June 6, 1933. C. M. WILLIAMSON 1,913,182

SHUTTER

Filed July 29, 1931

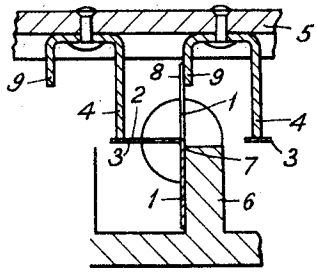


FIG. 2.

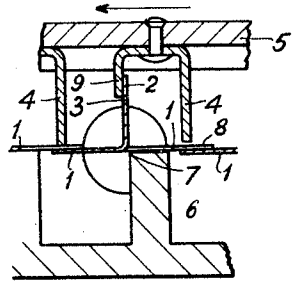


FIG. 1.

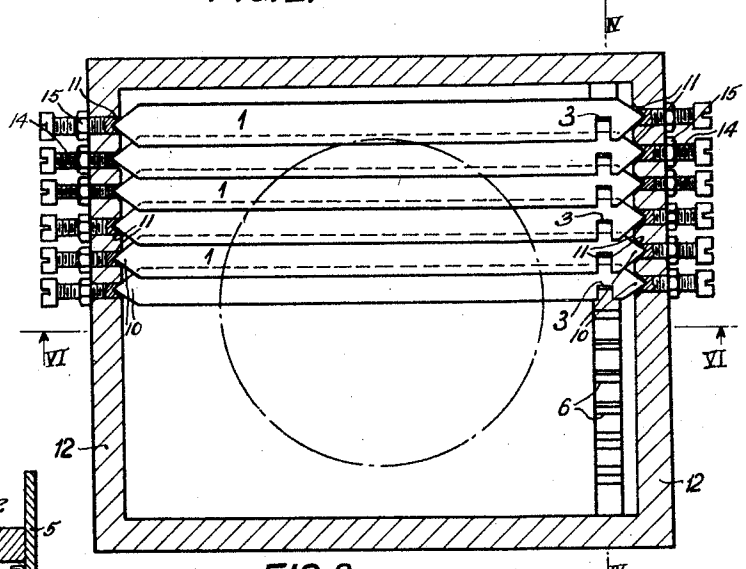


FIG. 3.

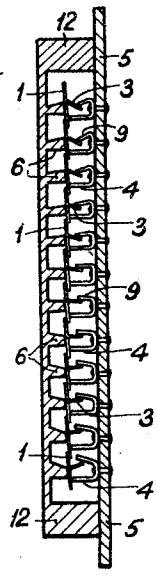


FIG. 4.

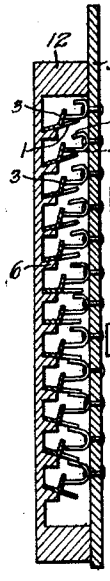


FIG. 5.

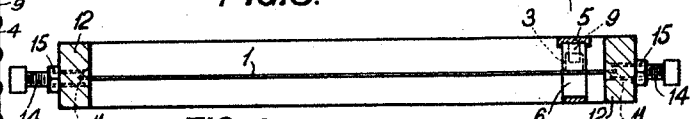


FIG. 6.

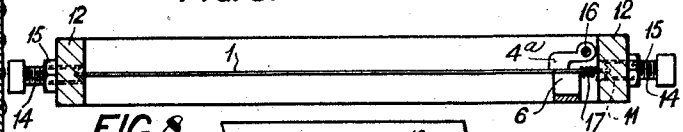


FIG. 8.

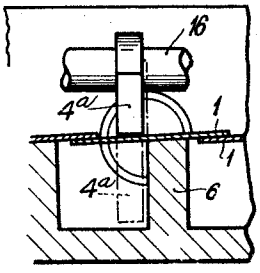


FIG. 9.

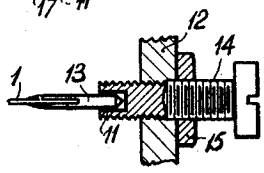


FIG. 7.

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UNITED STATES PATENT OFFICE

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SHUTTER

Application filed July 29, 1931, Serial No. 553,715, and in Great Britain October 31, 1930.

The present invention relates to improvements in shutters of the louvre type for use in photographic cameras, signalling lamps and other apparatus in which a quick opening and closing of an aperture is required with a minimum of effort.

An object of the present invention is to provide a louvre shutter of very light construction and simplified action, and in consequence a lively movement with rapid acceleration and deceleration.

