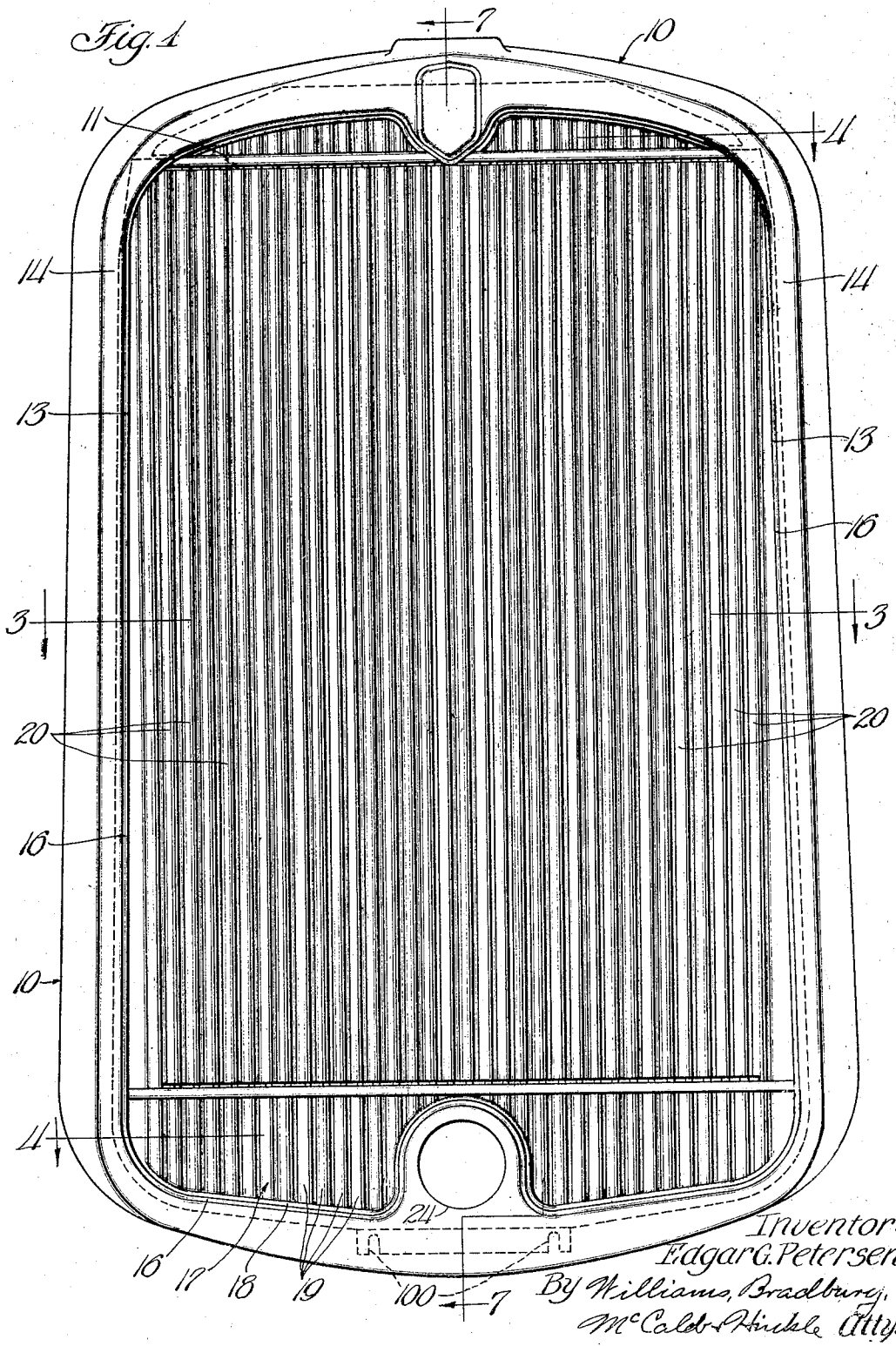
Sept. 6, 1932. E. G. PETERSEN 1,876,017

RADIATOR SHUTTER UNIT

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Fig. 1



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RADIATOR SHUTTER UNIT

