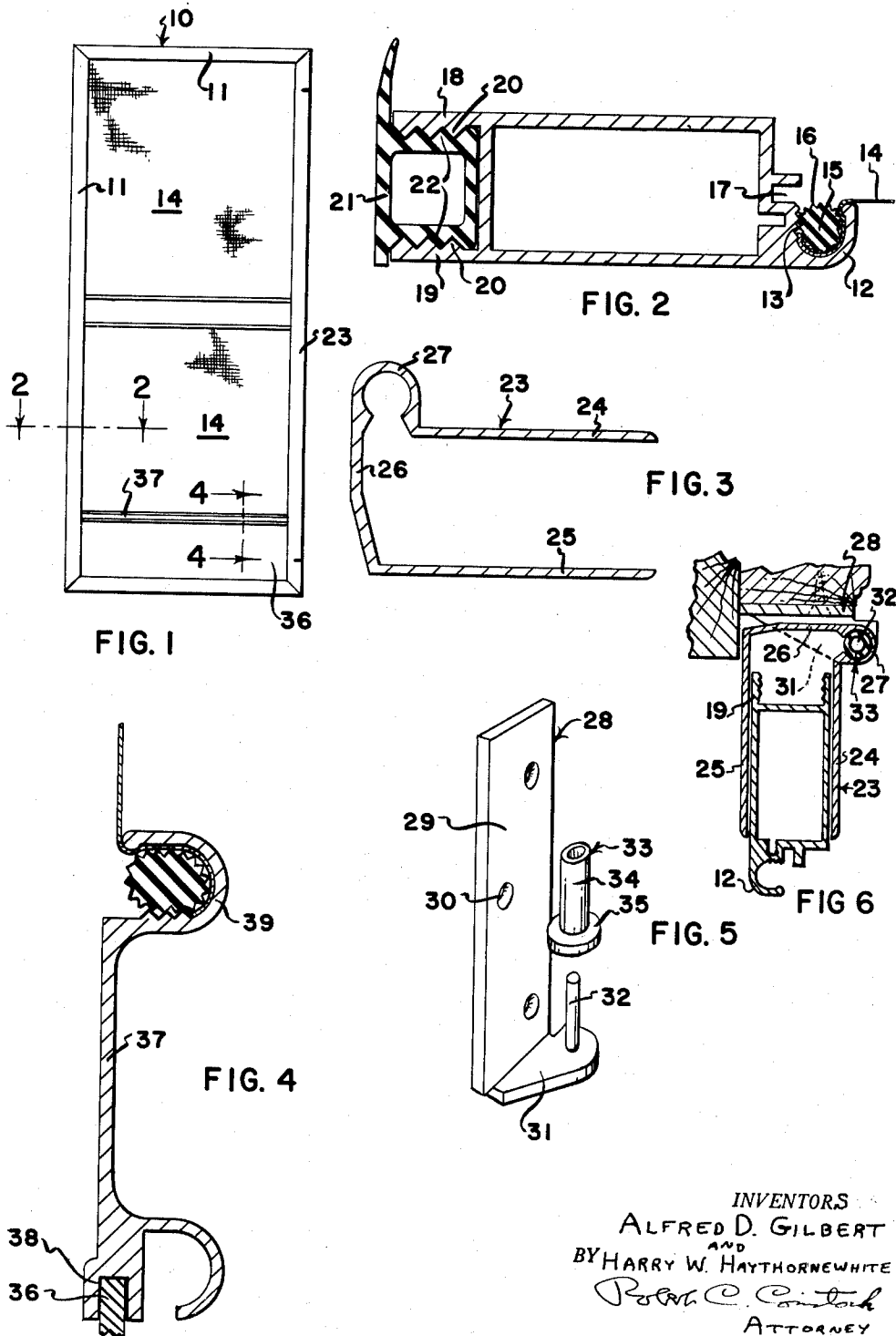


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SCREEN DOOR

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SCREEN DOOR

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This invention relates to screen doors and more particularly to such doors which are formed of metal such as aluminum.

At the present time, the conventional screen door comprises a substantially rectangular portion of screening material which is mounted in a rectangular frame. The frame is in turn mounted in an expansion strip which extends along one or more sides of the door and which compensates for small variations in the size of the door opening. The door is mounted in the door jamb by attaching one half of a hinge to the expansion strip, which requires drilling and driving in a plurality of rivets or other fastening members. The other half of the hinge is attached to the door jamb.

It is an object of our invention to provide an improved construction for mounting screen doors in which the attachment of a hinge to the expansion strip is entirely eliminated. Instead, the expansion strip is provided with a tubular portion which extends along the edge thereof for the entire length of the expansion strip and which may be formed integrally therewith.

