Feb. 5, 1924. 1,482,398

R. A. ILG

SHUTTER MECHANISM

Filed March 3, 1923

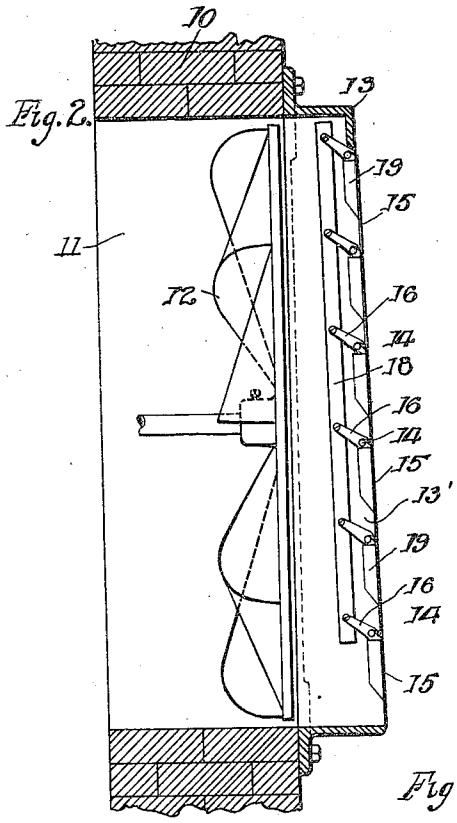

Fig. 2.

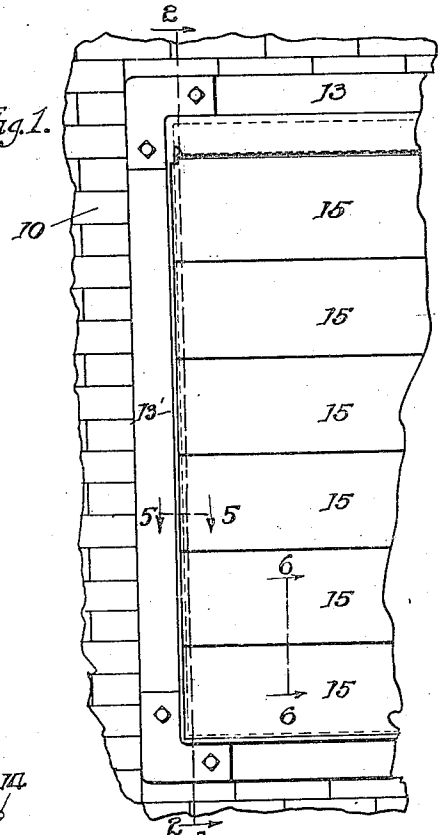

Fig. 1.

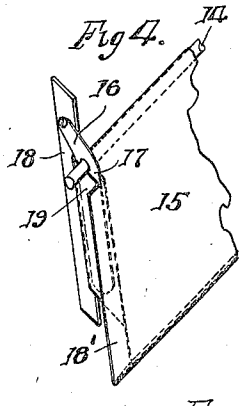

Fig 4.

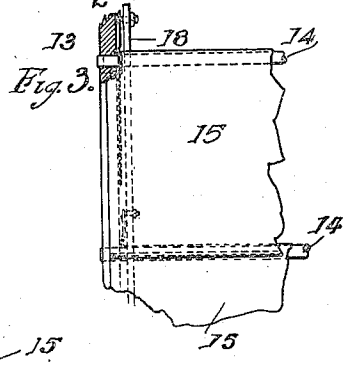

Fig. 3.

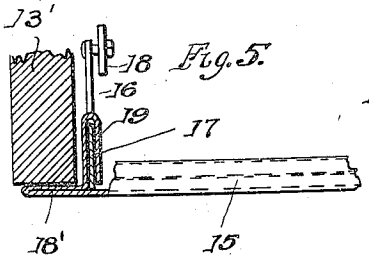

Fig. 5.

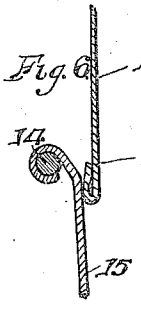

Fig. 6.

INVENTOR.
Robert A. Ilg,
BY Samuel H. Pond,
ATTORNEY.

Patented Feb. 5, 1924. 1,482,398

UNITED STATES PATENT OFFICE.

