Jan. 9, 1962 H. E. ESKRIDGE ET AL 3,015,839

CONTINUOUS ENGAGEMENT TYPE ELONGATE HINGE

Filed March 21, 1958 2 Sheets-Sheet 1

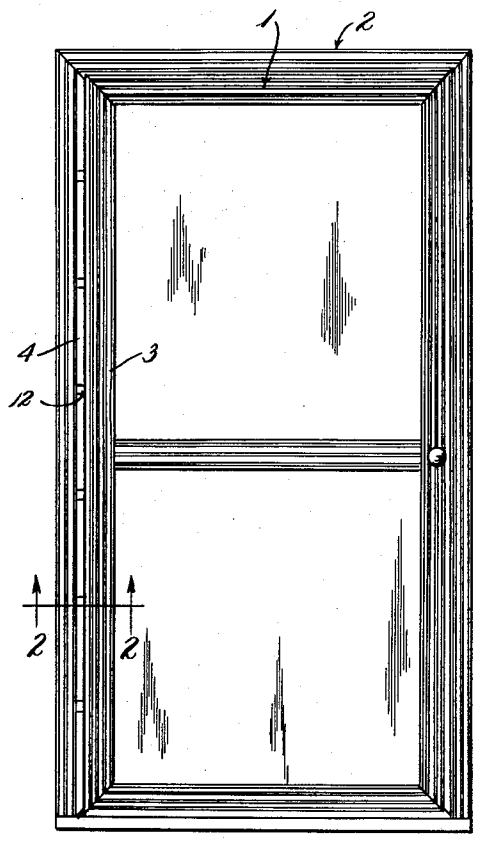


FIG. 1

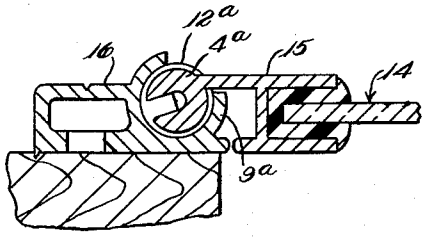
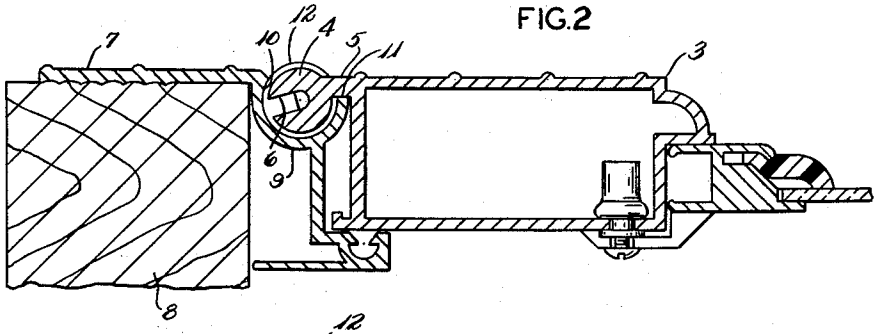


FIG. 4

FIG. 2



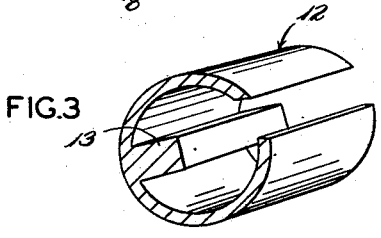


FIG. 3

INVENTORS
HAROLD E. ESKRIDGE
WALDO O. JOHNSON
BY Oldham & Oldham
ATTYS.

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FIG. 5

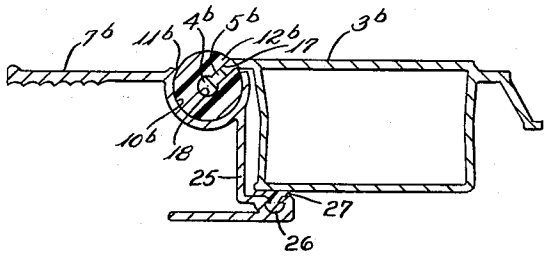
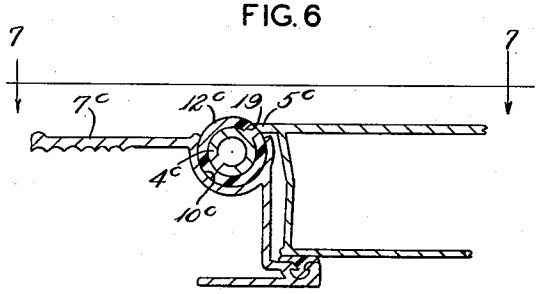