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Fig. 2

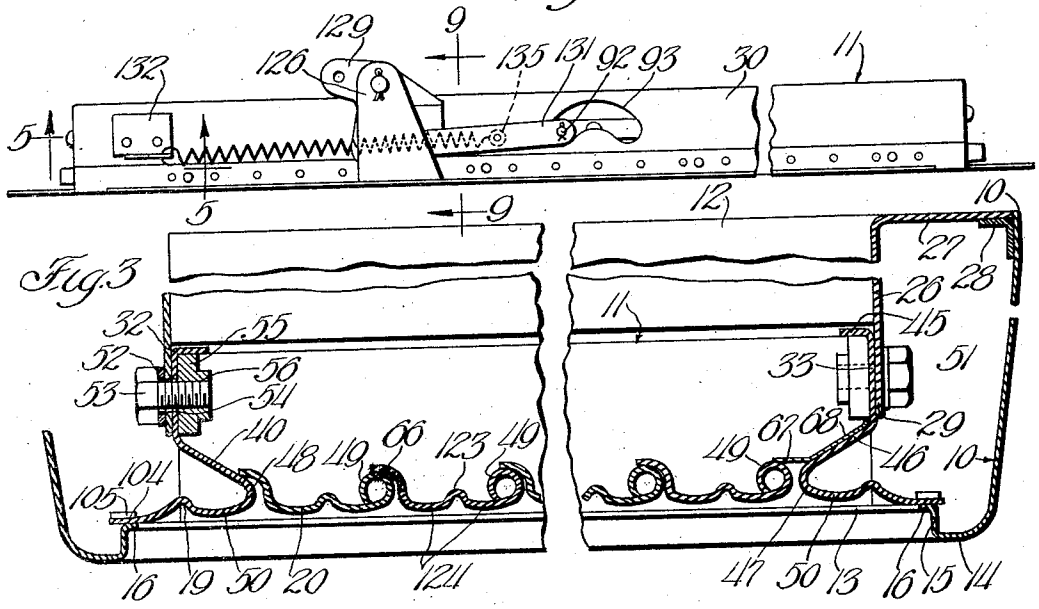


Fig. 3

Fig. 4

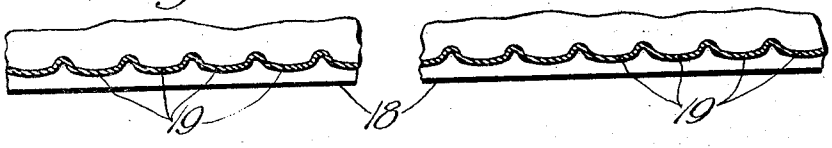


Fig. 5

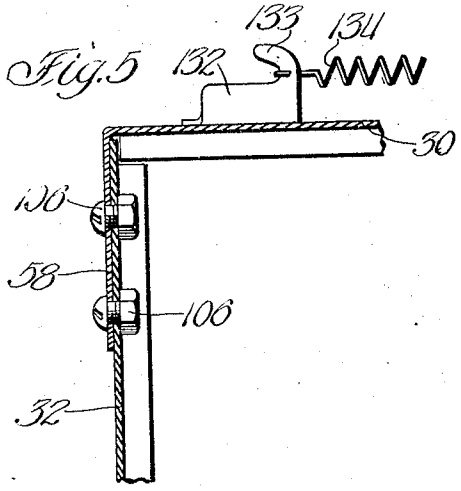
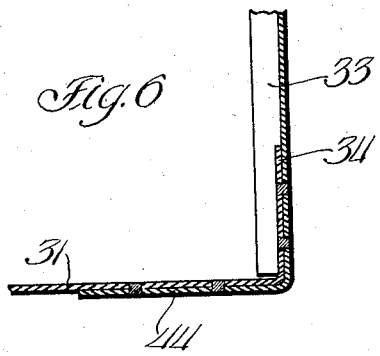


