

June 17, 1930.

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1,763,837

RADIATOR SHUTTER

Filed April 9, 1926

3 Sheets-Sheet 1

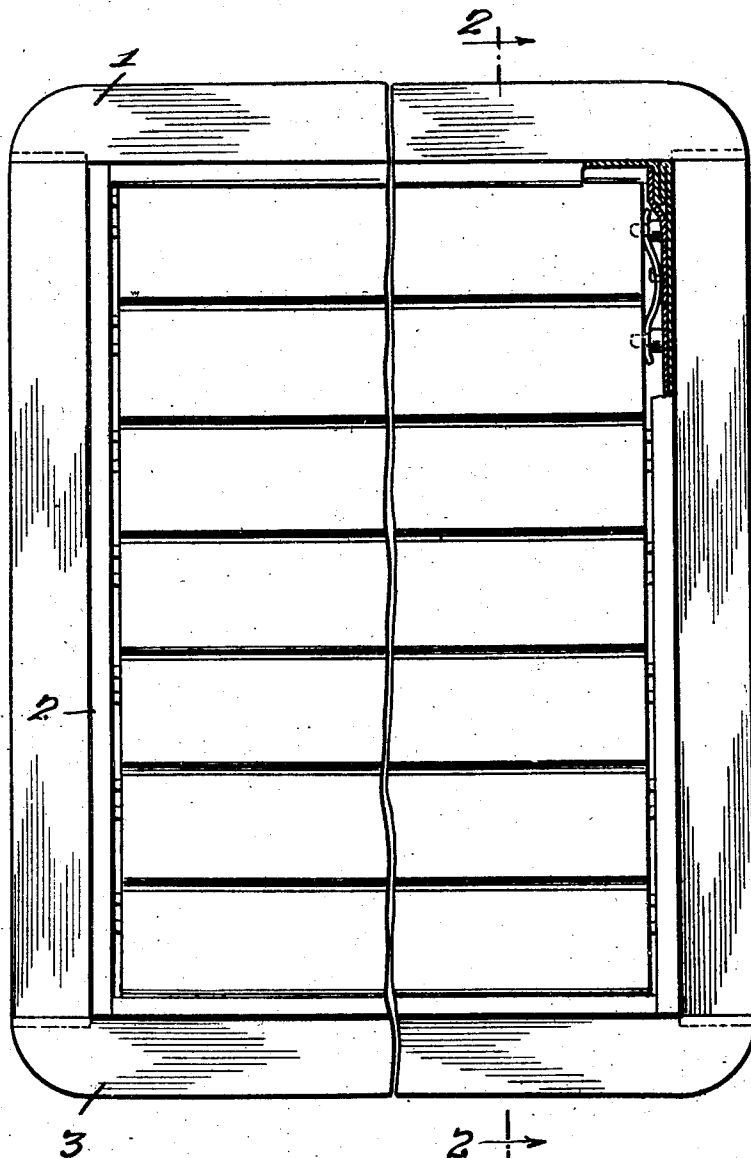


