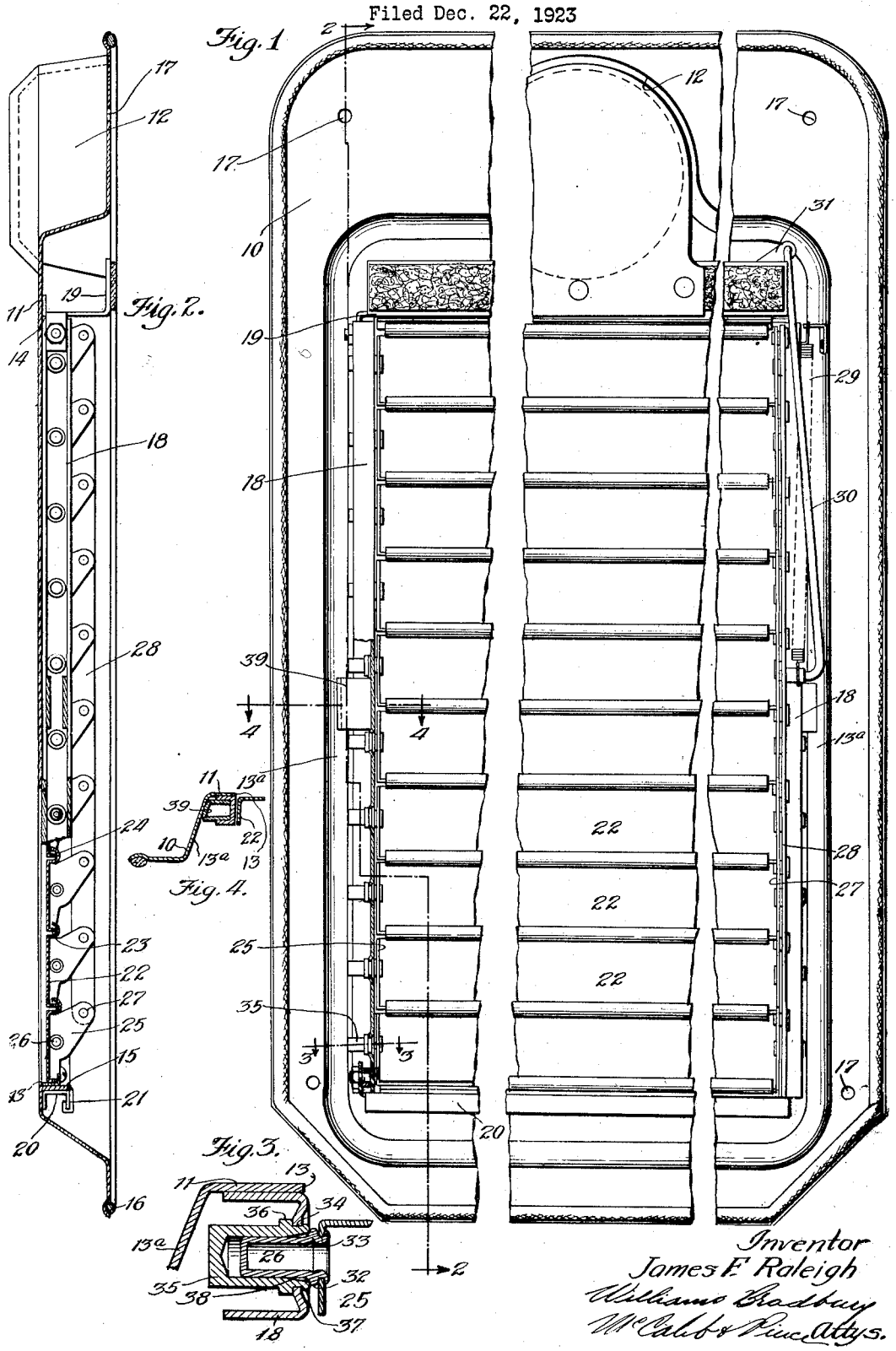
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J. F. RALEIGH

SHUTTER APPARATUS FOR RADIATORS

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SHUTTER APPARATUS FOR RADIATORS.

Application filed December 22, 1923. Serial No. 682,218.

To all whom it may concern:

Be it known that I, JAMES F. RALEIGH, a citizen of the United States, and resident of Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Shutter Apparatus for Radiators, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to a shutter apparatus adapted for use in conjunction with the radiator of an internal combustion engine constituting the power plant of an automotive vehicle. The improvements which are characteristic of my present invention are particularly useful when incorporated in a thermostatically operated radiator shutter attachment, but are by no means restricted to use in an attachment of this specific type.

