

Jan. 24, 1961

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2,968,829

HINGE WITH ARCUATE PLASTIC HINGE CONNECTOR

Filed April 8, 1958

2 Sheets-Sheet 2

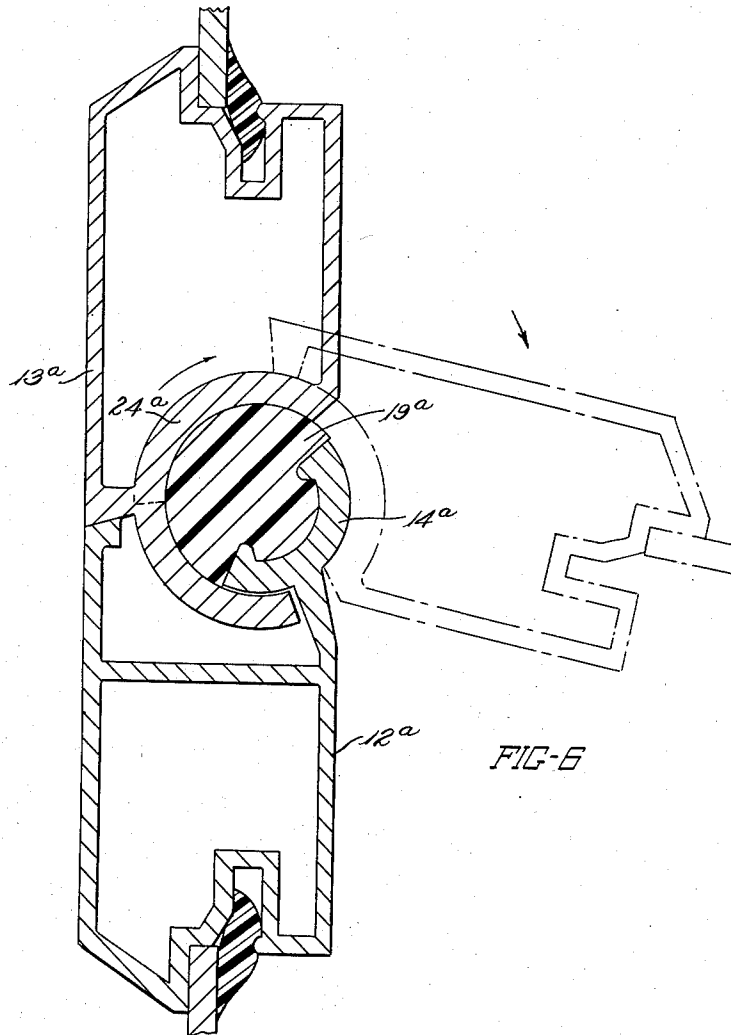


FIG-6

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HINGE WITH ARCUATE PLASTIC HINGE CONNECTOR

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Filed Apr. 8, 1958, Ser. No. 727,152

6 Claims. (Cl. 16—136)

The present invention relates to hinges, and especially to elongate hinges wherein metal hinge members are secured together by means of a plastic key, or bearing article.

The general object of the present invention is to provide a new and improved type of a hinge characterized by the use of a plastic key member carried by one of the hinge members and providing an arcuate bearing surface for engaging the other hinge member for bearing action.

Another object of the invention is to provide metal hinge members with a plastic insert for reducing or avoiding metal to metal bearing contact in the hinge, as desired.

A further object of the invention is to provide a low friction, hard surfaced plastic insert or bearing in a hinge to provide substantially all bearing contact therein.

Another object of the invention is to provide a plastic hinge key any desired length of which can be used in elongate hinge members to secure the hinge components together for pivotal action.

A further object of the invention is to provide a plastic key or bearing unit in a hinge wherein such plastic key is interlocked with one hinge member and can readily be moved longitudinally of the hinge.

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

Reference now should be had to the accompanying drawings, wherein:

Fig. 1 is an elevation of a door having the novel hinge of the invention included therein;

Figs. 2, 3 and 4 are fragmentary vertical sections taken on lines 2—2, 3—3 and 4—4, respectively, of Fig. 1;

Fig. 5 is a fragmentary reduced elevation taken on line 5—5 of Fig. 3; and

Fig. 6 is a fragmentary section through a modified hinge of the invention.

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

Broadly speaking, the hinge of the invention is made from two metal members one forming a hinge socket and one a hinge pintle, and a plastic hinge pintle engages the metal hinge pintle and extends therefrom to lock the pintles in the pintle socket and secure the metal members together for relative pivotal movement.

