

April 5, 1938.

C. M. PIERSON ET AL

2,113,240

SHUTTER FOR ENCLOSURES

Filed Sept. 27, 1937

2 Sheets-Sheet 1

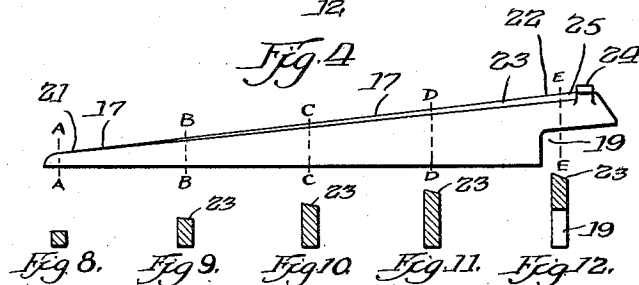
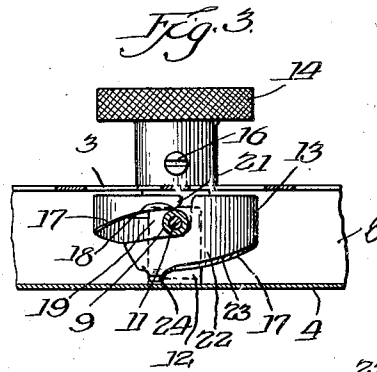
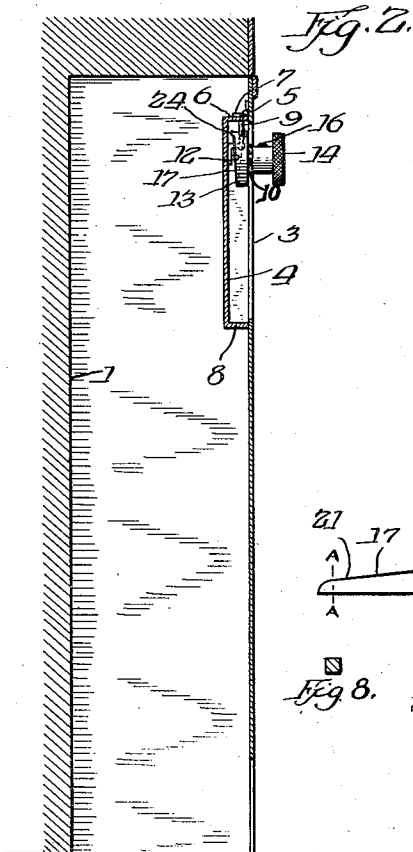
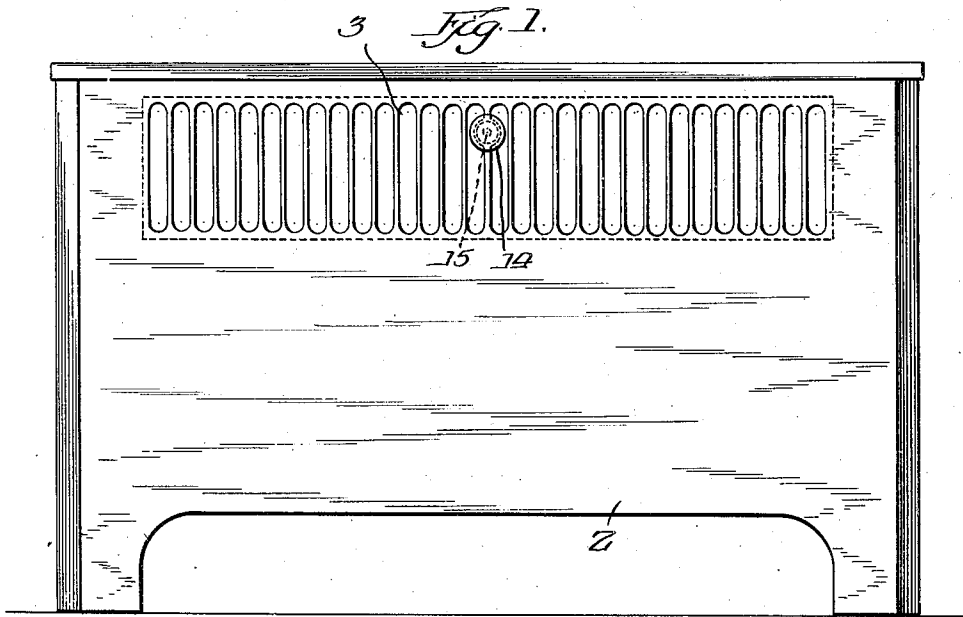


Fig. 8.