Fig. 1

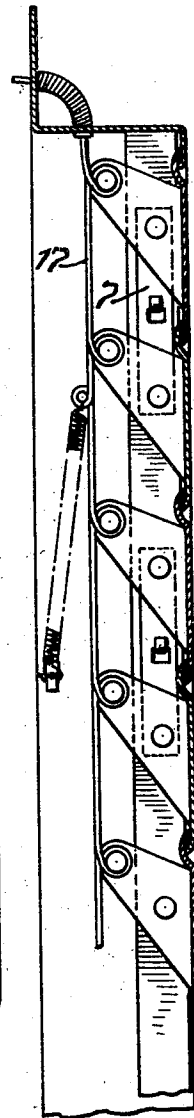


Fig. 2

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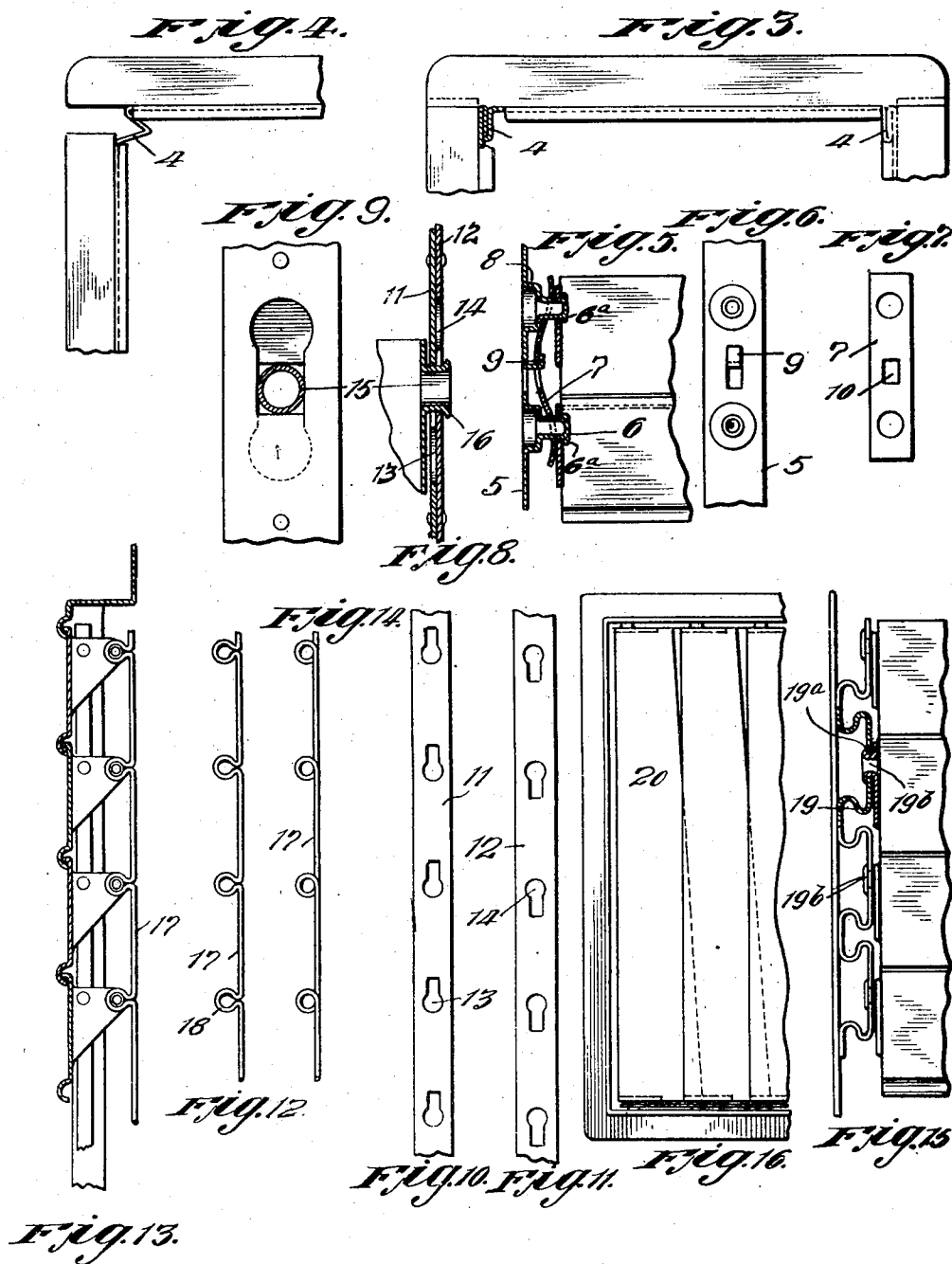