Attention now is particularly directed to the details of the construction shown in the drawings and a door is indicated as a whole by the numeral 1. This door in this instance is shown as being a generally conventional style of a garage door with a horizontally directed hinge therein connecting a plurality of horizontally extending sections 2 into which the door 1 is divided. These sections 2 are pivotally secured together by novel hinges of the invention, indicated as a whole by the numeral 3. The door 1 is positioned in a conventional frame 4 provided for it in the building shown. The door 1 obviously has other conventional controls associated therewith such as a guide

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roller and control track, springs, etc. to facilitate raising and lowering the door. The drawings bring out that the upper section 2a in the door 1 abuts against a top portion of the frame 4 when the door is in its closed position.

5 Preferably the lowest section 2b has a suitable rubber sealing strip 5 preferably secured thereto by telescopic engagement with a carrier channel 6. The carrier channel 6 is telescopically engaged with a downwardly open portion of a section frame member 7. This frame member, or strip 7, it will be seen, is of the same shape, usually formed by extruding the strip from a suitable metal such as aluminum as a frame member or strip 7a provided at the top of the door 1, but with such panel frame strips being oppositely directed in the door. Preferably the sealing strip 5 is made from rubber, or other suitable plastic material and flexible sealing lips 8 and 9 extend therefrom in diverging directions to engage any associated support surface to prevent flow of surface water underneath the door and to seal the door when in its closed position. The channel 6 has a pair of inwardly extending flanges 10 thereon for seating in recesses provided in the sealing strip 5 to mechanically bond the sealing strip to the channel 6. Usually the sealing strip 5 would be telescoped into engagement with the channel 6 from an open end thereof. Any conventional means can be used to secure the channel 6 to the panel frame strip 7, and to secure any panels 11 or window panes 11a to the associated sections for positioning in the door 1.

Fig. 3 of the drawings best shows that upper frame strips 13 and lower frame strips 12 are provided on each of the panels 2 in the door and that they form hinge members in the novel hinge 3 of the invention. The lower frame strip 12 has a hinge pintle 14 provided thereon. This hinge pintle has an arcuate outer surface 15 of desired arcuate length provided thereon and with such arcuate surface usually extending slightly more than 180° in the hinge construction. Substantially radially extending end walls 16 and 17 are formed on the hinge pintle 14 at the effective margins of the arcuate surface 15 thereof.

Fig. 3 of the drawings clearly shows that the hinge pintle 14 preferably is laterally offset from the center plane of the lower panel frame strip 12 and connects thereto by means of a connector section or flange 18 at one margin of the hinge pintle 14. This hinge pintle 14 is adapted to engage with and position a plastic hinge pintle 19 by complementary means formed on the two pintles. Thus the plastic hinge pintle is shown as having a pair of recesses 20, 20 therein that receive generally radially inwardly extending lugs or lips 21 provided on the hinge pintle 14. These lugs or lips 21 usually are at the margins of a center recess or bore 22 provided in the hinge pintle 14. It also should be noted that the plastic hinge pintle has an arcuate bearing section 23 provided thereon in a portion thereof that protrudes from the hinge pintle 14 to form a plastic bearing surface in the hinge 3. It will be noted that this plastic bearing section 23 has substantially the same, or possibly a slightly greater radial length than the hinge pintle 14, but combines therewith to define a substantially cylindrical bearing unit engaged with or seated in a hinge pintle socket 24 provided on but offset laterally from the upper panel frame strip 13. A slot 25 is formed in the hinge socket 24 and connects the margins thereof. Such slot 25 extends the length of the hinge socket 24 which in turn extends the length of the upper panel frame strip 13. The hinge pintle 14 and slot 25 are of such size that the hinge pintle 14 can be inserted into the hinge socket 24 when the plastic hinge pintle 19 is not engaged therewith. The plastic hinge pintle 19 effects the engagement of the two hinge members with each other and such plastic hinge pintle usually would be engaged with the hinge pintle 14 prior to its

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seating in the hinge socket 24. Thus the associated pintle means would then be telescopically engaged with the hinge socket 24 prior to assembly of the door sections in the frame 4.

This plastic hinge pintle 19 can be made from any suitable material. Thus polyvinyl chloride, nylon or any other hard surfaced, low friction plastic can be used for forming such member.

Fig. 3 shows how the main bearing engagement between the hinge members will be effected through the plastic hinge pintle 19 and that only a minimum of metal-to-metal bearing contact is provided in this particular hinge unit.

Fig. 3 of the drawings also best shows that the closing pivotal action of the adjacent sections 2 is controlled by means of front contacting flanges 26 and 27, provided respectively, on the lower and upper frame sections 12 and 13.

The limitation of movement in the hinge 3 is indicated in Fig. 3 and it will be realized that normally these individual sections 2 in the door do not have more than about 60 to 80° relative pivotal movement therebetween.