Fig. 9.

Fig. 10.

Fig. 11.

Fig. 12.

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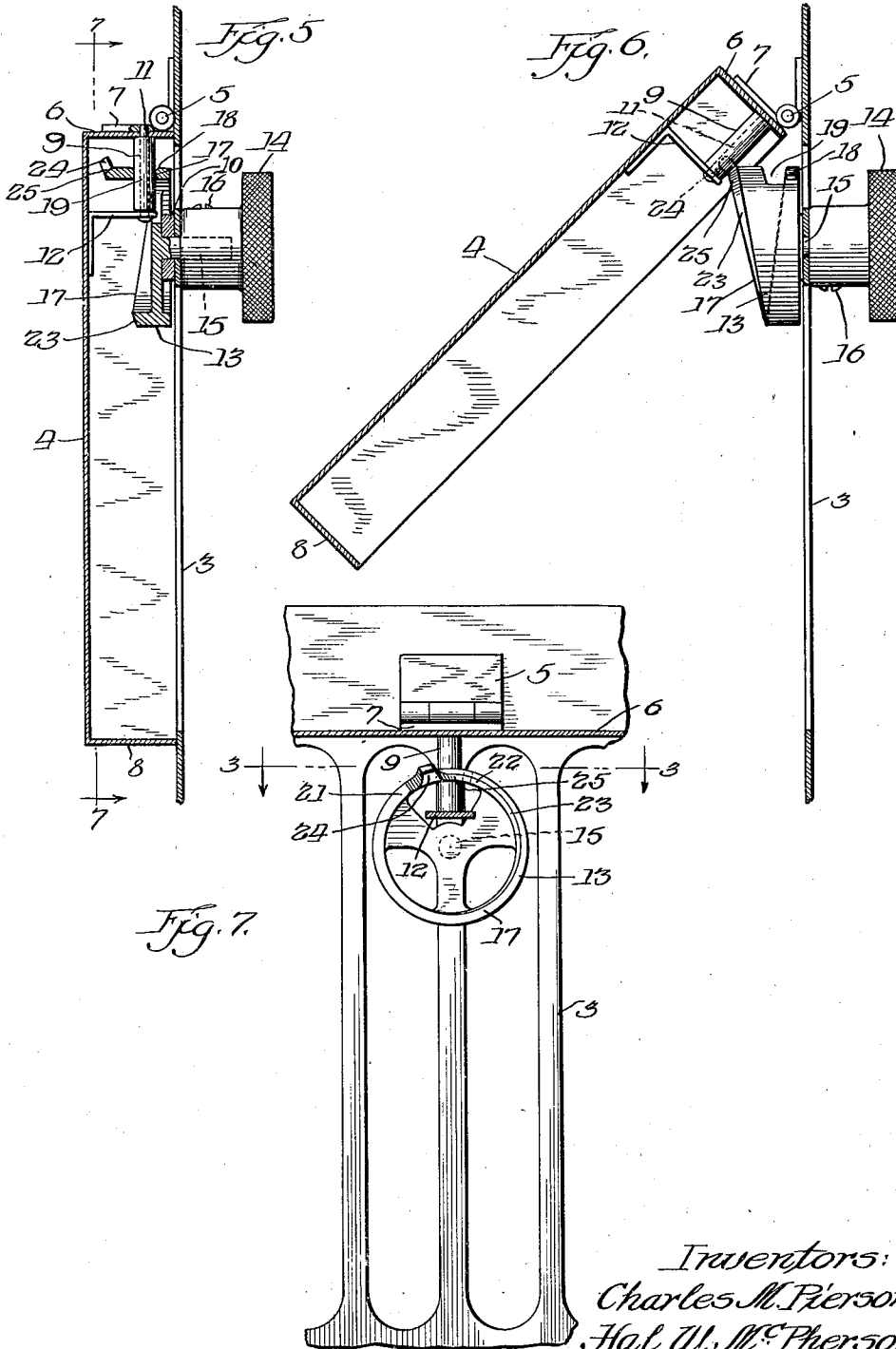
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2 Sheets-Sheet 2



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UNITED STATES PATENT OFFICE

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SHUTTER FOR ENCLOSURES

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Application September 27, 1937, Serial No. 165,786

4 Claims. (Cl. 98—106)

More particularly, our invention relates to a device for the operation of shutters suitable for radiator enclosures and the like, although obviously it may be adapted to other enclosure installations with equally satisfactory results.

