Jan. 5, 1965 V. SEGRE 3,164,228

STORM DOORS

Filed Nov. 23, 1962 2 Sheets-Sheet 1

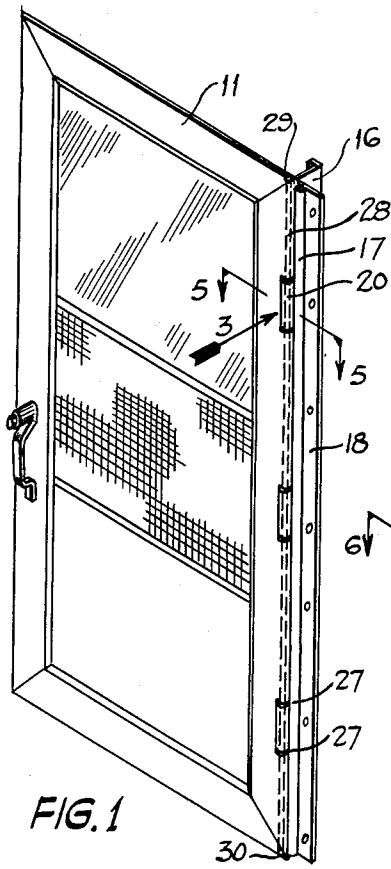


FIG. 1

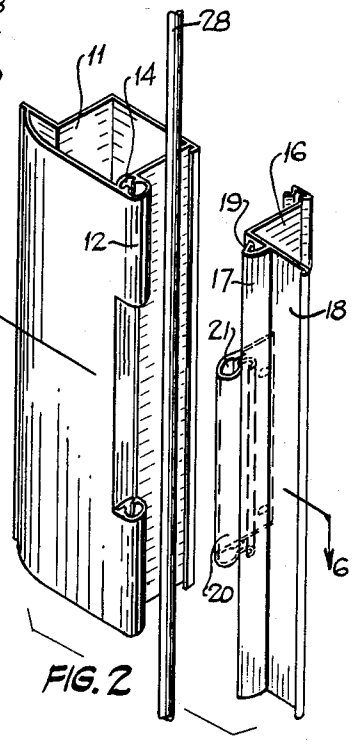


FIG. 2

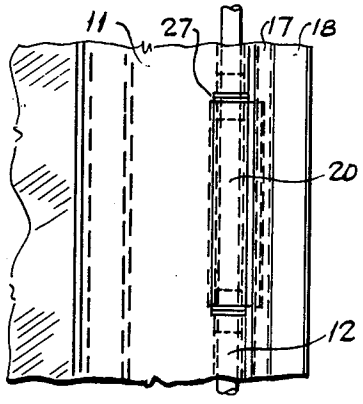


FIG. 3

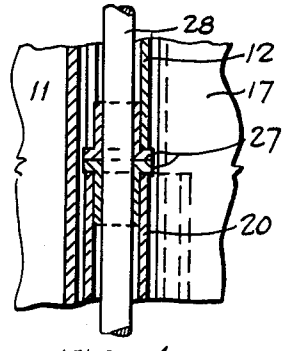


FIG. 4

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Jan. 5, 1965 V. SEGRE 3,164,228