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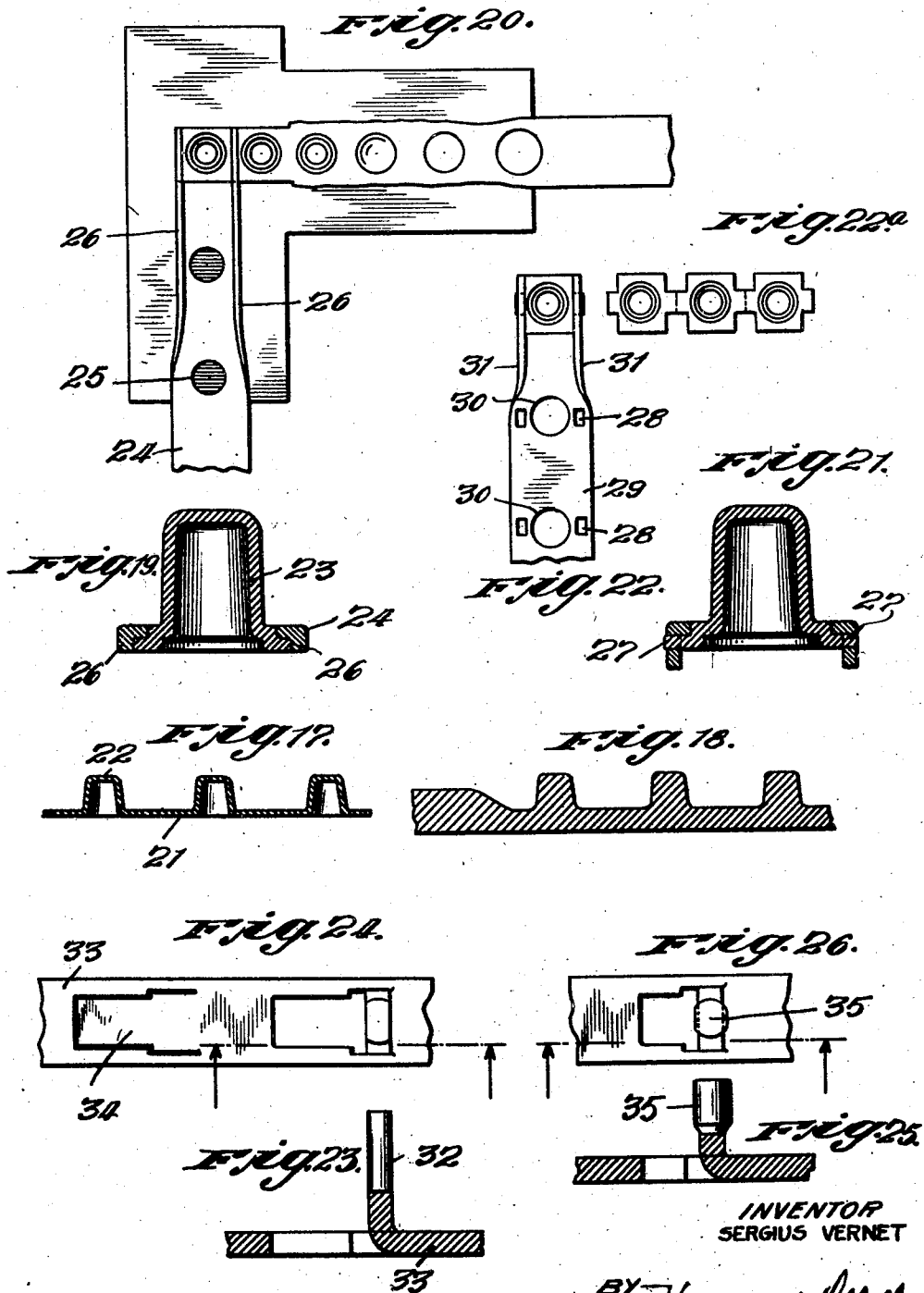
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RADIATOR SHUTTER