Moreover, our invention relates to a further improvement over that construction described in the pending patent application identified as Serial No. 109,646, filed November 7, 1936, and subsequently issued on December 7, 1937, as U. S. Patent No. 2,101,797. In the aforementioned patent, peripheral cam means have been employed to raise, lower and also to latch the louvers of a radiator enclosure, operating the same by means of a rotatable annular cam member in which the rotation thereof accomplished the displacement of the louver means. However, because the cam in the application referred to operated with a frictional contact between the cam displacement surface and the louver cover, it frequently required considerable effort to rotate the cam especially if the louver cover were relatively heavy, and for this reason also considerable wear in the parts occurred which was objectionable.

Accordingly, one of the objects of our present invention is to provide for a similar type of operating means in which, however, the rotation of the displacement cam is obtained with a minimum amount of effort, and further in which such complete displacement of the shutter is effected within approximately a turn of the operating handle.

Another important object is to provide a cam in which the actual contacting surface thereof, in order to accomplish the desired increments of displacement of the louver cover, takes place progressively upon a relatively small cam area or surface, thus minimizing the usual frictional resistance and in which the contacting means cooperate with the cam and provide for a relatively friction-free member to bear thereagainst.

Other objects and advantages of the construction will become more readily apparent upon proceeding with the following description in connection with the accompanying drawings, in which

Fig. 1 is a front view of a conventional type of recessed radiator enclosure with our invention applied thereto.

Fig. 2 is a partly sectional side elevation of the arrangement shown in Fig. 1.

Fig. 3 is a magnified fragmentary plan sectional view of the operating and latching mechanisms hereinafter described in greater detail, and with the cam and operating handle being shown in a vertical position, as distinguished from the normal operating position shown in Figs. 1 and 2, the section being taken on the line 3—3

of Fig. 7, with the louver plate in its closed position.

Fig. 4 is a diagrammatic plan development of the cam peripheral surface showing the camber used in obtaining the improved action subsequently to be referred to in greater detail.

Fig. 5 is a magnified fragmentary partly sectional side view of the operating mechanism of the cam member embodying our invention and as applied to the louver plate, the latter being shown in a closed position.

Fig. 6 is a side view similar to that described in Fig. 5 except that the louver plate is shown in its open position.

Fig. 7 is a view taken from the rear of the enclosure and with the shutter plate removed so as to show the cam and roller in the position described in connection with Fig. 5.

Fig. 8 is a sectional view of the annular portion of the cam taken on the line A—A of the perimetral development shown in Fig. 4.

Fig. 9 is a view similar to Fig. 8 taken on the line B—B of Fig. 4.

Fig. 10 is a view similar to Fig. 8 taken on the line C—C of Fig. 4.

Fig. 11 is a view similar to Fig. 8 taken on the line D—D of Fig. 4.

Fig. 12 is a view similar to Fig. 8 taken on the line E—E of Fig. 4.

Figs. 8 to 12 inclusive show the progressively increasing angularity or camber of the cam which, as indicated, is preferably directly proportional to the displacement provided by the cam.

In the various views, similar reference characters refer to similar parts.

Referring to Fig. 2, the numeral 1 designates the wall recess of a room in which the radiator enclosure 2 employing our invention is preferably positioned and in which the enclosure is provided with the usual open or grilled front plate 3 through which the warm air from the radiator within the enclosure passes into the room proper. Behind the front plate 3 a shutter or louver plate 4 is positioned preferably hingedly suspended from the conventional hinge member 5 and having a horizontally extending flange 6 which is suitably attached by welding, brazing, or threadedly to a complementary flange 7, also part of the hinge 5, the said shutter or louver plate 4 being provided with a flange member 8 in rim arrangement around the plate 4, the member 8 preferably abutting against the lower portion of the plate 3 thus in effect serving as a closure passing over and behind the openings of the plate 3.

Preferably to the underside of the shutter flange portion 6, the roller 9 is attached, extending downwardly in a substantially vertical direction (when the shutter is in the closed position) the roller being journalled upon the pin 11, and

as more clearly shown in Fig. 5, the pin 11 is preferably supported at its opposite end by means of the fixed member 12 of suitable angular form to give the necessary strength and rigidity thereto.