One of the principal objects of my present invention is to provide a plurality of radiator shutters with bearings which are noiseless and dustproof, which are adequately protected by the frame members by which they are supported, which operate with a minimum of friction, which may be economically manufactured and assembled with the shutters and shutter frame and which require practically no attention after the shutter apparatus is installed upon an automobile radiator.

The shutter apparatus herein shown is of the type comprising two principal frames, namely, the shell or main frame and a subframe which is secured in the shell or main frame and which supports the shutters, and, if desired, a part or all of the shutter-operating mechanism.

It is one of the objects of the present invention to provide improved means whereby the sub-frame is effectively prevented from rattling within the shell or main frame or from being sprung to such an extent as to impair the effectiveness of the shutter bearings.

In the accompanying drawings illustrating my invention—

Figure 1 is a rear elevational view of a radiator shutter attachment embodying my invention, certain parts of the apparatus with which my invention is not particularly concerned being broken away to conserve space in illustration;

Figure 2 is a vertical sectional view which may be regarded as taken on the line 2—2 of Figure 1, looking in the direction indicated by the arrows;

Figure 3 is an enlarged fragmentary sectional view which may be regarded as taken on the line 3—3 of Figure 1, looking in the direction indicated by the arrows; and

Figure 4 is a fragmentary sectional view which may be regarded as taken on the line 4—4 of Figure 1, looking in the direction indicated by the arrows.

Similar characters of reference refer to similar parts throughout the several views.

The shutter attachment herein shown and described may be regarded as an improvement upon the shutter apparatus described and claimed in my prior Patent No. 1,458,593, dated June 12, 1923. Certain parts of the apparatus illustrated in the accompanying drawings are, or may be, substantially identical to corresponding parts illustrated in my aforesaid patent. Therefore, I shall not burden this specification with a detailed description of parts which are adequately illustrated and described in my prior patent.

The shutter attachment illustrated in the accompanying drawings comprises a shell or main frame consisting of a single piece of sheet metal conformed to provide a marginal flange 10, forwardly dished central portion 11, and a thermostat housing 12. The forwardly dished central portion of the shell is provided with a rectangular fenestration 13, the shell metal at the upper and lower margins of this fenestration being turned rearwardly to provide flanges 14 and 15 which serve to stiffen the central portion of the shell and to support the shutter frame presently to be described. The marginal flange 10 of the shell is preferably beaded at its edges to provide a rearwardly facing channel adapted to receive a cushioning strip 16, which is clamped between the radiator and the attachment shell when the latter is secured to the radiator. Persons skilled in the art to which my invention relates and familiar with the disclosure of my prior patent aforesaid will understand that the attachment shell is preferably secured to the radiator by means of long, slender bolts which extend through the radiator core and through apertures in the attachment flange 10, which are spaced away from the cushion-

ing material 16. The shell flange apertures through which the attaching bolts may be passed are indicated at 17—17. It is desirable that the lateral walls of the forwardly dished central portion of the shell diverge toward the radiator. These diverging walls are illustrated at 13^a—13^a.

I prefer that all of the air which passes through the radiator with which my attachment is employed must find its way through the shell fenestration 13. I shall now describe the details of the shutter frame and the shutters which are adapted to regulate the effective area of the shell fenestration.

The shutter frame and parts carried thereby are preferably so designed as to be insertable in the attachment shell as a unit. The shutter frame is rectangular in shape and comprises side channel members 18—18, the upper channel member 19 and the lower channel member 20. The side channel members 18—18 are reversely arranged with their open sides facing away from the shutters presently to be described. The upper channel member 19 is preferably considerably larger in size than the lower channel and has side flanges of unequal height. The upper and lower channel members are provided at their extremities with lug portions which are turned into the adjacent ends of the side channel members 18—18 and are there rigidly secured by means of bolts, as illustrated. The frame is secured to the shell by any suitable means, 21, for instance, as by the clips shown in my aforementioned patent, which clamp the upper and lower channel members against the shell.

The side channel members 18 are disposed with their closed sides or webs just without the margins of the fenestration 13 in the dished portion 11 of the shell. Across the fenestration 13 is disposed a plurality of vertically aligned shutters 22 mounted about vertically spaced horizontal axes along side frames 18. The lower edge of each shutter is provided with a backwardly turned flange 23, while the upper edge of each shutter is provided with a trough-shaped flange 24 into which the flange 23 of the shutter thereabove enters when the shutters are in their normal or closed position, whereby the shutters form a substantially air-tight closure for the fenestration. Each shutter 22 is provided with inwardly turned ends 25 in the mid portions of which are secured aligned hollow studs 26 for journaling the shutter on the side channel members 18—18. At one side of the shutter (the right in Fig. 1) the ends 25 are extended into arms 27 for pivotal connection with a link bar 28 for simultaneously actuating all of the shutters. A tension spring 29 normally urges the link bar 28 upwardly, while a rod 30 reciprocated through a bell crank 31 by the thermostatic means contained in the housing 12 is adapted to push the link bar 28 downwardly to open the shutters against the force of the spring 29. This thermostatic means is not here shown, but is fully disclosed in patent application Serial No. 362,251, filed March 1, 1920, by Charles A. Pipenhagen.

