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2,697,163

MOUNTING MEANS FOR CEILING FANS

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2 Sheets-Sheet 1

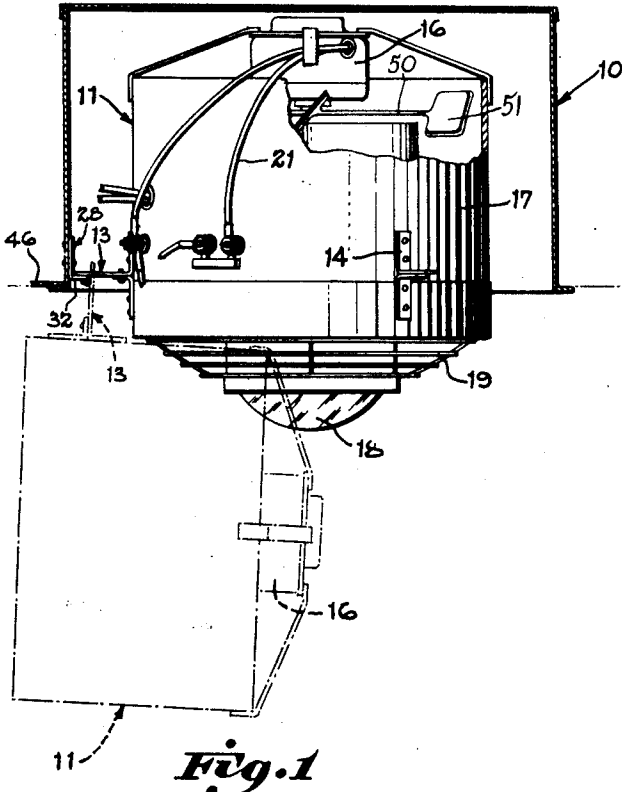


Fig. 1

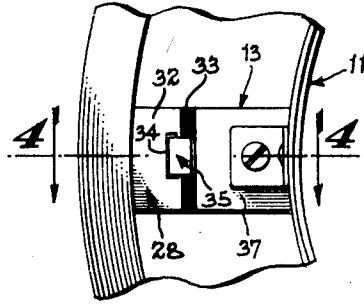


Fig. 3

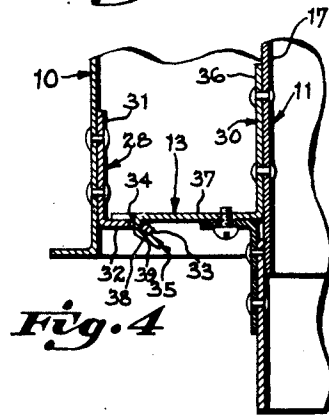


