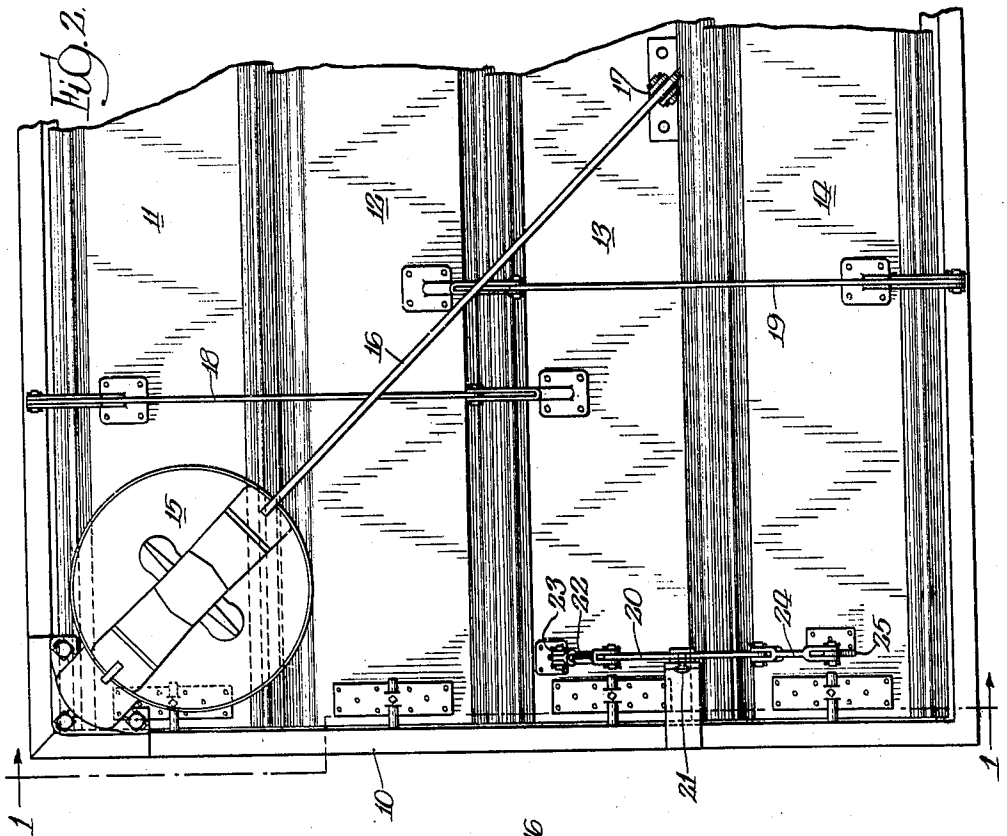
Oct. 12, 1943. H. BARNETT 2,331,758

LOUVRE DAMPER

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Fig. 2.



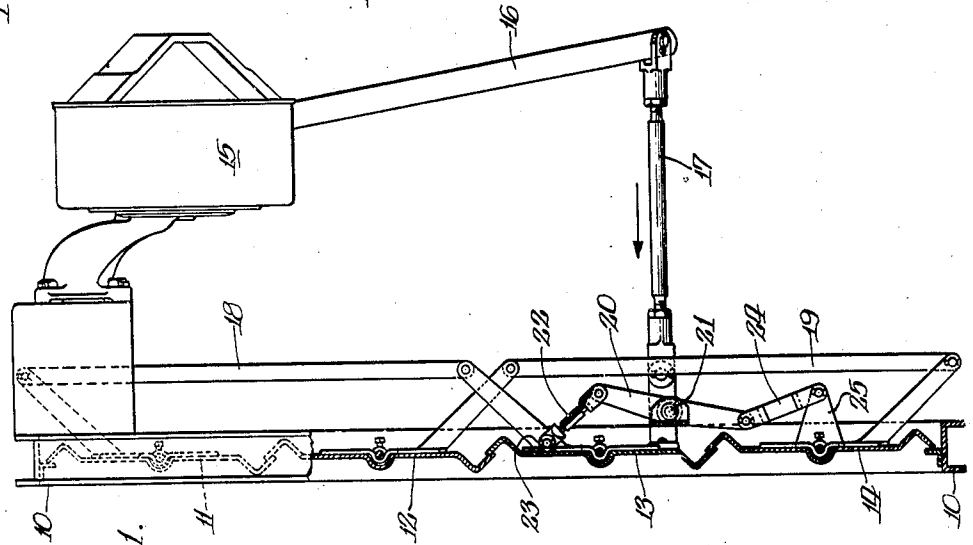


Fig. 1.