Fig. 6

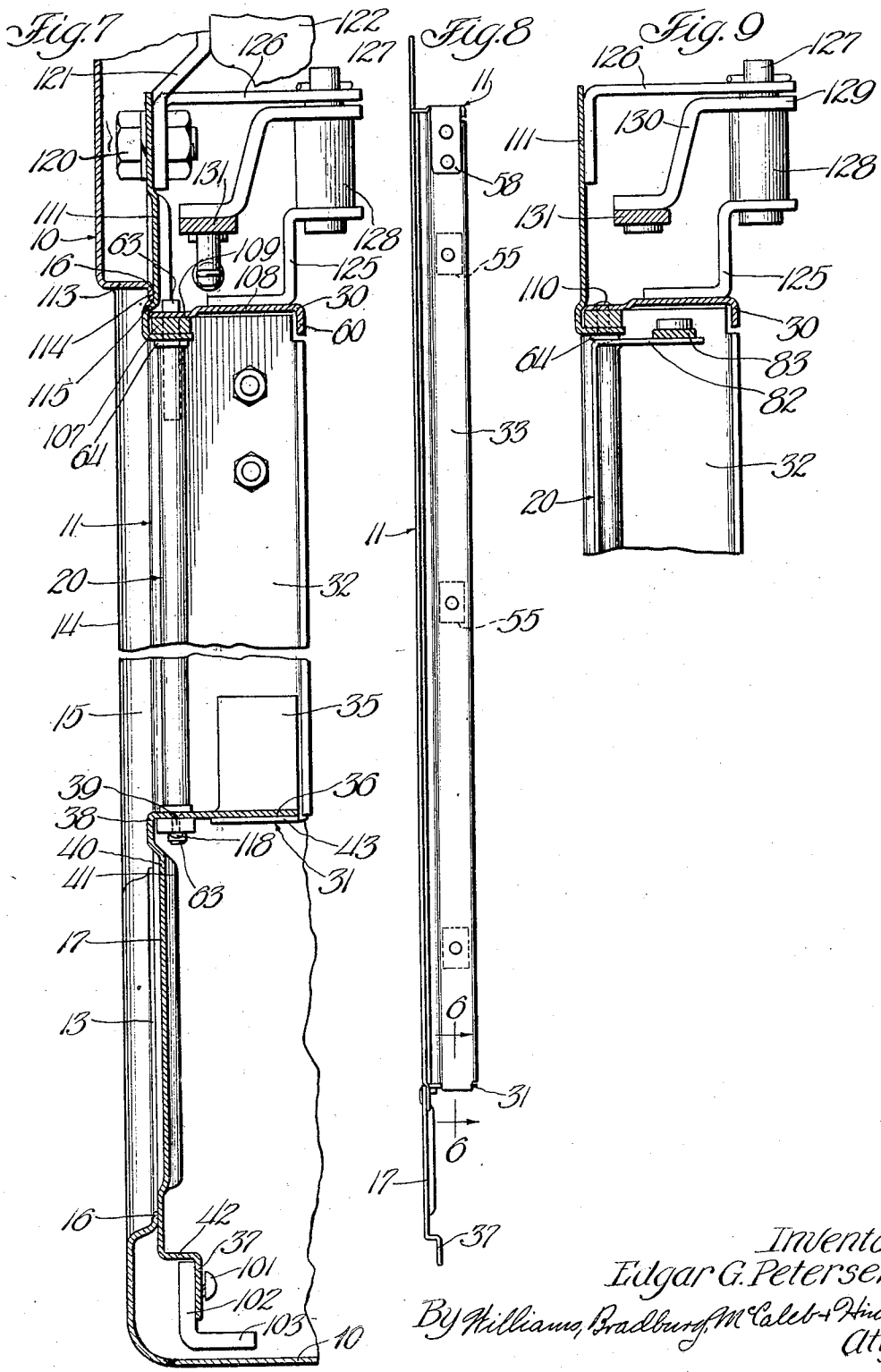


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RADIATOR SHUTTER UNIT

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RADIATOR SHUTTER UNIT

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Fig. 10

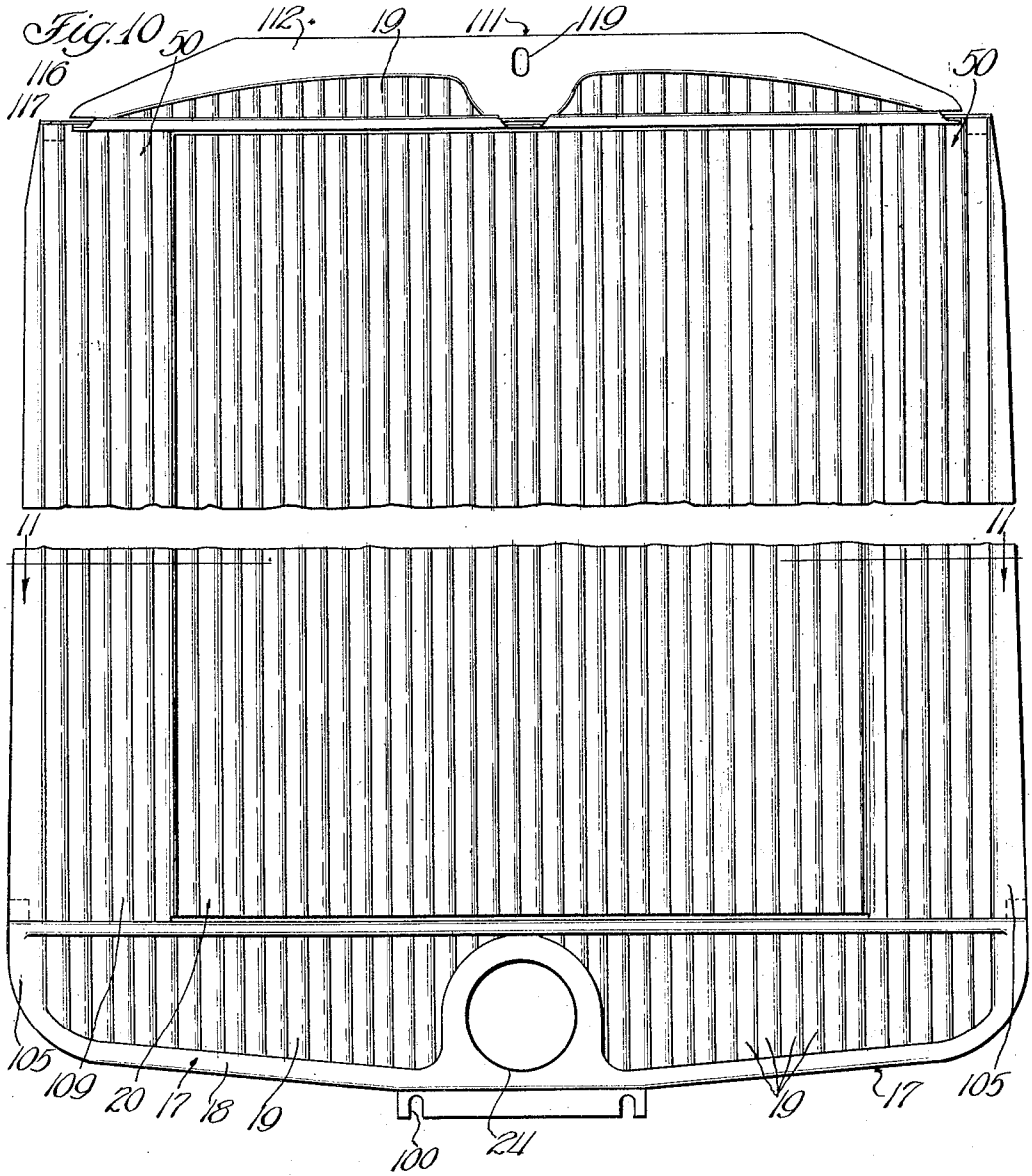
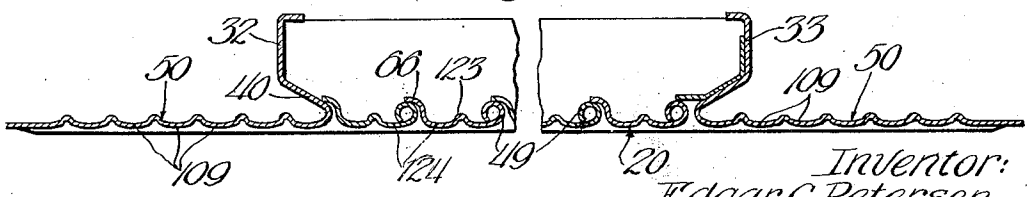


Fig. 11



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UNITED STATES PATENT OFFICE

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RADIATOR SHUTTER UNIT

Application filed March 19, 1930. Serial No. 436,940.

The present invention relates to radiator shutter units, and is particularly concerned with radiator shutter units for controlling the flow of cooling air through the radiator of internal combustion engines.

It is frequently not necessary or desirable to utilize the full radiating area for air conduits of the radiators of modern automotive vehicles during the winter, when radiator shutters are usually employed, and consequently it is often desirable to provide the radiator core with a shutter unit having a fenestration of smaller size than the complete core area. The shape of the radiator shell may also be irregular for ornamental reasons, and one of the objects of the present invention is the provision of an improved radiator shutter unit which is adaptable to use with radiator cores and shells of any size and shape.

Another object of the invention is the provision of an improved radiator shutter of the built-in type which is more sturdy than the devices of the prior art, capable of longer service without possibility of rattling, and capable of being economically manufactured and assembled.