ROBERT A. ILG, OF CHICAGO, ILLINOIS, ASSIGNOR TO ILG ELECTRIC VENTILATING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF LOUISIANA.

SHUTTER MECHANISM.

Application filed March 3, 1923. Serial No. 622,469.

To all whom it may concern:

Be it known that I, ROBERT A. ILG, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Shutter Mechanism, of which the following is a specification.

This invention relates to shutter mechanisms, and is designed mainly for use in connection with shutter devices employed in association with ventilating fans such as are located in suitable openings in external walls of buildings for discharging gases and foul air from the latter. In apparatus of this type it is quite commonly the practice to employ opposite the discharge side of the fan a shutter to normally close the opening when the fan is idle. In some instances the shutter vanes are positively opened and closed through electrical or other actuating means, as, for instance, in the shutter mechanism disclosed in Letters Patent No. 957,776, granted to me May 10, 1910, and in other instances the shutters are so constructed and mounted as to be opened by the blast of the fan, and closed by gravity when the fan is idle, as, for instance, in the shutter mechanism disclosed in Letters Patent No. 1,189,572, granted to me July 4, 1916.

My present invention relates to shutter mechanism of the last named type, and constitutes an improvement on the subject matter of the aforesaid Letters Patent No. 1,189,572. In the last named patent equal opening and closing movements of the vanes of the shutter are secured by levers mounted on the shutter spindles, said levers having depending arms lying opposite the side edges of the shutter vanes with inwardly turned forked ends that embrace the shutter vanes, and rearwardly extending arms connected together by a link, so that all the vanes are thus compelled to open or close simultaneously and to an equal extent. I have found in practice that with long continued wear the forked ends of the vane-operating levers wear and cut through the thin metal of the vanes. Furthermore, with the vane-operating arms lying opposite the vertical edges of the fans, it is impossible to extend the side edges of the vanes to an overlap on the vertical edges of the shutter casing to make a complete wind and weather-proof closure.

One object of my invention is to improve the construction of my aforesaid patent in both of these respects.

A still further object of the present invention is to provide an improved structure of shutter blade or vane that will afford increased strength and stiffness to the latter with but a trifling addition of metal and fabrication.

Still other objects and attendant advantages of the invention will be apparent to persons skilled in the art as the same becomes better understood by reference to the accompanying drawing, in which I have illustrated one practical and approved embodiment of the invention, and wherein—

Fig. 1 is a fragmentary front elevation of my improved shutter mechanism applied to a ventilating opening in an external wall of a building;

Fig. 2 is a vertical section taken on the line 2—2 of Fig. 1;

Fig. 3 is an enlarged fragmentary detail partly in elevation and partly in vertical section, showing two adjacent shutter vanes and their connections;

Fig. 4 is a perspective elevation of an end portion of one shutter vane showing its spindle, and operating lever and link;

Fig. 5 is an enlarged cross-sectional detail taken on the line 5—5 of Fig. 1; and

Fig. 6 is an enlarged cross-sectional detail taken on the line 6—6 of Fig. 1.

Referring to the drawing, 10 designates an external wall of a building, in which is formed a ventilating opening 11. Within said opening is mounted a ventilating fan 12 that, in practice, is usually driven by an electric motor (not shown).

Secured to the outer side of the wall 10 and surrounding the ventilating opening 11 is a rectangular shutter frame designated as an entirety by 13, in and between the vertical sides 13′ of which are journaled a series of horizontal shutter spindles 14, as most clearly shown in Fig. 3.

15 designates the shutter vanes, each of which comprises a rectangular strip of sheet metal that is mounted at its upper end on the spindle 14, preferably by being curled around the latter as shown in Figs. 4 and 6. The lower free longitudinal edge portion of each vane 15 is folded inwardly and upwardly on itself, as shown at 15′ in Fig. 6, which greatly strengthens and stiffens the

vane, and this folded lower edge thereof overlaps the rounded upper edge of the next lowermost vane, as clearly shown in Figs. 3 and 6.

By reference to Fig. 2 it will be observed that, in the construction shown, the pivotal axes of the spindles 14 of the several shutter vanes are located in a plane that is outwardly and downwardly inclined relatively to the vertical, as a result of which the vanes assume by gravity a completely closed position; but so far as the novel features of the present invention are concerned, the shutter vanes may be mounted in either an inclined or a vertical plane.