INVENTOR.

BY Harry Barnett,

ATTORNEY.

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Fig. 5.

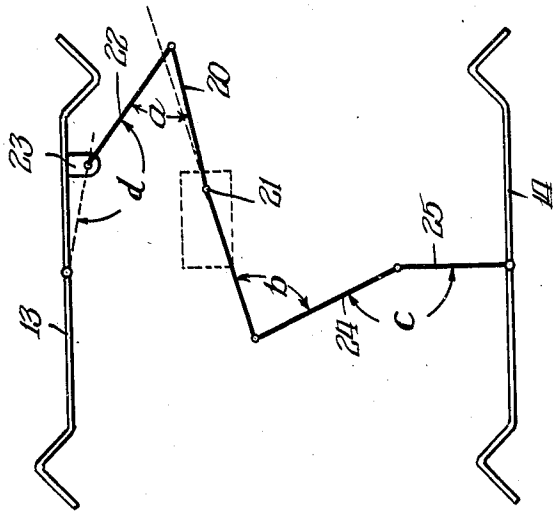


Fig. 4.

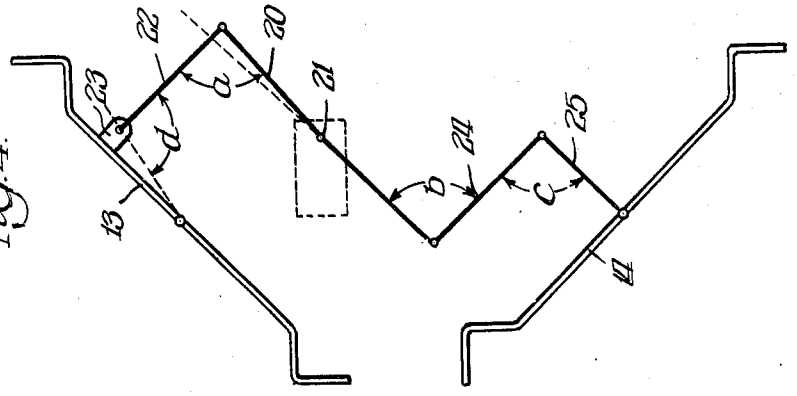
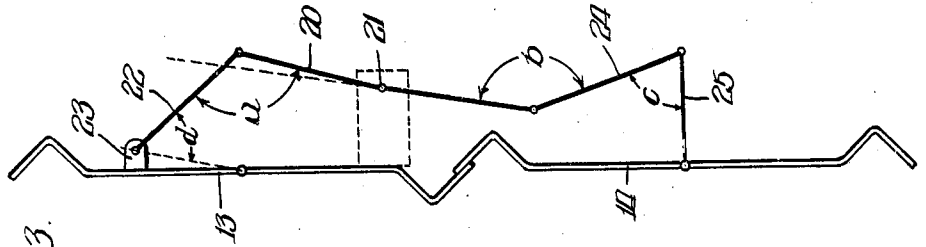


Fig. 3.



INVENTOR.
Harry Barnett,
BY
ATTORNEY.

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2,331,758

UNITED STATES PATENT OFFICE

2,331,758

LOUVER DAMPER

Harry Barnett, Chicago, Ill., assignor to The Powers Regulator Company, Chicago, Ill., a corporation of Illinois

Application October 4, 1939, Serial No. 297,854

6 Claims. (Cl. 98—110)

My invention relates to louver dampers and particularly to novel means for operating the multiple, cooperating blades of such dampers.

It is desirable, in dampers of the class described, to provide means whereby the adjacent edges of the damper blades shall overlap when in closed position. However, in the type of construction in which the adjacent blades swing in reverse directions, whereby the air passing between the blades is not compelled to change its direction, difficulty has been experienced in providing means for causing initial movement of the two blades at different rates of speed. The result has been accomplished in different manners in the Young Patent No. 2,040,893 and the Otto Patent No. 2,142,616. The present construction represents a simplified arrangement by which the desired result is accomplished.