FIG. 6



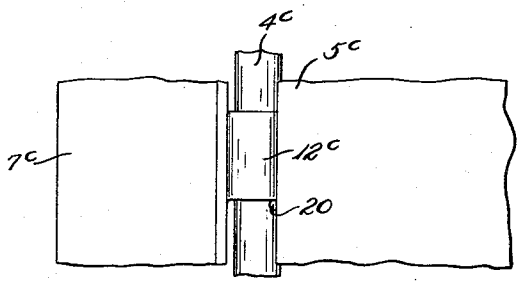


FIG. 7

INVENTORS
HAROLD E. ESKRIDGE
WALDO O. JOHNSON
BY
Oldham & Oldham
ATTYS.

United States Patent Office 3,015,839 Patented Jan. 9, 1962

3,015,839

CONTINUOUS ENGAGEMENT TYPE ELONGATE HINGE

Harold E. Eskridge, Barberton, and Waldo O. Johnson, Wooster, Ohio, assignors to Weather-Seal, Inc., Barberton, Ohio, a corporation of Ohio

Filed Mar. 21, 1958, Ser. No. 722,994
3 Claims. (Cl. 16—136)

This invention relates to elongate hinge constructions, and especially to a continuous or elongate hinge wherein the portions of the hinge are formed integrally with other structures such as door stiles, and Z-bars, or jamb liner rails.

The general object of the present invention is to provide a novel and improved hinge construction, characterized by the integral formation of the hinge pintle and socket members with door stiles, sash rails, or similar members and associated frame or liner rail means, or the like and wherein a continuous, attractive, serviceable hinge construction is provided.

Another object of the invention is to provide special low friction plastic bushings in an elongate metal hinge construction wherein the bearing contact takes place between the low friction plastic bearings and associated metal means rather than metal-to-metal contact.

Another object of the invention is to provide plastic bearings that secure associated metal hinge members together.

A further object of the invention is to provide plastic bearings in an elongate hinge to provide any desired length of bearing engagement in the hinge.

Yet another object of the invention is to provide complementary hinge pintle and hinge socket means on associated portions of a door and positioning frame means therefor and wherein longitudinally spaced positioning bushings are provided for the actual connecting medium between the hinge pintle and hinge socket members.

Still another object of the invention is to provide special extruded metal shapes in elongate hinge constructions and wherein hollow, cylindrical plastic bushings can be readily and permanently secured to the hinge.

The foregoing and other objects and advantages of the invention will be made more apparent as the specification proceeds.

In order to understand the invention more thoroughly, reference should be had to the accompanying drawings, wherein:

FIG. 1 is an elevation of a door and frame means embodying the principles of the invention;

FIG. 2 is an enlarged fragmentary horizontal section taken on line 2—2 of FIG. 1;

FIG. 3 is a perspective view of a plastic, low friction bearing means used in the hinge of the invention;

FIG. 4 is a horizontal section through a modification of the hinge construction of the invention;

FIG. 5 is a fragmentary vertical section, like FIG. 2, only showing a modified hinged construction of the invention;

FIG. 6 is another fragmentary vertical section, like FIG. 2, of a further modification of the invention; and

FIG. 7 is a fragmentary elevation, taken on line 7—7 of FIG. 6, of a portion of the modified hinge construction of FIG. 6.

When referring to corresponding parts shown in the drawings and referred to in the specification, corresponding numerals are used to facilitate comparison therebetween.

The present invention, broadly speaking, relates to a hinge comprising a member having an arcuate hinge socket and having a slot extending the length of the member and connecting to the hinge socket, a second member having a cylindrical pintle thereon, the second member having a flange connecting the pintle to the remainder thereof, said pintle being of a larger diameter than the width of said flange, and a cylindrical low friction plastic bearing carried by the pintle and engaging the hinge socket to connect the second member to the first member for relative pivotal movement therebetween, the plastic bearing having a slot extending thereinto from the periphery thereof and extending the length thereof. The plastic bearing has a center bore receiving the pintle therein with the flange of the first member received in the slot in the bearing.