As more clearly shown in Fig. 5, with a filler washer 10 interposed therebetween, the cam 13 is journaled upon the plate 3 and connected with a handle 14 which is rotatably mounted upon a shaft 15. The handle 14 is held in non-rotatable relation with the cylindrically formed cam 13 by means of the set screw 16. As shown more clearly in Fig. 3 and in the plan development of the rim edge shown in Fig. 4, the cam 13 is made with its annular rim of gradually increasing width with relation to the edge 17 thus forming the incline shown in Fig. 4 upon which the roller 9 initially bears against, as at 18, when the closure member or louver plate 4 is in the latched and closed position shown in Fig. 3. In the latter position it will further be noted that the annular rimmed portion of the cam 13 is provided with the slot-formed space 19 which is preferably made to such proportions as to snugly engage the peripheral surface of the roller 9 and therefore enables the shutter plate to be held in a locked and closed position.

Since the peripheral rim 17 of the cam 13 spirally climbs from the lower position, as indicated at 21, to the relatively greater height, as indicated at 22, and preferably acquiring such range of lift or travel and displacement in slightly less than 360° of rotation of the handle 14, it is evident that as the handle 14 is rotated in a counterclockwise direction, the roller 9 will be released from the latching slot 19 and as the rotation of the handle in the same direction continues, the roller 9 will continue to travel upon the surface 17, thereby being displaced angularly so as to cause the shutter plate 4 to which it is rigidly attached, to be swung inwardly and open upon the continued rotation of the handle 14.

However, because the angular position of the pin 9 during the course of rotation of the cam 13 is constantly changing through a range measured from that of the vertical position shown in Fig. 5 to that of maximum angular displacement shown in Fig. 6, it will be evident that the surface 17 properly should provide for such change in angularity of positioning of the pin 9. By providing the cam 13 with the cambered or inclined surface 23 having constantly varying degrees of angularity, as shown more clearly in Figs. 8 to 12 inclusive, the roller 9 at all stages of its angular displacement will be suitably supported upon the surface 23, the maximum width of such surface being provided at 25 adjacent to the stop 24 upon the cam 13, the gradual increasing width of the surface 23 being more clearly shown in Fig. 7. Thus, as shown in Fig. 6, the roller 9 will bear in substantially full contact upon the inclined annular surface 23, with the width of the latter surface developing from one of substantially line thickness to that width indicated at 25, and in this manner the wear upon the roller and also upon the surface 17 of the cam is reduced, with relatively greater durability and ease of operation assured to both roller and cam. Further, it will be apparent since the roller provides for a free rotative movement, there will be no sliding or frictional contact between the cam and roller respectively.

It will be apparent to those skilled in the art that we have discovered a novel, economical and effective means for operating a device of this kind possessing great flexibility and also having a more simple installation than anything heretofore developed, and since only a preferred embodiment of our invention has been described, it is obvious that numerous equivalent constructions may be made within the scope of our invention and we desire, therefore, to be limited only to the extent of the claims appended hereto;

We claim:

1. An enclosure of the character described including a front plate having openings therethrough, a shutter movably mounted upon said plate for controlling the passage of air through the said openings, a cam member rotatably mounted upon and operable exteriorly of the said plate, roller means journaled upon said plate, the said cam member cooperating with the said roller means for effecting movement of the said shutter, the said roller means upon rotation of the said cam member travelling upon an annularly positioned chamfered surface upon the said cam member.

2. An enclosure of the character described including a front plate having openings therethrough, a shutter movably mounted upon said plate for controlling the passage of air through the said openings and means comprising a cam member rotatably mounted upon and operable exteriorly of the said plate, roller means fixedly mounted upon said plate, the said cam member having an annular chamfered surface cooperating with the said roller means for effecting movement of the said shutter when rotated in one direction, the said cam member having a relieved portion for receiving said roller means whereby the shutter is latched when the said cam member is rotated in the opposite direction.

3. A radiator enclosure including a front plate having openings therethrough, a shutter movably mounted upon said plate for controlling the passage of air through the said openings and means comprising a cam member rotatably mounted upon and operable exteriorly of the said plate, roller means upon said shutter, the said cam member contacting with the said roller means for effecting the movement of the said shutter, the said cam member having an annularly positioned progressively widening chamfered surface upon which the said roller means travels upon rotation of the said cam member.

4. A radiator enclosure including a front plate having openings therethrough, a shutter movably mounted upon said plate for controlling the passage of air through the said openings and means comprising a cam member rotatably mounted upon and operable exteriorly of the said plate, roller means upon said shutter, the said cam member cooperating with the said roller means for effecting movement of the said shutter, the said cam member having an annularly positioned chamfered surface of progressively increasing width, the said roller means contacting with the widest portion of the said chamfered surface when the said shutter is opened to its maximum position.

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