Fig. 4

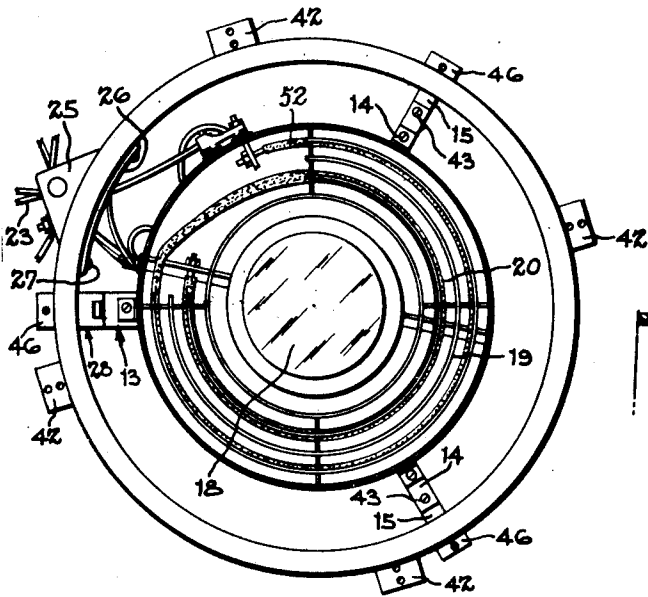


Fig. 2

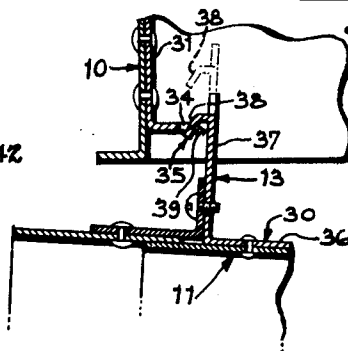


Fig. 5

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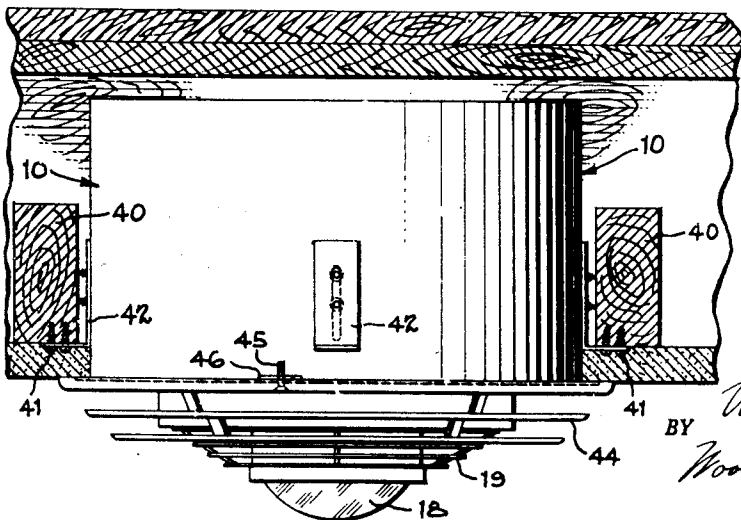
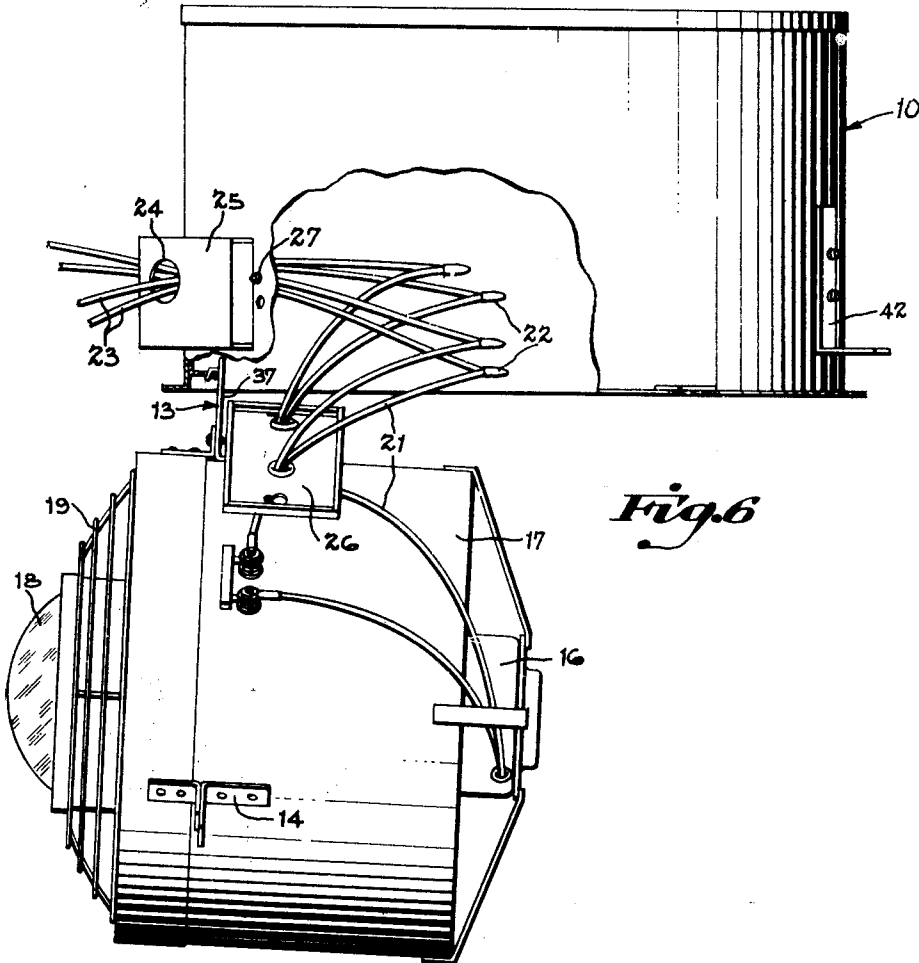
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2 Sheets-Sheet 2