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3 Sheets-Sheet 3



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RADIATOR SHUTTER

Application filed April 9, 1926. Serial No. 100,811.

This invention relates to improvements in radiator shutters.

One of the objects of the invention is to provide an improved frame for the radiator shutter, constructed of one piece of sheet metal.

Another object of the invention is to provide improved bearing members to support the vanes of the shutter.

10 Another object of the invention is to provide a simplified connecting member whereby the vanes may be simultaneously rotated.

A further object of the invention is to provide a simplified anti-rattling spring for the radiator shutter vanes, which may be more easily attached to the shutter.

Other objects of the invention will appear as the description proceeds.

20 In the drawings, Figure 1 is a front view of a radiator shutter, with portions broken away to illustrate the method of supporting the vanes.

Figure 2 is an enlarged sectional side elevation taken on the line 2—2 of Figure 1;

25 Figure 3 is a detailed view of a portion of the frame of the shutter;

Figure 4 is a detailed view of one corner of the frame, showing the method of bending the frame at the corner;

30 Figure 5 is an enlarged sectional view of one embodiment of bearing strip for the vanes, and an anti-rattling spring therefor;

Figure 6 is a front view of the bearing strip shown in Figure 5;

35 Figure 7 is a front view of the anti-rattling spring shown in Figure 5;

Figure 8 is an enlarged sectional view of another type of bearing strip to support the shutter vanes;

40 Figure 9 is a front view of the bearing strip shown in Figure 8;

Figures 10 and 11 are front views of strips forming the bearing member shown in Figure 8;

45 Figure 12 is an elevation of a connecting strip used to connect the vanes of the shutter for simultaneous rotation;

50 Figure 13 shows the connecting strip applied to the shutter vanes;

Figure 14 is an elevation of a modified form of connecting means;

Figure 15 is a modified form of bearing for the vanes of the shutter in which the anti-rattling spring and bearing member 55 are combined;

Figure 16 is a modified form of shutter in which the vanes overlap at one end;

Figure 17 is a sectional view of a portion of a pressed bearing strip similar to the bearing strip shown in Figure 5; 60

Figure 18 is a sectional view of a modified form of bearing strip, which is produced from a solid piece of metal;

Figure 19 is a sectional view of a bearing 65 similar to the bearing shown in Figure 17, but separate from the supporting strip;

Figure 20 illustrates the method by which these separate bearings shown in Figure 19 may be attached to the connecting strip; 70

Figure 21 is a sectional view of a bearing similar to that shown in Figure 19, but attached differently to the connecting strip;

Figures 22 and 22^a illustrate the method whereby this bearing shown in Figure 21 75 may be attached to the connecting strip;

Figures 23 and 24 show respectively a bearing formed from a bent up portion of the strip, and the method of forming the bearing; and 80

Figures 25 and 26 show a slightly modified form of the bearing shown in Figure 23, and the method of forming it integral with the connecting strip. 85

Referring now more specifically to the drawings, the shutter comprises a frame 1 composed of four side walls 2, and an out-turned flange 3 on each wall 2, so that the flanges extend completely around the frame. The frame is made up of an L-shaped bar 90 or section in which transverse cuts have been made on one web at spaced distances along the length thereof, at which points the other web of the section is bent to form the corner of the frame. These cuts mark off the parts forming the flanges 3. An additional longitudinal cut is made between the two webs of the section adjacent each transverse cut, and portions at the ends of the sides 2 are folded over at 4, so that two sides are 100

thus shortened. This folding process is done at each corner of the shutter frame, so that the adjacent ends of the flanges may be brought together and welded together to form a rigid frame composed entirely of one piece of metal.

The bearing strips 5 for supporting the radiator vanes may be pressed out of one piece of metal, as shown in Figure 5, and may be attached to the side walls of the shutter frame by rivets or by welding. These bearing strips 5 may have integral tubular projections 6 thereon to form the bearings for the vanes. Flat springs 7 having a hole in each end may be placed over each pair of bearings on the bearing strip 5, which comes on one side of the frame to provide means to urge the shutter vanes toward the opposite side of the frame. The bearings 6 may have shoulders 8 formed thereon to hold the springs spaced from the strip 5.