To secure simultaneous and equal opening and closing movements of the several vanes, I mount on each spindle 14 an elbow lever each having a rearwardly extending arm 16 and a depending arm 17. The rearwardly extending arm 16 is pivotally connected to a link 18, as in my former Patent No. 1,189,572; but the depending arms have a different connection with the shutter vane which avoids wear on the latter and also permits the side edges of the vane to overlap the vertical edges of the frame to afford a more perfect closure, as will next be described.

By reference to Figs. 2, 4 and 5 it will be observed that the metal forming each vertical marginal portion of the vane is folded back on itself forming a double thickness edge 18′ which overlaps the front edge of the side frame member 13′, and an extended part of this marginal portion of the metal is bent rearwardly and folded on itself through approximately the upper half of the blade, thereby forming a pocket 19 integral with and lying behind the blade, which pocket receives the depending arm 17 of the lever, as most clearly shown in Figs. 4 and 5. It will be observed that this pocket 19 lies closely alongside the inner surface of the side frame member 13′; so that, with the folded edge portion 18′ it forms a rectangular joint with the frame member 13′. This construction, aside from providing a superior joint between the shutter vanes and the frame for excluding rain, snow, dust, etc., also greatly stiffens and strengthens the vane, and permits the use of lighter and thinner sheet metal than has heretofore been practical, especially when used in conjunction with the folded and reinforced lower margin 15′. The pockets 19, lying at a right angle to the plane of the vane constitute in effect substantially vertical stiffening ribs which materially enhance the rigidity of the vane, indepedently of their function in co-operation with the lever arm 17.

The manner in which the mechanism operates when the fan is running is quite evident from the illustration and the foregoing description. The air blast from the fan striking the shutter vanes swings them open to a greater or less extent depending upon the strength of the blast; and, of course, their opening and closing movements are simultaneous and of equal extent owing to their being interconnected by the levers and connecting link. The instant the fan ceases to run, the shutter vanes swing by gravity to the closed position shown in Figs. 1 and 2, in which they effectively guard the opening against the introduction of wind, rain, etc., especially at the vertical edges where the double or L-joint exists.

While I have herein shown the folded parts 18′ and 19 formed as integral extensions of the metal of the vane, it is manifest that these parts may, if desired, consist of separate attached parts, without involving any departure from the principle of the invention or sacrificing any of its advantages. In other respects also the structure may be varied within the purview of the appended claims.

I claim:

1. In a shutter mechanism, the combination of a rectangular frame, a series of horizontal shutter spindles journaled in and between the vertical sides of said frame, a plurality of sheet metal shutter vanes secured at their upper edge portions to said spindles and at their lower edges overlapping when in closed position, the upper edges of the next shutter vanes therebeneath, and means for effecting simultaneous and equal opening and closing movements of said vanes comprising pockets formed on the rear sides of said vanes, levers mounted on said spindles and each having one arm thereof engaged with one of said pockets, and a link connecting the other arms of said levers.

2. In a shutter mechanism, the combination of a rectangular frame, a series of horizontal shutter spindles journaled in and between the vertical sides of said frame, a plurality of sheet metal shutter vanes secured at their upper edge portions to said spindles and, when closed, having their side edges overlapping the vertical sides of said frame, and means for effecting simultaneous and equal opening and closing movements of said vanes comprising pockets formed on the rear sides of said vanes inwardly of the side edges of the latter, elbow levers mounted on said spindles and having depending arms engaged with said pockets and rearwardly extending arms, and a link connecting the said rearwardly extending arms.

3. In a shutter mechanism, the combination of a rectangular frame, a series of horizontal shutter spindles journaled in and between the vertical sides of said frame, a plurality of sheet metal shutter vanes se-

cured at their upper edge portions to said spindles, said vanes having inwardly folded side edge portions overlapping the vertical sides of said frame and rearwardly bent and folded extensions of said folded edge portions forming substantially vertical pockets on the rear sides of said vanes, said pockets and folded edge portions forming a right angle joint with said vertical sides of the frame, elbow levers mounted on said spindles and having depending arms engaged with said pockets and rearwardly extending arms, and a link connecting the said rearwardly extending arms.

ROBERT A. ILG.