ears thereon disposed

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transversely relative to said support member, a rack member slidably mounted within said slideway and having racks thereon and which face laterally relative to said support member, gears pivotally mounted on said pivot ears on said support member in meshing engagement with the facing rack on said rack member and with their pivots in axial alignment with the pivots connecting said dampers to said support member, said gears having elongated arms to which said dampers are connected, and a rack member adjusting screw rotatably mounted on said bracket and having threaded engagement with said rack member.

4. A damper comprising a supporting frame, a damper support member supportedly connected at its ends to said frame and having laterally projecting pivot ears adjacent the ends thereof, damper blades disposed on opposite sides of said support member and provided with pivot ears pivotally connected to said pivot ears on said support members, a bracket of rectangular section fixedly mounted on said support member centrally thereof to project upwardly therefrom and having a vertically disposed slideway therein open at its lower end, said bracket having pivot ears thereon disposed transversely relative to said support member, a rack member slidably mounted within said slideway and having racks thereon and which face laterally relative to said support member, gears to which said damper blades are fixedly connected pivotally mounted on said pivot ears on said support member in meshing engagement with the facing rack on said rack member and with their pivots in axial alignment with the pivots connecting said dampers to said support member, and a rack member adjusting screw rotatably mounted on said bracket and having threaded engagement with said rack member.

5. A damper comprising a damper support member having laterally projecting pivot ears adjacent the ends thereof, dampers disposed on opposite sides of said support member and provided with pivot ears pivotally connected to said pivot ears on said support member, a bracket fixedly mounted on said support member to project upwardly therefrom and having a vertically disposed slideway therein open at its lower end, a rack member slidably mounted within said slideway and having racks thereon and which face laterally relative to said support member, gears secured to said dampers and pivotally mounted on said support member in meshing engagement with a rack on said rack member and with their pivots in axial alignment with the pivots connecting said dampers to said support members, an adjusting screw for said rack member having threaded engagement therewith and rotatably mounted on said bracket, a stop on said rack member projecting laterally therefrom, said bracket having a vertical slot therein through which said stop projects, an adjustable stop member mounted on said support member to coact with said stop on said rack member, and an adjustable thrust sustaining screw for said adjustable stop having threaded engagement with said support member and projecting therefrom for manual manipulation.

6. A damper comprising a damper support member having laterally projecting pivot ears adjacent the ends thereof, dampers disposed on opposite sides of said support member and provided with pivot ears pivotally connected to said pivot ears on said support member, a bracket fixedly mounted on said support member to project upwardly therefrom and having a vertically disposed slideway therein open at its lower end, a rack member slidably mounted within said slideway and having racks thereon and which face laterally relative to said support member, gears secured to said dampers and pivotally mounted on said support member in meshing engagement with a rack on said rack member and with their pivots in axial alignment with the pivots connecting said dampers to said support member, an adjusting screw for said rack member having threaded engagement therewith and rotatably mounted on said bracket.

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7. A damper comprising a damper support member having laterally projecting pivot ears adjacent the ends thereof, dampers disposed on opposite sides of said support member and provided with pivot ears pivotally connected to said pivot ears on said support member, a bracket fixedly mounted on said support member to project upwardly therefrom and having a vertically disposed slideway thereon, a rack member slidably mounted on said slideway and having racks thereon and which face laterally relative to said support member, gears operatively connected to said dampers and pivotally mounted on said support member in meshing engagement with a rack on said rack and with their pivots in axial alignment with the pivots connecting said dampers to said support member, manually operated means for adjusting said rack member, a stop on said rack member, an adjustable and springable stop member mounted on said support member to coact with said stop on said rack member, and a manually adjustable thrust sustaining member for said adjustable stop.

8. A damper comprising a damper support member having laterally projecting pivot ears adjacent the ends thereof, dampers disposed on opposite sides of said support member and provided with pivot ears pivotally connected to said pivot ears on said support member, a bracket fixedly mounted on said support member to project upwardly therefrom and having a vertically disposed slideway thereon, a rack member slidably mounted on said slideway and having racks thereon and which face laterally relative to said support member, gears to which said dampers are operatively connected, said gears being pivotally mounted on said support member in meshing engagement with a rack with their pivots in axial alignment with the pivots connecting said dampers to said support member, and manually operated means for adjusting said rack member.

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9. A damper comprising an elongated support member, dampers disposed on opposite sides thereof and pivotally mounted thereon, a bracket fixedly mounted on said support member to project upwardly therefrom and having a vertically disposed slideway thereon, a rack member slidably mounted on said slideway and having racks facing laterally relative to said support member, gears operatively connected to said dampers and pivotally mounted on said support member, each gear being in meshing engagement with a rack on said rack member with their pivots in axial alignment with the pivot connecting said support member, and a manually operable adjusting screw rotatably and supportedly mounted on said bracket above said rack member and disposed centrally therethrough with its lower end projecting below said support member and provided with a handpiece.

10. A damper comprising an elongated support member, dampers disposed on opposite sides thereof and pivotally mounted thereon, a bracket fixedly mounted on said support member to project upwardly therefrom and having a vertically disposed slideway thereon, a rack member slidably mounted on said slideway and having racks facing laterally relative to said support member, gears to which said dampers are operatively connected, said gears being pivotally mounted on said support member, each gear being in meshing engagement with a rack on said rack member, and a manually operable adjusting screw rotatably and supportedly mounted on said bracket.

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