With this and other objects in view, the invention consists in the combinations described below and defined in the claims.

In order that the invention may be fully understood and carried into practice, reference is directed to the accompanying drawing which illustrates by way of example two embodiments.

Figure 1 is an enlarged end view showing one blade in the closed position.

Figure 2 is a similar view to Figure 1 showing the blade open.

Figure 3 is a front view of a complete shutter with some blades removed.

Figure 4 is a section of Figure 3 on the line IV—IV.

Figure 5 is a similar view to Figure 4 with the blades in open position.

Figure 6 is a section of Figure 3 on the line VI—VI.

Figure 7 is a detail of a modification.

Figure 8 is a similar view to Figure 6 of a second embodiment, and

Figure 9 is a similar view to Figure 1 of this second embodiment.

According to the invention each blade is actuated by a member which slidingly engages a surface on or attached to the blade and transverses a path passing in close proximity to but not through, the pivotal axis of the blade. The shape of the surface and the shape and position of the path may be such that when the blade is turned from the closed to the open position the engaging member may continue to move without further turning of the blade occurring. Each blade is preferably supported immediately opposite the region of engagement by the corner of a stationary member which also forms a stop lug limiting the total turn of the blade into the open position.

The engaged surfaces may be on lugs secured substantially at right angles to the pivotal axes of the blades or they may be part of the surfaces of the blades themselves. Assuming the pivotal axes of the blades are in the centres of their thicknesses the path of the extreme end of the engaging member must be at least half the blade thickness from the axis but the term close proximity used herein is intended to cover somewhat greater distances from the axis.

Where the surfaces are formed on lugs the engaging members may be triggers on a bar reciprocating along an axis parallel with the blades when closed and transverse to their pivotal axes. When the engaged surfaces are on the blades themselves the members may be secured to a rotary shaft having its axis placed similarly to the axis of reciprocation just described, or they may move in parallel linear paths perpendicular to the plane of the closed blades.

A preferred mode of pivoting the blades, which may be of thin steel strip, is to taper their ends to points and support them in countersunk recesses, which are preferably adjustable.

The principle of the invention will be readily understood from Figures 1 and 2. Each blade 1 is pivoted on its mid axis and has an operative surface 2 formed in this case on a lug 3 shown bent up from the material of the blade. The blade is turned by the movement of a long trigger 4 which moves in a path passing closely above the rotary axis of the blade. As shown the trigger is secured to a member 5 which is moved parallel with the arrow in Figure 1. In moving from the position of Figure 1 to Figure 2, at a certain point the trigger 4 engages the surface 2 of the lug 3 and in a very short further movement (its length depending on the distance the end of the trigger is above the axis of the blade) turns the blade into the open position, simply sliding along the surface of the blade if it continues to move after the blade is open. A lug 6 is provided and forms a stop against which

the blade abuts when open, as shown in Figure 2. The lug 6 is carried up so far that its corner 7 forms a support for the blade at this point. The blade is conveniently closed on the return of the trigger to the position of Figure 1 by the engagement of the trigger with the surface 8 of the blade itself. A short trigger 9 may be provided adjacent each long trigger 4 which prevents any one blade from overtaking the other. Further, as will be seen from Figures 1 and 2 the short triggers coact with the blades both in the closed and open positions to hold them well home both when open and when closed.

In the complete shutter shown in Figures 3, 4, 5 and 6 the blades are shown with pointed ends 10 working in coacting recesses or bearings 11. This forms a very suitable method of pivoting light blades such as would be used in a photographic shutter, but for heavier uses such as signalling lamps, solid pivots 13 may be used as indicated in Figure 7. In both cases adjustment may be provided by making the bearings 11 in screws 14 screwing into the frame and furnished with lock nuts 15. The shutter shown in Figures 3, 4, 5 and 6 is designed for use behind or in front of a lens and in this position acts in a converging or diverging beam. In order to cause least interruption in the open position the blades should be at varying angles depending on their distances from the optical axis as shown in Figure 5. For this purpose the lugs 6 are sloped at appropriate angles and the lugs 3 and short triggers 9 bent to correspond. Each pair of long and short triggers 4, 9 is conveniently made in one piece rivetted to the bar member 5.