The invention will be more readily understood by reference to the accompanying drawings, in which,

Fig. 1 is a side view, partly in section, of a louver damper and its operating means arranged in accordance with my invention, said figure being taken substantially in the plane as indicated by line 1—1 of Figure 2;

Fig. 2 is a fragmentary elevation of the structure illustrated in Figure 1, looking toward the left as viewed in said figure;

Figs. 3, 4 and 5 are partly diagrammatic illustrations of the link movement as the result of which the desired action is secured.

In the drawings it will be seen that I provide a rectangular frame 10 within which is mounted on suitable pivot pins the damper blades 11, 12, 13, 14. A damper motor is indicated at 15 having an operating arm 16 pivoted to link 17, said link being pivoted to an ear fixed to the damper blade 13. It will be noted that the blades 11—13 and 12—14 are connected by links 18, 19 respectively in order that the blades may operate in unison. However, in order to insure that on the opening movement the edges of the blades 13—11 shall move at a greater angular velocity than the edges of the blades 14—12 with which they respectively mate, I provide the link mechanism comprising a rocker lever 20, said lever being pivoted adjacent the center thereof and being mounted for rotation on a pin 21 carried on a bracket secured to the frame, the two ends or arms of the rocker being slightly offset relative to a line parallel to the blades, and the distance from pin 21 to blade 13, in the embodiment shown, is substantially one-fourth (¼) the length of rocker 20. Additionally, the upper arm of the rocker is angularly disposed with respect to a line extending upwardly from the lower arm (as shown in the dotted line) in a direction away from the blades. In other words, it may be said that lever 20 comprises two arms, one arm being disposed at an angle of 180° with respect to the other arm, the angle being measured intermediate the lever and the blades 13 and 14. The arms of the rocker 20 are of substantially the same length, and one end of the rocker is connected by a link 22 to attaching ears 23 on the upper side of the blade 13, i. e. on the side of the axis of blade 13 removed from blade 14 while the other end of the rocker is connected by a link 24 to similar ears 25 provided at the center of the blade 14 and extending perpendicular to blade 14. Links 22 and 24 are substantially equal in length to the arms of the rocker 20. The ears 23 are as short as possible, yet are of sufficient size in order to provide an adequate and accessible connection for link 22, but the distance of the connection between ear 23 and link 22 from the pivot point of blade 13 is substantially equal to the length of the ear 25 from the pivot point of blade 14 to the pivot point between ears 25 and lever 24.

Because of the offset or angular construction of the rocker 20 and the disposition of the links and rocker, outward swinging motion imparted to the upper edge of the blade 14 will be slower at the beginning of the opening movement than the corresponding motion of the lower edge of the blade 13. This will be true both on the opening and closing movements and will prevent interference between the overlapped blades. This is best explained in connection with Figs. 3, 4 and 5.

In Fig. 3 which shows the damper blades or louvers in fully closed position, the angle a is smaller than angle b; both angles are obtuse and angle a is nearer to 90° than angle b. Upon initiation of movement of the louver 13 by movement of link 17 (Figure 1), the pivot point between link 22 and ears 23 rotates clockwise on a circle about the pivot of blade 13. The rocker 20 rotates about its pivot 21 with a constant angular velocity so that the pivots between link 22 and the rocker and link 24 and the rocker move with a constant velocity. However, the pivot between arm 25 and link 24 which is substantially the same distance from the pivot of blade 14 rotates counterclockwise about a circle, the center of which is the pivot of blade 14. As the upper end of rocker 20 moves clockwise, the pivot of link 22 and ears 23 moves, and as the lower end of rocker 20 moves, the pivot of link 24 and arm 25 moves, but due to the disposition of the linkage

systems, for a predetermined movement of the blades 13 and 14, i. e., until the mating edges are free as shown in Figure 4, there is a faster movement of the pivot between link 22 and ears 23 than of the pivot between link 24 and arm 25. Thus the blade 13 initially moves faster than blade 14.

As the blades approach substantially half open position (Figure 4), the speed of the pivot between link 24 and arm 25 approaches that of the pivot between link 22 and ears 23. In Figure 4 the blades are shown in substantially half open positions wherein angle *d* and angle *b* are substantially the same as angle *c*.

Beyond this point the speed of the pivot between link 24 and arm 25 exceeds that of the pivot between link 22 and ears 23, and just prior to full open position of the blades, angle *a* is less than angle *b*. In the full open position both blades are parallel as shown in Figure 5.