It should be appreciated that the present invention can be used for pivotally positioning any two members in desired relationship to each other. Thus, the hinge means of the invention could be used for pivotally securing an awning to positioning frame means therefor, or it could be used for positioning casement, awning-type, or other windows on associated frame or anchor means therefor, or for both horizontally or vertically pivoted doors.

Attention now is directed to the details of the construction shown in the accompanying drawings, and a door is indicated as a whole by the numeral 1. A door frame is indicated as a whole by the numeral 2 and the door 1 is pivotally received in such door frame and is secured thereto by the hinge means described hereinafter in more detail.

FIG. 2 of the drawings best brings out the fact that a door stile 3 is provided for the door 1 and such door stile may be of any desired construction and be associated with the remaining portion of the door 1 in a conventional manner. However, preferably this door stile 3 is made of metal by extrusion and a cylindrical hinge pintle 4 is formed integrally with the door stile 3 and connects thereto by means of a connector flange 5 extending between the hinge pintle and remainder of the door stile. The hinge pintle 4 is shown with a recess or slot 6 extending substantially radially thereof, which slot 6 normally extends the length of the hinge pintle 4. The drawings clearly bring out the fact that the connector flange 5 may extend substantially continuously from one edge or face surface of the door stile 3 to form substantially a continuation of one face surface thereof. The hinge pintle 4 hence is formed integrally with one hinge member i.e. the door stile 3 in this instance.

As another important feature of the present invention, a Z-bar or side jamb liner rail 7 is provided and normally is made from metal. Preferably this jamb liner rail 7 is made by extruding aluminum, or other suitable metal to a desired contour. The jamb liner rail 7 is adapted to be secured to a side jamb 8, or other equivalent member in a house or other building to which the door frame 2 is to be secured. The jamb liner rail 7 preferably has a hinge socket 9 formed integrally therewith, which hinge socket has an arcuate surface 10 provided therein. The arcuate surface 10 has a slot or opening 11 extending longitudinally of and the length of the jamb liner rail 7 connecting thereto. The hinge socket 9 is, it will be seen, formed integrally with a second hinge member, i.e. the jamb liner rail 7 in this instance.

Yet another important feature of the hinge construction of the invention is that a plurality of low friction bearings can be engaged with longitudinally spaced portions of the hinge pintle 4 for securing the door 1 and hinge pintle 4 in pivotal engagement with the hinge socket 9 of the jamb liner rail 7. Thus a hollow, cylindrical, low friction bearing 12 is provided and preferably is made from any suitable plastic material, such as polyvinyl resins, nylon or other hard smooth surfaced, low friction plastic substances. The bearing 12 is shown as having a tang 13 extending longitudinally thereof and radially inwardly

from the sleeve or hollow cylindrical surface of the bearings.

In order to engage the bearings **12** to the hinge pintle **4** and facilitate engaging the hinge pintle with its socket, these tangs **13** on the bearings **12** are engaged with or forced into the slots **6** provided in the hinge pintle. Usually, these bearings **12** can be sprung over the hinge pintle into engagement therewith, or they can be telescoped into engagement with the hinge pintle from the end thereof, if desired. After the bearings **12** are engaged with the proper longitudinal sections of the hinge pintle **4**, the bearings can be fixed in position by staking, or partially closing small areas of the walls defining the slot **6** in the hinge pintle adjacent the surfaces of the slot **6** therein so that the hinge pintle will lock onto the tang portion of the bearing **12** and securely hold the bearings **12** in engagement therewith, or will at least prevent undesirable longitudinal movement thereof. These bearings **12** are provided with inner diameters such as to engage the periphery of the hinge pintle **4** snugly whereas the outer diameters of the bearings **12** are such that the bearings are snugly received in the hinge socket **9** on the arcuate surface **10** thereof. Thus the bearings **12** will position the hinge pintle and associated means in the hinge pintle socket for smooth, arcuate, low friction movement of the hinged members, and any metal-to-metal contact is avoided.

FIG. 2 of the drawings clearly shows that the door **1** will abut against a portion of the jamb liner rail **7** when the door is in its closed position and this aids in maintaining the door properly closed, when desired.

Preferably to engage the door and the hinge pintle **4** with the jamb liner rail **7**, and hinge socket **9**, such members will be telescopically slid into engagement from an end portion of the hinge socket **9**.