Another object is the provision of an improved air-tight and non-rattling connection between the shutter unit and the radiator shell, including one or more false shutter members which are provided with resilient flanges for engaging the edge of a radiator shell and preventing rattling between these parts.

Another object is the provision of an improved shutter unit having improved forms of false shutter aprons or the like which are assembled with the radiator shutter in such manner that the possibility of rattling is eliminated.

Other objects and advantages of the invention will be apparent from the following description, and from the accompanying drawings in which similar characters of reference indicate similar parts throughout the several views.

Referring to the drawings, of which there are four sheets,

Fig. 1 is a front elevational view of a complete shutter assembly constructed according to the present invention.

Fig. 2 is a top plan view of the radiator shutter unit of Fig. 1.

Fig. 3 is a sectional horizontal view taken on the plane of the line 3—3 of Fig. 1.

Fig. 4 is a sectional view taken on the plane of the line 4—4 of Fig. 1.

Fig. 5 is a sectional view taken on the plane of line 5—5 of Fig. 2, showing one of the upper corners of the frame.

Fig. 6 is a similar view taken on the plane of the line 6—6 of Fig. 8, showing the construction of one of the lower corners.

Fig. 7 is a vertical sectonal view taken on the plane of the line 7—7 of Fig. 1.

Fig. 8 is a side elevational view of the shutter unit alone.

Fig. 9 is a detailed view in partial section of the shutter actuating mechanism and the top of the shutter unit taken on a vertical plane of line 9—9 of Fig. 2.

Fig. 10 is a front elevational view of a modification.

Fig. 11 is a horizontal section taken on the plane of the line 11—11 of Fig. 10.

Referring to Figs. 1, 3 and 7, the complete assembly of the built-in shutter constructed according to the present invention preferably includes a radiator shell 10, a radiator shutter unit 11, and a radiator core 12. The radiator shell may be of any conventional shape, and the present radiator shutter unit is peculiarly adapted to be used with radiator shells having a fenestration 13 of any shape, since the present shutter unit 11 is provided with a plurality of false shutter aprons, plates or flanges of different types for closing the space between the shutter unit and the edge of the radiator shell 10. The radiator shell 10 is preferably supported directly upon the chassis of a vehicle and the front wall 14 of the shell 10 is preferably provided with an inwardly projecting flange 15 and a contacting flange 16, which extends substantially parallel to the face of the shutter unit 11. The contacting flange 16 of the shell 10 may be made of resilient material to produce a closer fit between the shutter unit and the

contacting edge 16 of shell 10, and the flange 16 forms the border of a fenestration 13.

The design of fenestration illustrated in the present embodiment is to be regarded as merely exemplary of one of the many forms which the fenestration in the radiator shell 10 may take, and in any particular case the intervening space between the shell 10 and the shutter unit 11 may be closed by false shutter aprons.

The lower portion of the fenestration 13 in shell 10 may be closed by a shutter apron 17 consisting of a stamped sheet of metal which is preferably formed with a substantially flat border 18 for engaging the rear side of flange 16, and with a plurality of separate shutter formations 19 of the same width and shape as the shutters 20 which are carried by the shutter unit 11. The false shutter plate 17 preferably comprises an integral part of the lower frame member 31, and is preferably provided with a centrally located opening 24 for access to the crank shaft engine. The opening 24 may be closed by any conventional type of cap 25.

The radiator core 12 comprises one of the conventional forms of honey-comb structures for permitting the circulation of water through a multiplicity of conduits having fins exposed to the air, and the honey-comb part of the core 12 is supported by a sheet metal core band 26 forming the outer wall of the radiator core 12. At the rear side of the core 12, the core band 26 is provided with a laterally projecting extension 27 which may be secured to the radiator shell 10 by brackets and bolts 28 or other convenient fastening means.

The core band 26 is also preferably provided with a pair of forwardly projecting extensions 29 at each side to provide a support for the shutter unit 11. It will thus be observed that the radiator shutter 11 may be directly supported by the extensions on the core band 26 which are in turn fixed to the shell 10, carried by the chassis in such a manner that there is no possibility that the honey-comb portion of the core 12 may be damaged.

The forward extensions 29 on the core band 26 also forming a casing for enclosing the space between the shutter unit 11 and the radiator core 12 in such manner as to provide a substantially continuous conduit through the shell 10. The radiator shutter unit 11 preferably comprises a supporting frame consisting of two end frame members 30, 31 and a pair of side frame members 32, 33.