It may thus be said that in effect there are provided two four-bar linkages, one comprising link 22, the upper part of rocker 20, the fixed frame between pivot 21 and the pivot of blade 13, and the effective distance as shown by dotted lines in Figures 3, 4 and 5, between the pivot of blade 13 and the pivot between ears 23 and link 22. The second four-bar linkage comprises the lower part of rocker 20, the fixed frame between pivot 21 and the pivot of blade 14, arm 25 and link 24. The first linkage is arranged so that, taken in the position shown in Figure 3, a constant angular velocity at 21 causes a greater angular velocity of the louver 13 about its pivot than the louver 14 about its pivot, due to the fact that as the linkages have a common pivot 21 the link 22 initially moves faster than link 24, because of the disposition as above described.

Of course reverse movement of the linkages from the position shown in Figure 5 to that shown in Figure 3 causes a reverse operation of the parts.

While the operation is apparent as above described, it may be said that a thrust in the direction of the arrow—Fig. 1—will cause rotation of the blade 13 which rotation is transmitted through the link 22 to the rocker 20 and thence through the link 24 to the attaching bracket 25. The movement thus transmitted to blades 13—14 is transmitted to blades 11—12 by the appropriate links 18—19.

I claim:

1. In a louver damper construction, the combination of a pair of blades pivoted at the respective centers thereof, the edge of one blade overlapping the adjacent edge of the other blade when said blades are in closed position, a lever pivoted adjacent the center thereof at a point intermediate the pivots of said blades, a link pivoted to one arm of said lever and to one of said blades at a point on the opposite side of the pivot from the pivot of the lever, means rigid with the second blade and connected at the center of said second blade, and a link pivoted to said means and to the other arm of said lever.

2. In a louver damper construction, the combination of a pair of blades pivoted at the respective centers thereof, the edge of one blade overlapping the adjacent edge of the other blade when said blades are in closed position, a lever pivoted adjacent the center thereof at a point intermediate the pivots of said blades, a link pivoted to one arm of said lever and to one of said blades at a point on the opposite side of the pivot from the pivot of the lever, means perpendicularly and rigidly connected to said second blade at the center thereof, and a link pivoted to said means and to the other arm of said lever.

3. In a louver damper construction, the combination of a pair of blades pivoted at the respective centers thereof, the edge of one blade overlapping the adjacent edge of the other blade when said blades are in closed position, a lever pivoted adjacent the center thereof at a point intermediate the pivots of said blades, the arms of said lever being of substantially the same length, a link of substantially the same length as one of said arms pivoted to one of said arms and to one of said blades at a point on the opposite side of the pivot from the pivot of said lever, means perpendicularly and rigidly connected to said second blade at the center thereof, the effective length of said means being substantially equal to the distance from the pivot of said first named blade to the pivot between said link and said first named blade, and a link of substantially the same length as the length of said first named link pivoted to said means and to the other arm of said lever.

4. In a louver damper construction, the combination of a pair of blades pivoted at the respective centers thereof, the edge of one blade overlapping the adjacent edge of the other blade when said blades are in closed position, a member pivoted adjacent the center thereof, a link pivoted to one arm of said pivoted member and to one of said blades at a point on the opposite side of the pivot from the pivot of the pivoted member, means rigid with the second blade and connected at the center of said second blade, and a link pivoted to said means and to the other arm of said pivoted member.

5. In a louver damper construction, the combination of a pair of pivoted louver blades, the edge of one blade overlapping the adjacent edge of the other blade when said blades are in closed position, a lever pivoted intermediate the ends thereof and intermediate the pivots of said blades, a link pivoted to one arm of said lever and pivoted to one of said blades at a point spaced from the pivot of said blade and on the side of the pivot of said blade opposite to that on which said lever is pivoted, a member perpendicular to the other blade and rigidly connected thereto at the pivot thereof and a link pivoted to said last named member and the other arm of said lever.

6. In a louver damper construction, the combination of a pair of pivoted louver blades, the edge of one blade overlapping the adjacent edge of the other blade when said blades are in closed position, a lever pivoted intermediate the ends thereof and intermediate the pivots of said blades, said lever comprising a pair of arms, one of said arms being disposed at an angle of more than 180° with respect to the other arm, the angle being measured intermediate the lever and said blades, a link pivoted to the first named arm and pivoted to one of the blades at a point spaced from the pivot of said blade and on the side of the pivot of said blade opposite to that on which said lever is pivoted, a member substantially perpendicular to the other blade and rigidly connected thereto at the pivot thereof, and a link pivoted to said member and to the second named arm of said lever.

HARRY BARNETT.