In order to hold the springs in place before the vanes are mounted on the bearings 6, a hook 9 may be provided integral with the strip 5 and just beneath each spring 7. An opening 10 may be provided in each spring, and when the spring is placed over the bearings, the center portion thereof may be depressed so that the hook 9 enters the opening 10 and engages its edge and holds the central portion of the spring adjacent the strip 5, thereby urging the ends of the spring against the shutter vanes, the shoulders 8 acting as a fulcrum therefor. If desired, the bearings 6 may be slightly expanded at their ends 6^a after the vanes are placed thereon to hold the vanes in place. The vanes are indicated by the numeral 20.

Figures 8, 9, 10 and 11 show a modified form of bearing member in which tubular bearings are adapted to be attached to the shutter vanes and rotatably supported in openings in the bearing member. The bearing member is composed of two strips 11 and 12, in which keyhole slots 13 and 14 have been formed, the keyhole slots in each strip being oppositely disposed.

The tubular bearing member 15 has an enlarged end 16 which will readily pass through the enlarged opening in the keyhole slots, but is prevented from passing through the smaller part of the slot.

Bearings 15 for the vanes are inserted in the large openings of the keyhole slots in one strip 11, and the second strip 12 is placed thereagainst by slipping the large parts or openings of the keyhole slots over the ends 16 of the vane bearings.

Strips 11 and 12 are then moved longitudinally with respect to each other so that the large openings in the keyhole slots move away from each other, thereby retaining the tubular bearing attached to the vane in the smaller portions of both slots, as shown in

Figure 9. With this construction the vanes may be permanently mounted between the two bearing members before the bearing strips are attached to the frame of the shutter.

Figures 12, 13 and 14 illustrate the means for pivotally connecting the shutter vanes for simultaneous rotation. This means may comprise a wire 17 bent to form a plurality of loops 18, Figure 12 showing such loops in a single plane, and Figure 14 showing the wire bent completely over to form the loops.

Figure 13 shows the wire 17 attached to the shutter vanes so that when the wire is reciprocated the shutter vanes are opened and closed.

Figure 15 shows a modification in which the bearing member and spring are combined. To this end a strip 19 is bent into a series of loops, each loop having an opening 19^a therein to receive a bearing pin 19^b attached to the shutter vane, the strip being attached to the shutter frame by riveting or welding as described above. In this case the loops are sufficiently large to exert compression against the shutter vanes when the vanes are mounted therebetween.

Figure 16 shows a modification of the shutter in which the vanes 20^a are mounted vertically in the frame, and are wider at the bottom than at the top. In this modification the upper part of the shutter opens as soon as the vanes are rotated, but the lower part, because of the overlapping portions of the vanes, offers a restriction to the free passage of air therethrough until the vanes are completely opened.

Figure 17 illustrates a bearing strip 21 with bearings 22 integrally formed thereon similar to the strip 5 in Figure 5, but without the shoulder being formed on the bearings.

Figure 18 shows a bearing strip similar in outline to that shown in Figure 17, but formed out of a solid piece of metal.

Figure 19 shows a bearing 23 similar to the bearing 22 in Figure 17, but separate from the strip 24. The strip 24 may be provided with holes 25 shown in Figure 20, into which the bearings 23 may be inserted and edges 26 of the strip may then be bent down to retain the bearing on the strip. If desired the bearings may be formed on one strip of metal and cut off and inserted in the supporting strip all in the same machine as indicated in Figure 20.

Figures 21 and 22 show a similar bearing upon which the lugs 27 are formed. Holes 28 are provided in the strip 29, and when the bearings are inserted in the holes 30, the edges 31 may be bent down so that the lugs 27 are held in the openings 28 of the strip 29.

Figures 23 and 24 show a modified form of bearing 32 integral with the bearing strip

33. A flat portion or lug 34 of the strip 33 is cut out and bent at right angles to the strip 33, and the end of this portion or projection 34 is then pressed between suitable dies to round off the edges thereof to form the bearing.

Figures 25 and 26 show a bearing member similar to that shown in Figures 23 and 24, except that the end of the transverse portion or projection 35 is pressed more nearly into the form of a cylinder. Flat portions 36, however, are left on the sides of the bearing to eliminate the danger of ridges being formed thereon by the dies.