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**MOUNTING MEANS FOR CEILING FANS**

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10 Claims. (Cl. 219-39)

This invention relates to fan or ventilator units which are adapted for flush mounting in room ceilings. The invention is directed to novel means for demountably suspending a fan and motor assembly from an outer housing which is permanently installed in a recess in the ceiling of a room.

A typical ceiling fan consists essentially of an outer box-like housing, an electric motor and fan disposed within the housing, and a grill or ventilator cover disposed over the face of the fan and housing. A typical unit in which such elements are utilized in conjunction with an air heater and an electric light is shown in Joseph R. Corbett co-pending patent application, Serial No. 210,422, filed February 10, 1951, for "Ceiling Heater and Ventilator."

Whether or not the fan unit happens to have associated with it, a heater, an electric light, or both, as shown in the aforesaid patent application, conventional practice in the installation of the equipment involves, first, the insertion of the housing into an appropriate aperture or space above the ceiling level, between the building joists. To facilitate such installation, it is highly desirable if not requisite that the fan motor and associated elements be removable as a unitary assembly from the housing. This is especially desirable in new building construction where installation of the housing precedes the plastering and finishing of the ceiling, which operations might result in damage to the working elements. Thus, the fan unit is ordinarily made separable from the housing, and the electrical connection to the fan is completed after the housing has been permanently mounted within its recess.

For the sake of safety and appearance, the electrical connection to the fan is completed within the confines of the housing so that the wiring is fully protected and is ultimately excluded from view. In order to complete this electrical connection, it has heretofore been necessary that the electrician or his helper manually lift and hold the fan and motor assembly in an elevated position adjacent and below the housing while the wires are being attached, or to rig a temporary rope sling or scaffold for supporting the fan assembly. After the electrical connections are completed the fan and motor assembly is lifted bodily into place within the housing where it is fastened by means of appropriate bolts.

Supporting the fan assembly at ceiling height adjacent but outside the housing is obviously a tiring and cumbersome task. Moreover, it is necessary not only when the unit is originally installed but also whenever the fan is to be cleaned or repaired. It is frequently desirable for the householder to have access to the fan blades and the housing interior in order that accumulations of dust, grease or grime may be removed. In that event, the fan assembly may be loosened from the housing, but it is necessary for someone to hold it in an elevated position. If the fan assembly is allowed to be suspended by the electric wires, damage to them is almost certain to occur because of the weight of the assembly.

The principal objective of the present invention has been to provide a novel support for a fan assembly which permits it to be suspended in an out of the way position either while the electrician performs the connection of the wires of the fan unit to the household circuit, or while the fan assembly and housing interior are being cleaned or repaired.

A further objective of the invention has been to provide a hinge support from which the fan assembly may

be suspended but which, in turn, is capable of exerting a binding force upon its parts during normal usage of the fan so as to prevent any rattling of the parts when the fan is operating.

Briefly, the structure of the invention which provides these functions includes a bracket secured to the housing, and a hanger joined to the fan assembly which engage one another to form a hinge by means of which the fan assembly may be supported or suspended from the housing. In the preferred embodiment the bracket includes a portion projecting outwardly from the housing wall and having an aperture formed therein. The hanger is provided with an angulated tang receivable within this aperture to form a pivoted connection, or hinge.

To suspend the fan from the housing the electrician lifts the assembly until the tang is disposed above the bracket and then lowers it until the tang slips into place in the bracket aperture. The assembly can thus be suspended by means of the hinge until the wiring is completed, after which the assembly is rotated upwardly about the hinge into a nested position within the housing. The fan assembly is supported in the nested position by the hinge and one or more mounting feet secured to the assembly and bolted to cooperating members of the housing.