Each hollow stud 26, which may either be stamped or spun, is provided adjacent its open end with a bead or double shoulder 32 (see Fig. 3) against which the rim of the aperture 33 in the shutter end 25 bears, the open end of the stud being peened over to secure it to the shutter. The web of the side channel member 18 which lies adjacent the shutter end is provided with an aperture 34 into which projects the open end of a cup-shaped bearing member 35 provided with the external shoulder 36 for abutting the margins of the hole 34 whereby the member 35 may be peened over as at 37 to secure it to the side frame 18. The rim of the hole 34 is depressed outwardly away from the shutter a slight distance to compensate for the peened over portion 37.

It will be seen that the shutter is journaled in the side channel member 18 by means of the cylindrical bearing surface afforded by the hollow stud 26 and the bore of the stationary bearing member 35, while the end thrust is borne by the shoulder 32 of the stud which bears against the open end of the bearing member 35. I contemplate that the shoulder 32 bearing against the end of the bearing member 35 will constitute a dust seal to prevent dust and dirt from getting into the journal. However, since under certain strains this seal may be broken sufficiently to allow small particles to pass therethrough, I provide the cup-shaped bearing member 35 with a slightly belled mouth forming an annular space 38 through which dust or foreign matter will gravitate and tend to work out at the lower side of the bell. A peculiar advantage obtained by holding these stationary bearing members 35 in the side channel members in this particular manner is that they tend to "give" slightly about their securement in the holes 34 so that they may to some extent adapt themselves to irregularities in their alignment with the axes of the associated shutter. The same is also true of the method I employ in securing the studs 26 to the shutter ends 25. In this way a smooth fitting journal at each end of the shutter is obtained, even though in manufacture the bearing members and the studs are not accurately aligned.

To preserve the dust proof characteristic of the several shutter bearings and also to prevent an undue enlarging of the air leakage space between the ends of the shutters and the juxtaposed channel members 18, I

provide each channel member 18 midway between its ends with a spacer 39 which is formed from a short strip of sheet metal bent into a substantially U cross section as shown in Fig. 4. The legs of the U extend into the open side of the side channel members 18 between the flanges thereof, while the arch or web of the U is obliquely conformed to mate one of the diverging walls 13ª of the shell. Thus, while the side members 18 are actually secured to the shell only through the upper and lower frames 19 and 20, any tendency of the side channel members 18 to spread apart intermediate their ends is prevented by the spacers 39 which hold them in proper relation. Because the oblique surfaces of the spacers 39 contact the diverging walls 13ª of the shell, there is a tendency for the side channel members 18, in being pulled toward the shell by the previously mentioned clips or other frame retaining means, to be cammed inwardly at their mid portions to maintain under something of a spring tension, the shoulders 32 on the studs against the ends of the cup-shaped bearing members 35 and so preserve the dust-tight seal therebetween. It will be noted that the spacers 39 need not be riveted or otherwise secured to any of the parts, for once assembled in the position shown, it is impossible for them to work out of position. It will also be appreciated that these spacers 39 serve effectually to prevent rattling of the sub-frame against the shell and also to prevent rattling of a shutter against the sub-frame due to longitudinal movement of the shutter.

While I have shown this particular embodiment of my invention, it is to be understood that certain changes may be made therein without departing from the scope or spirit of my invention.

I claim:

1. The combination in an automobile radiator shutter comprising a fenestrated shell, of supporting means carried by said shell, a plurality of shutters mounted in said supporting means, an individual hollow pivot boss for each of said shutters carried by said supporting means, each of said pivot bosses being completely closed with the exception of an open end facing its shutter, and a hollow pivot boss on the end of each shutter entering the open end of said first boss.

2. The combination with a plurality of shutters and frame members adjacent the ends of said shutters for pivoting said shutters, of dust proof bearings for said shutters, said bearings comprising stationary bearing members secured to said frame members, and cylindrical studs secured to said shutter ends, the peripheries of said studs co-operating with the bores of said bearing members to form journals for the shutters, said studs being provided with shoulders which contact mating shoulders on said bearing members to form dirt-tight seals, means for urging said stationary bearing members towards said cylindrical bearing members.