While I have described and illustrated several embodiments of the various parts comprising my invention, there are many changes which may be made in the construction with out departing from the spirit of the invention, as for instance the transverse portion shown in Figures 23 and 26 might be cut out of the side of the strip instead of the center, and I do not therefore desire to limit myself to the embodiments shown but to interpret the invention broadly within the scope of the appended claims.

What I claim as my invention is:

1. In a radiator shutter having a plurality of rotatable vanes, means to mount said vanes comprising a pair of strips of sheet metal having a plurality of projections formed thereon, means to prevent said vanes from rattling, comprising spring members between said vanes and one of said strips to urge said vanes toward the other of said strips, and means to hold said spring members in place against said strips when said vanes are removed therefrom.

2. In a radiator shutter having a plurality of rotatable vanes, means to mount said vanes, comprising a pair of strips having integral bearing members thereon, means to prevent rattling of said vanes comprising flat springs each having holes therein adapted to fit over two of said bearing members, and hooks attached to said strips to engage said springs between said bearing members, to hold them in place on said bearings when said vanes are removed therefrom.

3. In a radiator shutter, a frame, a plurality of rotatable shutter vanes mounted in said frame, said vanes being wider at one end than at the other to provide quicker opening at one portion of said shutter than at the other portions when said vanes are simultaneously rotated.

4. In a radiator shutter having rotatable shutter vanes, a frame, means to support said vanes comprising a pair of flat strips at opposite sides of said frame, a plurality of integral flat portions cut from said strip and extending at right angles to said strips and bearings integral with said flat portions.

5. In a radiator shutter having rotatable shutter vanes, means to support said vanes comprising a pair of flat strips having a plurality of portions thereof cut out and bent up from the plane of said strips, the ends of said bent up portions being formed into bearings for said vanes.

6. In a shutter vane bearing means, a strip of metal, lugs extending outwardly from said strip and rounded portions on the end of said lugs to pivotally support said vanes.

7. In a shutter vane bearing means, a strip of sheet metal, projections integral with said strip and extending outwardly therefrom and rounded portions at the ends of said projections to pivotally support said vanes.

8. In a shutter vane bearing means, a strip of sheet metal, projections integral with said strip and extending outwardly therefrom and rounded portions at the ends of said projections to pivotally support said vanes, said rounded portions having slightly flattened opposite sides.

9. In a radiator shutter, a one piece frame comprising four side walls, a flange integral with each side wall, portions of said walls being folded over at the corners so that said flanges may engage with each other, supporting strips at opposite sides of said frame, a plurality of bearings integral with said strips, a plurality of vanes rotatably mounted between oppositely disposed bearings, means to rotate said vanes simultaneously, and means to prevent rattling of said vanes.

10. In a radiator shutter, a frame of one piece of sheet metal comprising four side walls, a flange integral with each of said side walls, portions of said walls being folded upon itself at the corners so that said flanges may contact with each other, supporting strips at opposite sides of said frame, a plurality of integral bearing members attached to said strip, a plurality of shutter vanes rotatably mounted between oppositely disposed bearing members, a pin attached to each vane, and integral means to connect each of said pins together for simultaneous operation of said vanes.

11. In a radiator shutter, a frame comprising sides and outturned flanges connected with each of said sides, said frame having portions of the sides bent and folded at the ends of the sides to reduce the size of the frame to bring the ends of the flanges together and enable the ends of said flanges to be secured to each other.

12. In a radiator shutter, a frame consisting of a bent piece of sheet metal L-shaped in cross-section to form webs, one web of said piece having transverse cuts adjacent the corners of the frame, said cuts forming divided portions of said web which constitute said flanges, the other web of said

piece having portions which are bent and folded at their opposite ends to enable the ends of the flanges to be brought together and said flanges to be secured one to another.

5 In testimony whereof I have affixed my signature to this specification.

SERGIUS VERNET.

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