Referring now to Figure 9, in this case the operative surface 2 is the surface of the blade itself and no bent or attached lugs are required. The triggers 4*a* here move parallel with the blade in their open position and in this case must be spaced away from the faces of the lugs 6 by the thickness of a blade plus a very small amount of working clearance. The blades are shown closed in Figure 9, the open position and the corresponding position of the triggers being indicated in chain lines. The triggers may be secured upon a spindle 16 and the spindle turned back and forth about its axis as provided for in Figure 8. The latter figure also shows a light spring 17 adapted to close the blades when the triggers rise. In this embodiment of the invention the provision of the supporting corners 7 on the lugs 6 is of particular importance, since the triggers press almost exactly transversely of the blade axes. The blades themselves may be pivoted as in Figure 3 or Figure 7.

The blades can conveniently all be actuated at one end as shown and any suitable means can be used for moving the bar 5 or spindle 16 carrying the triggers.

What I claim is:—

1. In a shutter the combination of a plurality of parallel pivoted blades overlapping when closed, a lug substantially at right angles upon each said blade, a reciprocating bar moving in a path parallel with said blades when closed and transversely of the axes thereof, triggers on said bar member adapted to make sliding engagement with said lugs to move said blades into the open position when said bar is moved in one direction and means closing said blades when said bar is returned to its original position.

2. In a shutter the combination of a pivoted blade, an actuating surface rigidly associated with said blade, actuating means slidingly engaging said surface and traversing a path passing in proximity but not through the axis of said blade, and a stop against which said blade abuts when open.

3. In a shutter the combination of a pivoted blade, an actuating surface rigidly associated with said blade, a trigger slidingly engaging said surface and traversing a path passing in proximity but not through the axis of said blade, and means supporting said blade on the opposite side to that on which said trigger moves.

4. In a shutter the combination of a blade tapered to a point at both ends, and means supporting said points in recesses.

5. In a shutter, the combination of a plurality of parallel blades each tapered to a point at both ends, and adjustable supports having recesses receiving said points.

6. In a shutter, the combination of a plurality of parallel pivoted blades overlapping when in closed position, means for simultaneously turning said blades into diverging open positions, and means for returning said blades into closed position.

7. In a shutter, the combination of a plurality of parallel pivoted blades overlapping when in closed position, means for simultaneously turning said blades out of closed position, a series of stops one for each blade arresting said blades in diverging open positions, and means for returning said blades to closed position.

8. In a shutter the combination of a plurality of parallel pivoted blades overlapping when closed, a lug substantially at right angles upon each said blade, a reciprocating bar moving in a path parallel with said blades when closed and transversely of the axes thereof, and triggers on said bar member adapted to make sliding engagement with said lugs when moved in one direction to turn said blades into open position and to making sliding engagement with said blades to close them when moved in the other direction.

9. In a shutter the combination of a plurality of parallel pivoted blades overlapping when closed, a lug substantially at right an-

gles upon each said blade, a reciprocating bar moving in a path parallel with said blades when closed and transversely of the axes thereof, long triggers on said bar member adapted to make sliding engagement with said lugs when moved in one direction to turn said blades into open position and to making sliding engagement with said blades to close them when in the other direction, and short triggers on said bar arranged one between each two adjacent long triggers.

10. In a shutter the combination of a pivoted blade, a stop supporting said blade on one side near its pivotal axis, an actuating member engaging said blade adjacent the opposite side of its pivotal axis to said stop and moving in a path perpendicular to the plane of the blade in its closed position, and means for closing said blade.

11. In a shutter the combination of a plurality of parallel pivoted blades overlapping when closed, a plurality of stops each supporting one of said blades slightly to one side of its pivotal axis, a shaft parallel with the plane of the blades when closed and perpendicular to their pivotal axes, a plurality of parallel triggers on said shaft located to engage said blades respectively on the opposite sides of their pivotal axes to said stops when said shaft is rotated, and spring means for closing said blades.

12. In a shutter the combination of a plurality of parallel pivoted blades overlapping when closed, a plurality of stops one for each said blade each having a surface against which its blade abuts when open and a corner contacting with the blade close to its pivotal axis, a shaft parallel with the plane of said blades when closed and perpendicular to their pivotal axes, a plurality of triggers on said shaft one for each said blade located to leave at least the thickness of the corresponding blade between itself and said stop surface when said shaft is turned to cause said triggers to engage said blades, and a spring upon each said blade urging it to the closed position.

13. In a shutter the combination of a pivoted blade, a substantially flat actuating surface rigidly associated with said blade, a trigger slidingly engaging said surface and traversing a path not passing through the pivoted axis but not substantially more than half the thickness of the blade from said axis.

In testimony whereof I have signed my name to this specification.

COLIN MARTIN WILLIAMSON.