A pair of hinge halves are attached to the door jamb, adjacent the top and bottom thereof. Each of the hinge halves is provided with a pin which is preferably circular in cross section. The pins extend toward each other and are adapted to fit within the open ends of the tubular portion of the expansion strip, thus mounting the door for pivotal movement. A cylindrical bushing which is preferably formed of plastic is mounted on each of the pins so that no metal to metal wear can occur and no lubrication is necessary.

It is accordingly an object of our invention to provide a screen door and mounting construction therefor of the type described above, which has among other advantages those of simplicity, ease and economy of manufacture, ease and economy of installation, and longer life.

It is a further object of our invention to provide a screen door and mounting construction therefor in which the expansion strip may be cut to any desired length and still operate to pivotally mount the door without any attachments whatsoever being made to the expansion strip or to the door.

It is a further object of our invention to provide a screen door having improved means for mounting the screen and bumper strips.

It is another object of our invention to provide a screen door having an improved mounting member for holding a kick plate at the bottom of the door and in which the kick plate mounting member is further adapted for use as a cross bar.

Our invention also comprises such other objects, advantages and capabilities as will later more fully appear and which are inherently possessed by our invention.

While we have shown in the accompanying drawings a preferred embodiment of our invention, it should be understood that the same is susceptible of modification

and change without departing from the spirit of our invention.

Referring to the drawings,

Fig. 1 is a front elevational view of a complete screen door;

Fig. 2 is an enlarged sectional view of the same taken along lines 2-2 of Fig. 1 showing the frame member with the screen and spline at one end and the bumper strip at the other end;

Fig. 3 is an enlarged sectional view of the expansion strip of our invention;

Fig. 4 is an enlarged sectional view taken along lines 4-4 of Fig. 1, showing the kick plate mounting member;

Fig. 5 is an enlarged perspective view showing the lower hinge half and bushing;

Fig. 6 is an enlarged sectional view of our mounting means in use, showing the lower hinge half attached to the door, the expansion strip fitted around the frame and the pin and bushing fitted within the tubular portion of the expansion strip.

A preferred embodiment which has been selected to illustrate our invention comprises a door 10 having a rectangular frame 11, which is preferably formed of aluminum, although other suitable materials may be used. The frame 11 comprises a top member, a bottom member and a pair of oppositely disposed side members. All of the members of the frame 11 are preferably formed from lengths of the same material and are identical in construction.

The frame 11 is hollow and when viewed in cross section is provided at one end thereof with a substantially U-shaped hook portion 12 having a plurality of serrations 13 extending along one edge thereof. The hook portion 12 is adapted to receive and hold the edge of a piece of screen 14, which is held in place by a spline 15. The spline 15 is preferably formed of elastic material such as rubber or the like and is substantially round in cross section. The exterior of the spline 15 is provided with a plurality of serrations 16 which cooperate with the serrations 13 of hook portion 12 to hold the spline 15 and screen 14 firmly in position.

Directly adjacent the opening of hook portion 12 and extending at a right angle with respect thereto is a rectangular opening 17, which is adapted to receive and fit around the edge of a kick plate or grill.

The opposite end of the frame 11 is provided at its opposite edges with a pair of outwardly directed flanges 18 and 19, which comprise extensions of the side edges of the frame 11. The inner surfaces of the flanges 18 and 19 are provided with teeth 20, which are directed toward each other. A bumper strip 21 is adapted to be mounted within the area between the flanges 18 and 19 and overlying the ends thereof. The bumper strip 21 is preferably formed of resilient material such as rubber or the like and is provided along the side edges of the portion disposed between flanges 18 and 19 with a plurality of teeth 22. The teeth 22 are adapted to interengage with the teeth 20 of the flanges 18 and 19 to hold the bumper strip 21 firmly in position.

The bumper strip 21 is used only along an edge of the door to which an expansion strip is not mounted. Normally the expansion strip is disposed along the side edge of the door which is attached to the door jamb and along the bottom edge of the door.

The expansion strip 23 of our invention fits over the flanges 18 and 19 of the frame 11 and is adjustably mounted with respect to the frame 11 to provide for variations in the size of the door opening in which the door is mounted. The conventional elongated slot type of adjustment is preferably used for this purpose; with

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the expansion strip 23 having elongated slots through which screws extend into the frame 11.