It will be realized that the bearings **12** can be made of any suitable plastic material and can be of desired length, and usually will be about an inch long and are positioned about every 12 inches along the length of the door. Nylon and polyvinyl resin bearings have proven very effective with aluminum hinge members. The connector flange **5** extends through the slot **11** which normally is of about 90° to 110° long and controls the amount of pivotal movement of the door **1**.

FIG. 4 of the drawings best shows that a casement window **14**, having a sash rail **15** provided therein, can be engaged with a supplementary rail **16** or other suitable frame means, by use of the hinge means of the invention. Thus a hinge pintle **4*a*** is shown formed integrally with the sash rail **15**, whereas a hinge socket **9*a*** is formed integrally with the supplementary rail **16**. The hinge pintle **4*a*** is engaged with the hinge socket **9*a*** by means of bearings **12*a*** like that described hereinbefore.

Any suitable means, not shown, but preferably a modified bearing **12**, can be used adjacent the bottom of the jamb liner rail **7** in order to provide a support bearing, or member to aid in supporting the weight of the door **1** on the frame means provided therefor. The bearing at the bottom edge of the door **1** may have a special end flange thereon to aid in supporting the door **1** for pivotal movement and it will bear on whatever support surface, such as a threshold, that is provided for the door **1**.

With reference to the modified hinged construction shown in FIG. 5, one hinge member **3*b*** is shown and it has a hinge pintle **4*b*** thereon, usually of cylindrical contour. The hinge pintle **4*b*** is connected to the remainder of the hinge member by a connector flange **5*b*** that normally is of lesser width than the diameter of the hinge pintle **4*b***. Such connector flange **5*b*** connects to any desired type of hinge member, in this instance, another type of a door stile is shown. A second hinge member **7*b*** is provided and it has an arcuate hinge socket **10*b*** provided therein. A slot **11*b*** extends the length of the second hinge member **7*b*** and connects to the arcuate hinge socket provided therein. The second hinge member **7*b*** also has an extension or flange **25** formed integrally therewith and extending therefrom. Such extension **25** preferably has a recess or seat **26** therein in which a plastic sealing or cushion strip **27** is received and with such strip extending therefrom. The one hinge member **3*b*** usually also is of such a shape, usually a hollow rectangle, that it has a section lying immediately adjacent the strip **27** so as to resiliently abut thereagainst for cushioning and sealing action when the hinge members are in the closed position indicated in FIG. 5.

In this embodiment of the invention, it is a special feature of the invention that a hard, low friction plastic bearing **12*b*** is provided for effecting the connection between the first and second hinge members. This bearing **12*b*** is of cylindrical contour, but is not a continuous disc in cross section. The bearing **12*b*** has a slot **17** provided therein and connecting to a center bore **18** in the bearing **12*b***, which bore **18** is of a size and shape complementary to the hinge pintle **4*b*** for snug engagement therewith. Usually the bearing **12*b*** can only be engaged with the pintle **12*b*** and connector flange **5*b*** by telescoping the bearing into engagement with the pintle from the end thereof. The bearings **12*b*** may, however, have sufficient resiliency therein and be of such size as to be sprung over the pintle **4*b*** and to retain themselves in engagement with any given section of the hinge pintle **4*b***. More positive holding means may be provided for the bearings to retain them against longitudinal movement. Thus a dimple or a rivet can be formed in or secured to the connector flange **5*b*** immediately adjacent one or both margins of the bearings **12*b***, as hereinafter described. If the door with which the hinge of the invention is to be used will be vertically positioned, then it is usually only necessary to provide a stop means adjacent the lower end of the bearings **12*b***.

The modification of the invention shown in FIG. 6 provides a bearing **12*c*** which has thinner radial walls than, for example, the bearing **12*b*** shown in FIG. 5. These bearings **12*c*** engage a hollow hinge pintle **4*c*** that connects to the remainder of the construction by an integral connector flange **5*c***. The bearing **12*c*** seats in a hinge socket **10*c*** provided in the second hinge member **7*c***. The bearing **12*c*** is not of a continuous cylindrical shape, but is of hollow cylindrical shape and has a longitudinally extending slot **19** therein adapted to receive the connector flange **5*c*** when the bearing is operatively positioned. The bearing **12*c*** may be slightly smaller in internal diameter than the external diameter of the pintle **4*c*** so as to be retained snugly in engagement therewith. Again, any desired type means may be provided for preventing relative movement of the bearing **12*c*** with relation to the pintle **4*c***. FIG. 7 shows that a pin or rivet **20** may be engaged with the connector flange **5*c*** immediately adjacent one or both ends of the bearing **12*c*** to prevent movement thereof after it has been slid into engagement with the pintle **4*c***. As previously indicated, dimples or other protuberances could be formed on the connector flange **5*c*** to aid in preventing longitudinal movement of the bearings **12*c*** after brought into their desired relative position on the associated one hinge member and prior to sliding the two hinge members into engagement for permanent assembly thereof.