STORM DOORS

Filed Nov. 23, 1962 2 Sheets-Sheet 2

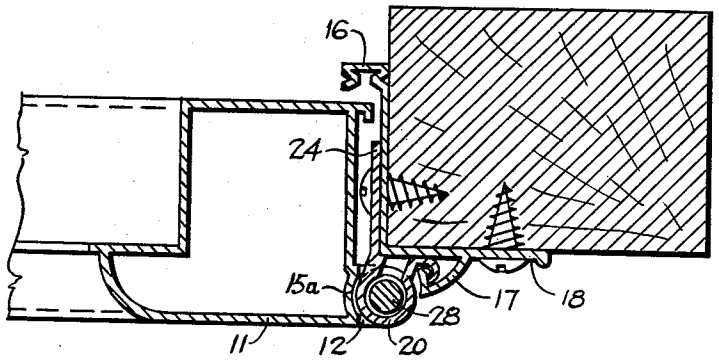


FIG. 5

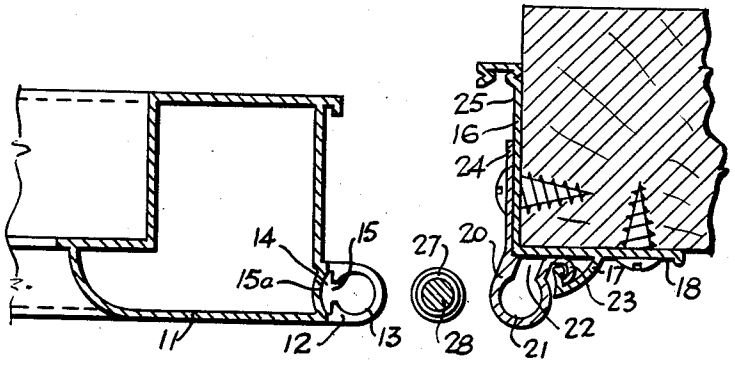


FIG. 6

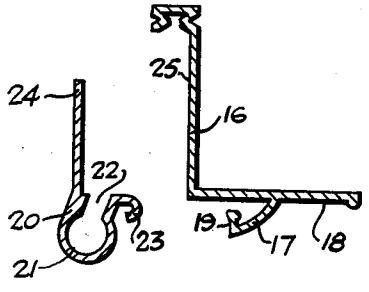


FIG. 7

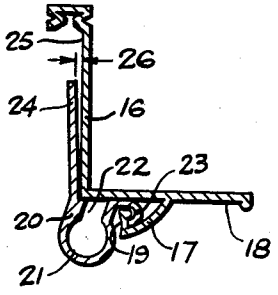


FIG. 8

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3,164,228

STORM DOORS

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Claims priority, application Canada, Sept. 15, 1962, 858,069
3 Claims. (Cl. 189—46)

This invention relates to storm doors and has particular reference to an improved hinge arrangement for aluminium or similar storm doors, in which the knuckle portions of one side of each hinge assembly are formed by the door frame extrusion.

The usual practice for hanging storm doors is to use separate hinge assemblies, thus necessitating rivetting or screwing the hinge leaves to both the door frame and the door case.

A disadvantage with this method is that the screws or rivets work loose during constant door operation, resulting in a loose door assembly.

Another disadvantage is that hinge strength is limited by the fact that conventional hinges are manufactured from two sheet metal stampings, each having one edge recessed to form an interlocking pair. The recessed edges of the two stampings are then rolled to form interlocking hinge pin knuckles. Thus constant door operation and vibrations will open the rolled knuckles, resulting in a loose hinge pin and, consequently, door assembly.

Still another disadvantage is that the hinge pins are located on the outside surface of the door, thus enabling the door to be opened, even though securely locked to the door jamb, by removing the hinge pins.

The present invention overcomes the aforementioned disadvantages by providing a door frame extrusion designed to embody the knuckle portions of one side of each hinge assembly and a door case extrusion designed to enable the knuckle portions of the other side of each hinge assembly to be attached thereto in a manner whereby a large percentage of hinge loading is taken directly by the door case extrusion and not through rivets or screws. Thus there is very little tendency for the hinge leaf rivets to work loose during operation.

At the same time, this invention provides a hinge knuckle which cannot open, thus increasing the strength of the hinge assembly. Also, one long hinge pin, of door length, is used per door, passing through all hinges and disposed beneath the door surface, thereby providing a burglar proof hinge arrangement.

The main object of this invention is to provide an improved door hinge arrangement which is considerably stronger than conventional door hinge arrangements.

Another object is to provide a door hinge arrangement of improved appearance, having no projections beyond the door surface.

A further object is to provide a door hinge which is completely burglar proof.

Other objects and advantages of this invention will be apparent from the following specification and the accompanying drawings in which:

FIG. 1 is a perspective view of a storm door and one side of the door casing, embodying this invention.

FIG. 2 is an enlarged and exploded perspective detail of the basic hinge components.

FIG. 3 is an enlarged detail of a hinge assembly, taken in the direction of arrow **3** in FIG. 1.

FIG. 4 is a further enlarged section through the hinge bushing details shown in FIG. 3.

FIG. 5 is an enlarged section through **5—5** in FIG. 1.

FIG. 6 is an enlarged section through **6—6** in FIG. 2.

FIG. 7 shows sections through a door case knuckle portion and the door case extrusion, before assembly.

FIG. 8 shows an assembly of the details shown in FIG. 7, but not rivetted together.

With reference now to the figures which show the preferred execution of this invention, door frame extrusion **11** is formed integral with knuckle portion **12** and includes hinge bore **13** which connects with recess **14** through axial slot **15**. Door frame extrusion **11** may be an aluminium or similar extrusion. Thus, the knuckles of the door frame portions of the hinge assemblies are provided by slotting door frame extrusion **11** back as far as recess **14** for the hinge lengths required, leaving a concave surface **15***a* formed as part of the extrusion.