The lower end frame member 31 may consist of an elongated sheet metal member which is preferably provided with a pair of upwardly projecting attaching flanges 34, 35. The lower frame member 31 preferably has a flat body portion 36 with a forwardly projecting rib for housing 38 for enclosing and protecting a bearing strip 39. The housing 38 preferably comprises a downwardly extending flange 40, a backwardly extending flange 41, and the flange 41 also supports the depending false shutter apron 17.

The depending false shutter apron 17 is preferably provided with a downwardly extending securing flange 37 which is offset at 42 from the main body of the false shutter apron 17, and provided with a plurality of vertically extending slots 100 for receiving screw bolts 101 threaded into a supporting bracket 102. The supporting brackets 102 preferably have an upwardly extending flange and a horizontally extending flange 103, which may be spot welded, brazed or otherwise secured to the inside of the shell 10 at the bottom in such a position that when the flange 37 is secured by bolt 101 to bracket 102, the depending shutter apron 17 has its flat surface 18 resiliently engaging the contacting edge 16 at the lower part of the shell 10. The brackets 102 are thus adapted to provide additional support for the core 12 at the front of the shell, through the intermediary of the shutter unit, and to also secure the lower part of the shutter unit to the shell in such manner as to positively prevent any possibility of rattling. The slots 100 constitute an adjustable form of connection which permits some variation in the fit of the parts, so that they may be assembled without difficulty, although the parts are stamped out in large quantities by ordinary machinery.

The side frame members 32 and 33 of the shutter unit 11 preferably consist of elongated sheet metal members which are likewise formed with attaching flanges 43, 44 at each end, and with laterally projecting reinforcing flanges 45 at the rear edge.

At the front edge of each of the lateral frame members 32, 33, these members are each preferably provided with an inwardly projecting flange 46 which is bent outward and backward upon itself as at 47, forming a curved surface 48 of substantially the same shape as one of the curled portions 49 of the shutter 20. The outwardly extending portion 50 of each of the side frame members 32, 33 constitutes a resilient false shutter flange which may be made of sufficient width to fill the space between the shutter unit 11 and the contacting edge 16 of the shell 10. Each of the flanges 50 is also preferably formed with a plurality of stamped shutter formations 19 so that the shutter unit has the appearance of shutters extending over the complete area of the fenestration 13, but only the part within the frame of the shutter unit 11 consists of movable shutters.

Where the shape of the fenestration 13 is such that it tapers in width toward the top, the outermost flat part 104 of flange 50 may taper in width toward the top as shown in Fig. 10, so that the balance of the shutter for-

mations may be substantially parallel to each other.

In the embodiment of Fig. 3, the flange 50 is provided with one false shutter formation 19 and the flat portion 104, but in the embodiment of Fig. 10 the shutter unit is provided with side flanges 50 having a plurality of false shutter formations 19, and it will be evident that any amount of the area outside the shutter frame and inside the shell 10 may be covered by the false shutter flanges 50. The flanges 32 and 50 are preferably resilient, so that the flat part 104 is maintained in resilient engagement with the inwardly projecting contacting edge 16 of shell 10, thereby providing a substantially air-tight and rattle-proof connection between the shutter unit 11 and the front part of shell 10 at each side. The laterally projecting extension 27 on core band 26 provides the principle support for the radiator core 12 at its rear side, and also encloses the rear side of the space 51 in the shell 10, forming a dead air space about the radiator core 12, which tends to prevent the radiation of the heat from the water in the core during cold weather.

The present construction having false shutter flanges at the side is peculiarly adapted to be used with radiator cores which are considerably narrower than the radiator shell, in cases where it is desirable to have a relatively larger radiator shell with a smaller and narrower radiator core.

In order to secure the shutter unit 11 to the forward extensions 29 on core band 26, the extensions 29 are preferably provided with apertures 52 for receiving screw bolts 53 and the side frame members 32, 33 are provided with apertures 54 adapted to register with the apertures 52. Inside the side frame members 32, 33, these members are preferably provided with metal plates 55 having a threaded aperture 56 for receiving the threaded portion of bolt 53, and the plates 55 are preferably secured to the side frame members by spot welding.

It will thus be observed that the shutter unit may be secured to the forward extensions 29 of core band 26 by bolts 53 passing through extensions 29 into the threaded members 55.