It thus will be seen that the invention provides a hollow cylindrical bearing means of low friction characteristics to provide the bearing engagement between metal hinge members, such as ones made from aluminum, or other metals that may freeze when in intimate contact with other metal surfaces over long periods of time, and possibility of such freezing or galling is avoided.

The term plastic in this application is used to cover any suitable hard but low friction plastic material from which bearings, like those described herein can be produced.

The invention contemplates that the male hinge member, or hinge pintle **4**, if necessary or desired, can be made an integral portion of the jamb liner rail and have

the hinge socket, or female hinge member formed integrally with the door stile 3, but the construction shown in FIG. 2 of the drawings is the preferred construction for the hinge means of the invention. These hinge members, it will be seen, are formed integrally with the remaining portions of the members to be pivotally secured together, and the elongate hinge and socket construction form an attractive, effective hinge means that are sturdy and will give an effective service life. It will be realized that no special positioning means are required to secure the door, casement sash or the like, to a positioning member therefor and this greatly facilitates assembly and installation of doors and casement sashes to frame means therefor.

This invention is a continuation-in-part of our co-pending application Serial No. 656,545, and now abandoned.

Any end bearings supporting a door naturally would protrude slightly from the end of the door. The bearings may be cemented onto the pintles, if desired.

While several complete embodiments of the invention have been disclosed herein, it will be appreciated that modification of these particular embodiments of the invention may be resorted to without departing from the scope of the invention as defined in the appended claims.

We claim:

1. In a hinge, a cylindrical hinge pintle having a slot extending longitudinally thereof and inwardly from the periphery thereof, a hinge socket having a slot extending longitudinally thereof and having an arcuate surface connecting to and extending between the margins of said slot, and bearings carried by said hinge pintle at longitudinally spaced portions thereof and pivotally positioning it in said hinge socket, said bearings being of hollow cylindrical form and having arcuate surfaces engaging the periphery of said hinge pintle and having tangs thereon extending into and secured in said slot of said hinge pintle to retain said bearings in given positions radially spacing said pintle from said hinge socket.

2. An elongate hinge comprising a cylindrical hinge pintle having a slot extending longitudinally thereof and inwardly from the periphery thereof, a connector flange extending from said hinge pintle, a hinge socket having a slot extending longitudinally thereof the length thereof and having an arcuate surface directly connecting to said slot, and plastic bearings carried by said hinge pintle on the periphery thereof and pivotally positioning it in said hinge socket, said bearings being of hollow cylindrical form and having integral inwardly extending tangs thereon extending into said slot in said hinge pintle, the radius of said hinge pintle being correlated to and smaller than the radius of said arcuate surface of said hinge socket so that said pintle is radially spaced from said arcuate surface by said bearings, said connector flange extending through said slot in said hinge socket.

3. An elongate hinge comprising a solid cylindrical hinge pintle having a slot extending longitudinally thereof and radially inwardly from the periphery thereof, and a connector flange extending from said hinge pintle, a hinge socket having a slot extending longitudinally the length thereof and having an arcuate surface connecting to and extending between the margins of said slot; and plastic bearings carried by and engaging said hinge pintle at longitudinally spaced portions on the periphery thereof and pivotally positioning it in said hinge socket, said bearings being of hollow cylindrical form and having radially inwardly extending tangs thereon extending into said slot in said hinge pintle; portions of said hinge pintle at said slot therein and adjacent the ends of said bearings being closer together than the width of said bearing tangs to retain said bearings against longitudinal movement in at least one direction, the radius of said hinge pintle being correlated to and smaller than the radius of said arcuate surface of said hinge socket so that said pintle is spaced radially from said arcuate surface by said bearings, said connector flange extending through said slot in said hinge socket.

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