The hinge thus provides a simple means for orienting the assembly with the housing so that each of the feet on the assembly will be properly aligned with its corresponding element of the housing, and the lead-in wires for the fan motor will be disposed opposite the outlet box. In the preferred embodiment, the bracket is secured to the housing near the junction box and the hanger is mounted adjacent to the lead-in wires of the fan assembly so that when the hanger and bracket are brought into engagement the lead-in wires are automatically positioned beneath the outlet box, ready for connection to the house wires. After the connections are completed, any excess wire can be pushed into the junction box and consequently only a minimum length of wire is used to connect the fan motor, heating coil, and light bulb, if any; and the air passageways within the housing are left free from obstruction.

In addition to the construction just described the hinge is arranged to prevent, in a simple way, vibration or chattering of the fan assembly after it has been installed in the housing and the fan is in operation. For this purpose, the bracket is provided with an angulated binding segment and the hanger tang is configured to form a cooperating foot so that when the fan assembly is swung upwardly about the hinge into the nested position there is a binding action between the binding segment and the tang foot providing a firm mounting for the assembly even if some of the bolts fastening the mounting feet to the housing should become loosened.

These and other objects and advantages of the present invention will be apparent from a further consideration of the following detailed description of the drawings in which a typical embodiment of the invention is disclosed.

In the drawings:

Figure 1 is a side elevational view, partly in section and partially broken away, of the fan assembly and housing showing the manner in which the fan assembly resides within the housing.

Figure 2 is a bottom elevational view of the fan assembly and housing.

Figure 3 is an enlarged bottom elevational view of the fan assembly mounting hinge.

Figure 4 is a cross sectional view taken along line 4-4 of Figure 3.

Figure 5 is a view similar to Figure 4 showing the hinge with the fan assembly in the dropped position.

Figure 6 is a side elevational view of the housing with the fan assembly in a dropped position, the housing being partially broken away to show the electrical connection of the fan assembly lead-in wires to the house wiring system.

Figure 7 is a side elevational view of the fan installed in the ceiling.

As shown in Figures 1 and 2, one type of ceiling fan with which the mounting means of the present invention

may be used comprises an outer housing 10, which is adapted to fit into a recess in the ceiling of a bathroom, dressing room, or the like, and a fan assembly 11, mounted within the housing by means of hinge 13 and cooperating feet 14 and 15. Fan assembly 11, includes fan motor 16, a plurality of arms 50 and fan blades 51 rotated by the motor, a divider shell 17 and, in one preferred embodiment, a light 18, and an electric resistance heating coil 52. A grill 19 is carried by shell 17 and provides an attractive cover for the air discharge opening 20.

In the installed or nested position, the fan assembly 11 resides within the outer housing 10 and is supported by means of hinge 13 and one or a plurality of feet 14 and cooperating elements 15 which are respectively riveted or otherwise secured to shell 17 and the outer housing 10. The fan assembly also includes lead-in wires 21 for the fan motor, heating resistance and electric lamp. These wires are joined as at 22 to wires 23 of the house wiring circuit which are brought into the housing through openings 24 in junction box 25 which is mounted on the outer housing wall. Cover plate 26 is secured to the inner surface of the housing wall as by bolts 27 to complete the enclosure of box 25.

As shown in Figures 3, 4 and 5, the hinge 13 comprises a bracket 28 which is riveted or otherwise secured to the outer housing 10, and a hanger 30, similarly secured to the fan assembly 11. Bracket 28 is preferably constituted by a strip of metal configured to form a base segment 31 which resides against the housing, a projecting segment 32 which extends outwardly from the housing wall, and an angulated segment 33 which depends from the end of projecting segment 32. An aperture 34 is provided in projecting segment 32 for receiving tang 35 formed on hanger 30.

Hanger 30 preferably includes an attaching web 36 which is riveted or otherwise secured to a member of the fan assembly such as shell 17, and an extending web 37 which engages bracket 28. A tang 35, struck from the extending web 37 is adapted for insertion in aperture 34 formed in bracket 28. Tang 35 is generally L shaped, but the foot 38 of the L constitutes a binding surface for engagement with edge 39 of bracket 28 when the fan assembly is rotated into the nested position. Thus, the relative angulation of the foot 38 of the tang 35 and the depending segment 33 of the bracket are such that when the fan assembly 11 is swung upwardly into the nested position shown in Figure 1, edge 39 bears against foot 38 urging the assembly counter-clockwise downwardly into the dropped position. When the fan assembly is in the nested position the feet 14 secured to shell are disposed above the cooperating feet 15 of the housing 10, consequently, even if the bolts securing these feet together should become loosened, the fan assembly will not vibrate or chatter when the fan is in operation since the two sets of feet reside in pressure engagement with one another. On the other hand, the fan assembly readily may be demounted from the housing by removal of the tank 35 from aperture 34 thus separating the hinge elements from one another.