In a modified hinge unit of Fig. 6, it will be seen that one hinge member 12a has a hinge pintle 14a provided thereon and extending therefrom, which hinge pintle engages a plastic hinge pintle 19a. In this instance, the metal hinge pintle 14a is of less than 180° of length and again has interengaging, complementary portions formed thereon for telescopic engagement with and permanent operative association with the plastic hinge pintle 19a. The plastic hinge pintle is seated in a hinge socket 24a on the other hinge member 13a.

It also will be seen that the hinge socket 24a provided in this embodiment of the invention has reduced area presented for possible metal-to-metal bearing contact between it and the associated hinge means. Again, the hinge members are operatively engaged with each other by means of the plastic hinge key or hinge pintle 19a provided in the hinge of the invention.

The amount of pivotal movement of the hinge components may be controlled by the circumferential length of the slot 25 in the hinge socket 24. Such slot is shown as about 125° in length but smaller slots may be used. The arcuate length of the hinge pintle may vary at least from about 155° (Fig. 6) to about 210° (Fig. 3) and the hinge pintle can readily be introduced into the hinge socket through the slot 25, if desired.

From the foregoing, it will be seen that a novel and improved hinge has been provided.

While two 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.

What I claim is:

1. In a hinge, one member with a metal hinge socket extending longitudinally thereof, said hinge socket having an arcuate inner surface and a longitudinally extending slot connecting marginal portions of said arcuate surface, a second member having a metal hinge pintle with a semi-cylindrical arcuate outer surface thereon received in said hinge socket, and a plastic hinge member engaged with and carried by said hinge pintle but extending therefrom, said plastic hinge member having an arcuate peripheral section of larger radius than said hinge pintle and extending therefrom to form a substantially cylindrical unit with said semi-cylindrical arcuate surface of said hinge pintle,

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said peripheral section of said plastic hinge member continually engaging said hinge socket to reduce metal-to-metal bearing contact of said members.

2. A hinge as in claim 1 wherein said hinge pintle has a center bore therein, and said plastic hinge member completely fills the center portion of said hinge pintle.

3. A hinge as in claim 1 wherein said hinge pintle has substantially radially extending end walls and a center recess, and said plastic hinge member snugly engages said hinge pintle center recess, the end walls of said hinge pintle and the arcuate inner surface of said hinge socket.

4. In a hinge, one member with a metal hinge socket extending longitudinally thereof, said hinge socket having an arcuate inner surface and a longitudinally extending slot connecting marginal portions of said arcuate surface, a second member having a metal hinge pintle with an arcuate outer surface thereon of more than 180° in length received in said hinge socket, and a plastic hinge member carried by said hinge pintle but extending therefrom, said plastic hinge member having an arcuate peripheral section of larger radius than said hinge pintle and extending therefrom to form a substantially cylindrical unit with said hinge pintle, said plastic hinge member and said hinge pintle having telescopically interengaging portions thereon, said plastic hinge member securing said members together, said hinge pintle being readily engagable with said hinge socket through said slot when said plastic hinge member is not engaged with said hinge pintle.

5. In a hinge, one metal member with a hinge socket extending longitudinally thereof, said hinge socket having an arcuate inner surface and a longitudinally extending slot connecting marginal portions of said arcuate surface, a second metal member having a hinge pintle with an arcuate outer surface thereon of more than 180° in length received in said hinge socket, and a plastic hinge member engaged with and carried by said hinge pintle but extending therefrom, said plastic hinge member having an arcuate peripheral section forming a substantially cylindrical unit with said hinge pintle, said peripheral section of said plastic hinge member continually engaging said hinge socket to reduce metal-to-metal bearing contact of said members, said plastic hinge member and said hinge pintle having inter-engaging portions thereon, said plastic hinge member securing said members together, said plastic hinge member having a large radius in the portion thereof engaging said hinge pintle socket than in the portion engaging said hinge pintle.

6. In a hinge, one metal member with a hinge socket extending longitudinally thereof, said hinge socket having an arcuate inner surface with edge margins and a longitudinally extending slot connecting marginal portions of said arcuate surface, a second metal member having a hinge pintle with an arcuate outer surface thereon received in said hinge socket, and a plastic hinge member engaged with and carried by said hinge pintle but extending therefrom, said plastic hinge member having an arcuate peripheral section of larger radius than said hinge pintle and extending therefrom to form a substantially cylindrical unit with said hinge pintle, said plastic hinge member and said hinge pintle having interengaging portions thereon to make a unitary structure therefrom, said plastic hinge member securing said metal members together.

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