The lower corners of the frame of shutter unit 11 are preferably permanently secured together by spot welding or similar methods, and the attaching flange 44 may be spot welded to the body of the frame member 31 while the attaching flange 34 may be spot welded to the body of side frame member 33, by a plurality of spot welds. This form of joint between the lower and side frame members, provides a frame which is particularly strong and rigid as distinguished from the frames of a prior art. In order to provide a shutter having resilient false shutter aprons at both the sides and the bottom, the false shutter apron 17 is preferably of sufficient length to extend from side to side of shell 10, and consequently the ends of the false shutter apron 17 project laterally beyond the radiator core band 26.

Either the false shutter flanges 50 or the false shutter apron 17 may be provided with an overlapping attaching flange 105 for securing these false shutter members together at their outer edges, and the flange 105 may be secured to the adjacent part by spot welding.

The upper frame member 30 preferably comprises an elongated sheet metal member having downwardly extending attaching flanges 58 which may be secured to the side frame members 32, 33 by a plurality of screw bolts 106. The upper frame member is also preferably provided with a downwardly extending reinforcing flange 60 at its rear edge, and the body of the upper frame member 30 is preferably of sufficient width to extend over the side frame members 32, 33, flanges 46, and false shutter flanges 50, so that the false shutter flanges 50 may abut the lower face of the upper frame member 30. The upper frame member 30 is preferably provided with a bearing strip 107 of bearing metal such as bronze, brass or other alloys having a plurality of drilled apertures forming bearings on the trunnion 63 of the shutters 20. The frame member 30 may be formed with an offset 108 and the bearing 107 secured to the offset portion 109 of frame member 30 by a plurality of rivets 110. The upper frame member 30 is also preferably provided with a false shutter plate 111, formed with a plurality of false shutters 19 of the same shape and provided with a relatively flat outer surface 112 conforming to the shape of the shell fenestration 13 at the top, so that the contacting edge 16 of the shell may be resiliently engaged by the flat part 112 of plate 111. The plate 111 is preferably formed with a forwardly projecting housing for bearing strip 107 consisting of a forwardly projecting flange 113, a downwardly projecting flange 114, and a horizontal flange 115. The horizontal flange 115 may be secured to the lower side of bearing strip 107 by the same rivets 110 in such manner that the offset portion 109, and bearing strip 107, are received within the groove formed by flanges 113, 114, 115. The false shutter plate 111 thus encloses and protects the bearing strip 107, and provides a finished forward and lower surface for the upper frame member 30 and the false shutter plate 111 is preferably made of sufficient width to cover the fenestration 13 in the shell, and consequently the plate 111 projects laterally beyond the frame members 32, 33. The upper frame member 30 may also be provided with lateral extensions 116 of the offset portion 109, and with attaching flanges 117 for securement to the false shutter flanges 50 by

spot welding or other fastening means. It will be understood that the flange 115 of shutter plate 111 and flange 109 of upper frame member 30 may also be provided with apertures for passing the trunnions 63.

The lower frame member 31 is also provided with similar bearing strip 39 for receiving the lower trunnion 63 and the lower bearing 69 may be secured in the bearing housing 38 by a plurality of rivets 118. It will be understood that the lower frame member 31 also has apertures registering with the bearings in the strip 39 for passing trunnion 63.

The false shutter plate 111 is also preferably provided with a slot 119 for receiving a screw bolt 120 which adjustably secures the shutter plate 111 to a sheet metal bracket 121, which may be welded or otherwise secured to the front of the water box or spout 122. The upper false shutter plate is thus also reinforced agaist rattling, and held in resilient engagement with the contacting edge 16 of shell 10, and the entire structure is given increased rigidity by this mode of securement.

The shutters 20 preferably consist of elongated sheet metal members each of which is formed with a longitudinally extending rib 123, giving the front of the shutter the semblance of a pair of shutters formed by the curved portions 124. The rib 123 reinforces each shutter longitudinally, increases its resilience in a lateral direction, and improves the appearance of the shutters which may be made wider than the ordinary shutters without sacrificing the strength and durability of the unit. A widening of the shutters decreases the number of trunnions, and increases the efficiency of the unit by increasing the proportionate amount of open space when the shutters are open.