The expansion strip 23 comprises a pair of oppositely disposed side walls 24 and 25, which extend substantially parallel to each other. One end of the expansion strip 23 is open to permit the side walls 24 and 25 to slidably fit around the flanges 18 and 19 of the frame 11. The opposite end of the expansion strip 23 is closed by an end wall 26. The portion of the end wall 26 which is directly adjacent the side wall 25 is slightly offset inwardly to avoid binding at the corner of the door jamb due to the accumulation of paint in older houses.

The portion of expansion strip 23 between side wall 24 and end wall 26 is flared outwardly to provide a tubular portion 27, which is substantially circular in cross section and which is formed integrally with the expansion strip 23. While one side of the tubular portion 27 is shown as being open to the interior of the expansion strip 23, this is not critical to its operation and is provided primarily to reduce the weight and to facilitate the manufacture of the expansion strip 23.

A pair of similarly formed hinge halves 28 are adapted to be attached to the door jamb adjacent the top and bottom thereof to provide pivotal mounting for the door 10. Each of the hinge halves 28 comprises a flat plate 29 having a plurality of screw receiving openings 30 extending therethrough. Extending at a right angle from one end of the plate 29 and preferably formed integrally therewith is a substantially triangular extension 31. Extending at a right angle from the extension 31 parallel to and spaced slightly from the plate 29 is a pin 32. The pin 32 is preferably circular in cross section and is attached at one end to the extension 31, its opposite end being free. The extension 31 extends beyond the edge of the plate 29, so that the longitudinal axis of the pin 32 is substantially aligned with the edge of the plate 29.

The hinge half 28 which is disposed at the bottom of the door jamb is provided with a pin 32 which extends upwardly. The hinge half 28 at the top of the door jamb has a pin 32 which extends downwardly and which is aligned with the corresponding pin 32 of the other hinge half 28.

A bushing 33 is provided with a cylindrical body portion 34 having an outwardly directed base 35 at one end thereof. The bushing 33 is preferably formed of synthetic material such as nylon or Zytel. One of the bushings 33 is slidably mounted on each of the pins 32. The extension 31 is so dimensioned that it will receive and support the base 35 of the bushing 33, while the end of the body portion 34 extends slightly beyond the end of the pin 32.

In use, members comprising the frame 10 are assembled in any desired manner and the screen 14 mounted therein in the manner previously described above. The expansion strip 23 must be attached to the side member of the frame which is pivotally mounted with respect to the door jamb. The expansion strip 23 may also be attached to one or more of the other members of the frame.

One hinge half 28 is mounted at the bottom of the door 10, with its pin 32 and bushing 33 extending into the open bottom end of the tubular portion 27 of expansion strip 23. The plate 29 is attached to the door jamb by mounting a plurality of screws or other fastening members through its openings 31 into the door jamb.

The corresponding hinge half 28 is then mounted at the top of the door 10, with its pin 32 and bushing 33 extending into the open upper end of the tubular portion 27. Its plate 29 is similarly attached to the door jamb. It will be noted that the body portions 34 of the bushings 33 prevent any metal to metal contact between the pins 32 and the tubular portion 27. The bases 35 of the bushings 33 also prevent any metal to metal contact between the ends of the expansion strip 23 and the extensions 31. The bushings thus provide substantially

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friction and lubrication free pivotal mounting for the door.

It should be noted that the attachment of hinges to the expansion strip 23 is completely eliminated, thus saving time, labor and materials. Since the tubular portion 27 extends along the entire length of the expansion strip 23, the method of mounting is always the same and is easily and rapidly accomplished, regardless of the size of the door.

If a kick plate 36 is to be used with the door 10, no change in the construction of the door is necessary. Instead of the bottom edge of the screen 14 being held in the hook portion 12 of the bottom frame member, the bottom edge of the kick plate 36 is mounted within the opening 17. A kick plate mounting member 37 is then mounted transversely across the door 10. The mounting member 37 has extending along the bottom edge thereof a rectangular opening 38 which is adapted to receive and fit around the top edge of the kick plate 36. The opposite edge of the mounting member 37 is provided with a hook portion 39, which is formed and operates in the same manner as the hook portion 12 of frame 11.

In the past, it has been customary to mount the kick plate over the screen. It will be noted that with our construction this duplication of materials is eliminated, thus reducing the cost of construction by eliminating the unnecessary screening and simultaneously improving the appearance of the door. The openings 17 and 38 may also be used for holding decorative grills and other similar attachments on the door.

If desired, the mounting member 37 may also be used as a cross or push bar by notching its ends and attaching them to the side members of the frame 11.