To install a heater in the ceiling, the outer housing 10 is secured to suitable structural members such as cross headers 40, by means of screws 41 which pass through suitable apertures provided in mounting lugs 42. Next wires 23 of the house wiring circuit are brought into the junction box 25 through aperture 24, as shown in Figure 6. The fan assembly is then lifted to the ceiling and tang 35 is inserted in aperture 34 of bracket 28 to form a pivotal connection for suspending the assembly. The bracket and foot are preferably secured respectively to the housing and shell of the fan assembly in such a manner that the lead-in wires emerge from the assembly at a point beneath the outlet box so that short lead-in wires readily may be joined to the house circuit wires as at 22. Thus the air passageways within the housing are not cluttered with wires but are left free to permit a maximum volume of air flow.

After the electrical connections have been made, cover plate 26 is slid along the wires to a position in abutment with the inner wall of housing 10, covering the junction box. It is secured in this position as by screws or bolts 27. The fan assembly is then rotated upwardly about the hinge 13 until feet 14 reside above, and rest upon, feet 15 of the housing. Bolts 43 are then inserted through appropriate apertures in the feet 14 and elements 15 to secure the assembly in place. Finally a

louver 44 is secured in place over the air inlet opening as by bolts 45 which engage the louver and mounting lugs 46.

When the housing interior and fan assembly require cleaning or repair the louver may be removed by loosening bolts 45. Next bolts 43 joining feet 14 and elements 15 are loosened and the fan hinge 13 permits assembly to be rotated downwardly into a dropped position below the housing. In the dropped position the interior of the housing and the various parts of the fan assembly are readily accessible and any parts needing replacement can be removed without the necessity of completely disconnecting the fan assembly from the house wiring circuit.

Having described my invention, I claim:

1. A ceiling fan comprising an outer housing, a fan assembly adapted to reside within said housing, said fan assembly including a motor and rotatable fan blades, and means for mounting said assembly within said housing, said means comprising a hinge, having pivotally cooperable members, one of which is secured to said housing, and the other to said fan assembly, a plurality of mounting feet secured to said fan assembly and cooperating elements associated with said housing and adapted for releasable securance to said feet.

2. A hinge for mounting ceiling fans of the type having an outer housing adapted to be mounted within the ceiling of a room and a fan assembly which is inserted within said housing in nested relationship therewith, said hinge comprising a bracket having a base segment adapted for securance to the housing, a projecting segment extending outwardly from the housing, and an angulated segment depending from the end of the projecting segment, said projecting segment being configured to form an aperture, a hanger secured to said fan assembly, said hanger having an attaching web for securance to said fan assembly and an extending web for engagement with said bracket, said extending web being provided with a substantially L shaped tang adapted to be inserted in the said aperture.

3. In a ceiling fan comprising an outer housing, a fan assembly adapted to reside in a nested position within said housing, means for mounting said assembly within said housing, said means comprising a hinge constituted by a bracket and a hanger, said bracket being secured to said housing, and said hanger being secured to said fan assembly, said hanger having a substantially L shaped tang formed therein, said bracket being configured to form an aperture for receiving said tang to form a pivoted connection therewith whereby said assembly may be suspended from said housing and then rotated upwardly about said hinge into the nested position within said housing.

4. In a ceiling fan comprising an outer housing adapted to be mounted within the ceiling of a room, a fan assembly adapted to reside in a nested position within said housing, means for mounting said assembly within said housing, said means comprising a hinge, a plurality of feet secured to said assembly and a plurality of cooperating elements associated with said housing and adapted for releasable securance to said feet, said hinge being constituted by a bracket secured to said housing, and a hanger secured to said fan assembly, said hanger having a tang formed therein, said bracket being configured to form an aperture for receiving said tang to form a pivoted connection, whereby said assembly may be supported within said housing by means of said hinge, and elements.