Each of the shutters 20 preferably has a curled or tubular portion 49 for receiving the trunnion 63, and the trunnions 63 may consist of relatively short pins driven into each end of the tubular portion 49. In a preferred embodiment, the trunnions are each formed with an integral outwardly projecting rib or flange 54, and driven into each end of the tubular formations 49 to be secured therein by a spot weld at one of the concealed parts of the shutter. The rib 64 forms a washer for spacing the shutter from its bearing, and also acts as a thrust bearing for engagement with the frame or bearing strip. The rib 64 also definitely limits the length of the trunnion 63 which may be driven in until the rib engages the end of the shutter.

The trunnions 63 are preferably formed of steel so as to produce a minimum amount of wear from the engagement with the bearing strips.

Each of the shutters is preferably provided with a curved portion 66 which is complementary to the tubular portions 49, and the curved portion 66 of the left-hand shutter is adapted to engage the curved part 48 of side frame member 32 in the same manner as the engagement between the respective shutters.

The crack between the right-hand shutter and the shutter frame member 32 is preferably closed by the resilient flange 67 of a sheet metal member which is secured to the frame member 32 by means of another flange 68 spot welded to the inside of flange 46. The flange 67 preferably has sufficient clearance with respect to the curved portion 49 of the adjacent shutter to permit the shutter to rotate freely.

Each of the shutters 20 is preferably provided at one end with a backwardly extending shutter arm 82, and the shutter arms 82 are pivotally connected to a shutter actuating bar 83. The shutter actuating bar 83 has a fixed stud 92 which projects upward through an arcuate slot 93 and the upper frame member 30. The upper frame member 30 is preferably provided with a bracket 125, and the false shutter plate 111 may also be provided with a bracket 126. The brackets 125, 126 may support a stub shaft 127 having a tubular spacer 128 and a bell crank 129. One arm of the bell crank 129 may be connected to any form of actuating device, manual or thermostatic, and the opposite arm 130 may be pivotally connected to a link 131 which has its opposite end pivotally mounted on the stud 92. A sheet metal bracket 132 may be spot welded to the upper frame member 30, and provided with a hook 133 for securing one end of the coil spring 134, the opposite end of which is secured to a stud 135 carried by link 131. The spring 134 urges the link 131 to the left in Fig. 2, tending to close the shutters. The specific mode of mounting the actuating mechanism at the top of the shutter unit also increases the rigidity of the frame, and provides additional support for the false shutter plate.

The modification shown in Figs. 10 and 11 differs from that of the other figures only in the provision of a multiplicity of false shutters formed in the side flanges 50, and this construction has already been described with reference to the other figures.

While I have illustrated a preferred embodiment of my invention, many modifications may be made without departing from the spirit of the invention, and I do not wish to be limited to the precise details of construction set forth, but desire to avail myself of all changes within the scope of the appended claims.

Having thus described my invention, what I claim is new and desire to secure by Letters Patent of the United States, is:

1. In a radiator shutter unit the combination of a pair of side frame members, with

a pair of end frame members, forming a fenestration, a bearing strip carried by the inner side of one of said end frame members, and a false shutter plate having a forwardly projecting bead for housing said bearing strip, and having a backwardly extending attaching flange, said bearing strip being secured between said flange and an end frame member.

2. In a radiator shutter unit the combination of a pair of side frame members, with a pair of end frame members, forming a fenestration, a bearing strip carried by the inner side of one of said end frame members, a false shutter plate having a forwardly projecting bead for housing said bearing strip, and having a backwardly extending attaching flange, said bearing strip being secured between said flange and an end frame member, and a plurality of shutters pivotally mounted on said end frame members.

3. In a radiator shutter unit the combination of a pair of side frame members, with a pair of end frame members, forming a fenestration, a bearing strip carried by the inner side of one of said end frame members, a false shutter plate having a forwardly projecting bead for housing said bearing strip, and having a backwardly extending attaching flange, said bearing strip being secured between said flange and an end frame member, a plurality of shutters pivotally mounted on said end frame members, a bracket carried by said false shutter plate, a second bracket carried by the adjacent end frame member, a bell crank pivotally mounted on said brackets and having an offset arm and operative mechanical connections between said arm and said shutters.

4. A radiator shutter assembly, comprising a radiator shell, a radiator core carried by said shell, a shutter unit carried by said core, said shutter unit having a plurality of outwardly extending resilient false shutter plates engaging the inner edge of said shell, a plurality of shutters carried by said shutter unit, and means for adjustably securing said shutter plates to the lower part of said shell and the upper part of said radiator.

In witness whereof, I hereunto subscribe my name this 28th day of February, A. D. 1930.

EDGAR G. PETERSEN.