We claim:

1. For use with a screen door comprising a rectangular frame having a pair of oppositely disposed side members, an expansion strip having a closed end and an open end adapted to adjustably receive and fit around one of the side members of said frame, said expansion strip extending for the entire length of said side member, said expansion strip having adjacent the closed end thereof a tubular portion formed integrally with said expansion strip and having a substantially circular cross section, said tubular portion extending for the entire length of said expansion strip and having open lower and upper ends, a bottom hinge half adapted to be attached to the door jamb adjacent the bottom thereof, said bottom hinge half having a flat plate with means for attachment thereof to the door jamb, the bottom of said plate having an extension outwardly directed at a right angle with respect to said plate, a circular pin attached at the bottom thereof to said extension and extending upwardly therefrom substantially parallel to said plate, an upper hinge half adapted to be attached to the door jamb adjacent the top thereof, said upper hinge half having a flat plate with means for attachment thereof to the door jamb, the top of said plate having an extension outwardly directed at a right angle with respect to said plate, a circular pin attached at the top thereof to said extension and extending downwardly therefrom substantially parallel to said plate, the circular pin of said upper hinge half being substantially aligned with the circular pin of said bottom hinge half, a bushing formed of synthetic material mounted on each of said pins, each of said bushings having a substantially cylindrical body portion surrounding said pin and a base extending outwardly from said body portion, said base being disposed adjacent said extension, said pins and bushings adapted to fit into the open upper and lower ends of the tubular portion of said expansion strip to mount the screen door for pivotal movement with respect to the door jamb, said bushings preventing metal to metal contact between said expansion strip and hinge halves and providing lubrication-free pivotal mounting for said door.

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2. For use with a screen door comprising a rectangular frame having a pair of oppositely disposed side members, an expansion strip having a closed end and an open end adapted to adjustably receive and fit around one of the side members of said frame, said expansion strip extending for the entire length of said side member, said expansion strip having adjacent the closed end thereof a tubular portion formed integrally with said expansion strip and having a substantially circular cross section, said tubular portion extending for the entire length of said expansion strip and having open lower and upper ends, a bottom hinge half adapted to be attached to the door jamb adjacent the bottom thereof, said bottom hinge half having a circular pin extending upwardly substantially parallel to the side member of said frame, an upper hinge half adapted to be attached to the door jamb adjacent the top thereof, said upper hinge half having a circular pin extending downwardly substantially parallel to the side member of said frame, said pins being substantially aligned with each other, a bushing formed of synthetic material mounted on each of said pins, each of said bushings having a substantially cylindrical body portion surrounding said pin and a base extending outwardly from said body portion, said pins and bushings adapted to fit into the open upper and lower ends of the tubular portion of said expansion strip to mount the screen door for pivotal movement with respect to the door jamb, said bushings preventing metal to metal contact between said expansion strip and hinge halves and providing lubrication-free pivotal mounting for said door.

3. For use with a screen door comprising a rectangular frame having a pair of oppositely disposed side members, an expansion strip having a closed end and an open end adapted to adjustably receive and fit around one of the side members of said frame, said expansion strip extending for the entire length of said side member, said expansion strip having adjacent the closed end thereof a tubular portion having a substantially circular cross section, said tubular portion extending for the entire length of said expansion strip and having open upper and lower ends, a bottom hinge half adapted to be attached to the door jamb adjacent the bottom thereof, said bottom hinge half having an upwardly directed cir-

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cular pin, an upper hinge half adapted to be attached to the door jamb adjacent the top thereof, said upper hinge half having a downwardly directed circular pin substantially aligned with the circular pin of said bottom hinge half, a bushing formed of synthetic material mounted on each of said pins, said pins and bushings adapted to fit into the open upper and lower ends of the tubular portion of said expansion strip to mount the screen door for pivotal movement with respect to the door jamb, said bushings preventing metal to metal contact between said expansion strip and hinge halves and providing lubrication-free pivotal mounting for said door.

4. For use with a screen door comprising a rectangular frame having a pair of oppositely disposed side members, an expansion strip having a closed end and an open end adapted to adjustably receive and fit around one of the side members of said frame, said expansion strip extending for the entire length of said side member, said expansion strip having adjacent the closed end thereof a tubular portion having a substantially circular cross section, said tubular portion extending for the entire length of said expansion strip and having open upper and lower ends, a bottom hinge half adapted to be attached to the door jamb adjacent the bottom thereof, said bottom hinge half having an upwardly directed circular pin, an upper hinge half adapted to be attached to the door jamb adjacent the top thereof, said upper hinge half having a downwardly directed circular pin substantially aligned with the circular pin of said bottom hinge half, said pins adapted to fit into the open upper and lower ends of the tubular portion of said expansion strip to mount the screen door for pivotal movement with respect to the door jamb.

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