3. The combination with a plurality of shutters and a frame adjacent the ends of said shutters for pivoting said shutters, of dust proof bearings for said shutters, said bearings comprising stationary bearing members secured to said frame, and studs secured to said shutter ends, the peripheries of said studs co-operating with the bores of said bearing members to form journals for the said shutters, said studs being provided with shoulders which contact mating shoulders on said bearing members to form dirt-tight seals, and annular spaces between said shoulders and said journals for the purpose of collecting dirt before reaching said journals.

4. The combination with a plurality of shutters and frame members adjacent the ends of said shutters on which said shutters are pivoted, of dust proof bearings for said shutters, each of said bearings comprising a stationary bearing member secured to one end of said frame members and a stud secured to the end of one of said shutters, said stud co-operating with the bore of said bearing member to form a journal for the shutter, contacting shoulders on said bearing member and said stud, said stationary bearing member between said journal and the shoulder on said member being outwardly belled to provide an annular space between said shoulders and said journal for collecting dirt entering between said shoulders before such dirt reaches said journal and for again discharging said dirt outwardly between said shoulders.

5. In a shutter apparatus the combination of a plurality of sheet metal shutters pivoted on parallel axes, spaced bearing frame members for said shutters at the ends thereof, each of said shutters being provided at one end with a bearing stud supported thereon solely by means of spaced shoulders at each side of the sheet metal of said shutter, and a tubular bearing member secured solely by means of spaced shoulders thereon to one of said frame members, said stud extending into said tubular bearing members to form a journal for said shutter.

6. In a shutter apparatus the combination of a plurality of sheet metal shutters pivoted on parallel axes, spaced frame members for said shutters at the ends thereof, each of said shutters being provided at one end with a bearing stud, and a female bearing member secured solely by means of spaced shoulders to one of said frame member, said stud extending into said bearing member to journal said shutter.

7. In a shutter apparatus for the purpose set forth, a plurality of shutters adapted to move around parallel axes, parallel frame members by and between which the shutters are supported, said frame members being in the form of channels disposed with their open sides away from said shutters, apertures in the web portions of said channels, cup-shaped stationary bearing members disposed between the flanges of said channels and secured in said apertures, and shutter carried trunnions extending through said apertures and into said cup-shaped bearing members.

8. In a shutter apparatus for the purpose set forth, a plurality of shutters adapted to move around parallel axes, parallel frame members by and between which the shutters are supported, a plurality of apertures in each frame member, a plurality of stationary bearing members each provided with blind bores, each of said bearing members extending into and being secured in one of said apertures and presenting its bore toward one of said shutters, and shutter carried trunnions extending through said apertures and into the blind bores of the aforesaid stationary bearing members.

9. A shutter apparatus including a shell comprising a marginal flange and a forwardly dished central portion provided with a rectangular fenestration, the lateral walls of said forwardly dished central portion diverging rearwardly from said fenestration, a rectangular shutter frame, shutters journalled in the side members of said frame, said shutter frame being held in said shell by having its top and bottom members secured to the shell at the upper and lower margins of said fenestration, and spacers carried by the shutter frame side members intermediate the ends thereof, said spacers being provided with oblique surfaces bearing against the diverging side walls of the dished portion of the shell.

10. A shutter apparatus including a shell comprising a marginal flange and a forwardly dished central portion provided with a rectangular fenestration, a rectangular shutter frame, shutters pivotally supported by and between the shutter frame side members, said side members being in the form of channels opening away from said shutters, said shutter frame being held in said shell by having the upper and lower shutter frame members secured to the upper and lower margins of said fenestration, and substantially U-shaped spacers disposed in said channel side members between the ends thereof, the web portions of said spacers bearing against the side walls of the dished portion of the shell.

11. A shutter apparatus including a shell comprising a marginal flange and a forwardly dished central portion forming rearwardly diverging side walls, said dished portion being provided with a rectangular fenestration, a rectangular shutter frame, shutters pivotally supported by and between the shutter frame side members, said side members being in the form of channels opening away from said shutters, said shutter frame being held in said shell by having the upper and lower shutter frame members secured to the upper and lower margins of said fenestration, and substantially U-shaped spacers disposed in said channel side members between the ends thereof, the web portions of said spacers bearing against said diverging side walls to cam the said side members toward said shutters.

In witness whereof, I hereunto subscribe my name this 12 day of December, 1923.

JAMES F. RALEIGH.

Witness:

FRANK LELIS.