Door case extrusion **16**, which may also be an aluminium or similar extrusion, is basically an angle section and includes an outwardly extending flange **17** formed on one of its outer surfaces **18**. Flange **17** contains an inwardly extending lip **19**.

Door case hinge extrusion **20** includes hinge bore **21** having an axial slot **22**. Extending from one side of axial slot **22** is lip **23**, which is formed to present a hooked configuration and is designed to interlock with inwardly extending lip **19** on flange **17**. Extending from the other side of axial slot **22** is a flange **24** which lies adjacent to, but slightly apart from, the other outer surface **25** of door case extrusion **16**, when hooked lip **22** is interlocked with lip **18**. (See **26** in FIG. 8.) To complete the door case portions of the hinges, flanges **24** are rivetted to door case extrusions **16**, thus closing the gaps **26** and maintaining the assemblies in tension.

Door case hinge extrusions **20** are cut to length leaving a suitable clearance for hinge bushings **27**, which are positioned in bores **21** at each end of hinge extrusions **20** and in bores **12** at each end of the slotted door frame knuckle portions. Bushings **27** may be nylon, oil impregnated bronze or other suitable bushing material.

Hinge pin **28** is in the form of one long pin throughout the door and may be made from stainless steel, aluminium or other suitable hinge pin material.

Hinge pin **28** is assembled through a hole **29** in the top corner of the door frame. At the bottom corner of the door frame a second hole **30** is of a diameter sufficiently smaller than the diameter of hinge pin **28** to act as a stop during the assembly to the pin, but is large enough to permit insertion of a probe to force hinge pin **28** upwards to facilitate removal of the hinge pin and door.

Concave surfaces **15***a* at the rear of the slotted door frame knuckle portions, are of a radius suitable to provide a clearance for the outside surface of door case hinge extrusions **20**.

Between hinges, outwardly extending flange **17** can be used to retain a flexible door seal section.

In another execution of this invention door case hinge extrusion **20** is incorporated with door case extrusion **16** to form one common extrusion. This execution provides a very strong door case hinge portion, though not being so economical as the preferred execution.

This invention provides a door hinge arrangement which is stronger and more economical than contemporary door hinge arrangements.

At the same time, the one piece hinge pin whilst presenting an improved appearance also provides a burglar proof arrangement in that, the hinge pin can only be removed when the door is in a wide open position.

What I claim is:

1. A storm door assembly including a door frame, a door case and a plurality of door hinges, the knuckle portions of one side of said hinges being formed as part of the door frame extrusion and disposed within the thickness of said door frame, and the knuckle portions

of the other side of said hinges projecting outwardly from the outer surface of the door case extrusion and being disposed in alignment with the knuckle portions of said door frame, the knuckle portions of the other side of said hinges each comprising a tubular portion having an axial slot therethrough, one side of said axial slot extending into a hooked lip portion which rigidly interlocks with a cooperating lip on said outer surface of said door case extrusion, the other side of said axial slot extending into a hinge leaf portion which is rigidly attached to a second surface of said door case extrusion, and hinge pin means fitted therethrough, and interconnecting, said aligned knuckles.

2. A storm door assembly as set forth in claim 1 including hinge bushing means positioned on said hinge pin means between the knuckle portions of each of said hinges.

3. A storm door assembly including a door frame, a door case and a plurality of door hinges, the knuckle portion of one side of said hinges being formed as part of the door frame extrusion and disposed within the thickness of said door frame, said knuckle portion being cut away to form a plurality of recessed portions of narrow width relative to the length of said door frame and disposed along the hinge edge of said door frame, a

door case extrusion of angular configuration including a flange extending outwardly from one face thereof and inclined towards said door and a lip extending inwardly from the outer edge of said outwardly extending flange, the knuckle portions of the other side of said hinges being dimensioned to fit within said recessed portions and each having an axial slot therethrough, one side of said axial slot extending into a hooked lip portion which rigidly interlocks with said inwardly extending lip on said door case extrusion, the other side of said axial slot extending into a hinge leaf portion which is rigidly attached to said door case extrusion on the other face thereof, said door frame knuckle portions being in alignment with said door case knuckle portions, and a hinge pin extending throughout the length of the door and fitted in, and interconnecting, the aligned knuckles.

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