5. In a ceiling fan, a hinge for suspending a fan assembly from an outer housing adapted to be mounted within the ceiling of a room, said hinge comprising a bracket secured to said outer housing and a hanger secured to said assembly, said bracket having a body segment adapted to reside against said housing, a projecting segment extending outwardly from said housing and being configured to provide an aperture therein, and an angulated segment depending from the end of said projecting segment, said hanger including an attaching web in abutment with said fan assembly, and an extending web extending outwardly from said attaching web, said extending web having a tang formed therein for cooperative engagement with the aperture provided in said projecting segment.

6. A ceiling heater comprising an outer housing, a fan assembly adapted to reside in a nested position within said

5

housing, said fan assembly including a shell, an electric resistance heating element mounted within said shell, means for mounting said fan assembly within said housing, said means including a hinge constituted by a bracket and a hanger member, said hanger member being secured to said shell, and said bracket being secured to said housing, said bracket being configured to form an aperture therein, said hanger being provided with a bent tang on one end thereof for insertion into said bracket, a plurality of feet secured to said shell, and a plurality of cooperating elements secured to said housing, the feet on the shell being adapted for releasable securance to said cooperating elements on the housing, whereby said assembly may be supported by said hinge and said feet.

7. In a ceiling heater comprising an outer housing and a fan assembly adapted to reside in a nested position within said housing, an electric resistance heating element supported by said fan assembly, means for mounting said fan assembly within said housing, said means including a hinge constituted by a bracket and hanger member, said hanger member being secured to said fan assembly and said bracket being secured to said housing, said bracket having a body segment for attachment to said housing, a projecting segment extending outwardly from said body segment and being configured to provide an aperture therein, and an angulated segment depending from the end of said projecting segment, said hanger including an attachment web adapted for securance to said fan assembly and an extending web projecting outwardly from said attaching web, said extending web having a tang formed therein for insertion in the aperture provided in said projecting segment, said tang being substantially L shaped, the bracket and hanger members being so mounted upon said fan assembly and housing that the foot of said L resides in binding abutment with said angulated segment when the fan assembly is in the nested position in said housing.

8. A ceiling heater comprising an outer housing, a fan assembly adapted to reside in a nested position within said housing, an electric resistance heating element supported by said fan assembly, means for mounting said fan assembly within said housing, said means including a hinge constituted by a bracket and hanger member, said hanger member being secured to said fan assembly and said bracket being secured to said housing, said bracket having a body segment adapted to reside against said housing, a projecting segment extending outwardly from said housing

6

and being configured to provide an aperture therein, and an angulated segment depending from the end of said projecting segment, said hanger including an attaching web in engagement with said fan assembly and an extending web extending outwardly from said attaching web, said extending web having a tang formed therein for insertion in the aperture provided in said projecting segment, said tang being substantially L shaped, the foot of said L being in binding abutment with said angulated segment when the fan assembly is in the nested position, a plurality of feet secured to fan assembly, and a plurality of cooperating elements associated with said housing and adapted for releasable securance to said feet.

9. A ceiling fan comprising an outer housing adapted to be mounted within the ceiling of a room, said outer housing being provided with an outlet box in one wall thereof, a fan assembly adapted to reside within said housing, said fan assembly including a motor, lead-in wires for said motor, and rotatable fan blades, and means for mounting said assembly within said housing, said means comprising a hinge, one member of said hinge being secured to said housing adjacent said outlet box, the cooperating member being secured to said fan assembly adjacent said lead-in wires, a plurality of mounting feet secured to said fan assembly and cooperating elements associated with said housing and adapted for releasable securance to said feet.

10. In a ceiling fan comprising an outer housing adapted to be mounted within the ceiling of a room and having an outlet box in one wall thereof, a fan assembly including a motor, lead-in wires for said motor and rotatable fan blades, a hinge for suspending said fan assembly from said housing, said hinge comprising a bracket secured to said housing adjacent said outlet box and a hanger secured to said assembly adjacent said lead-in wires, said bracket being configured to form an aperture therein, said hanger being provided with a single bent tang on one end thereof for insertion into the aperture in said bracket, said bent tang being removable from said aperture.

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