April 7, 1953 E. H. JOHNSON 2,634,146

WINDOW LOCK

Filed Oct. 23, 1951 2 SHEETS—SHEET 1

FIG. 1

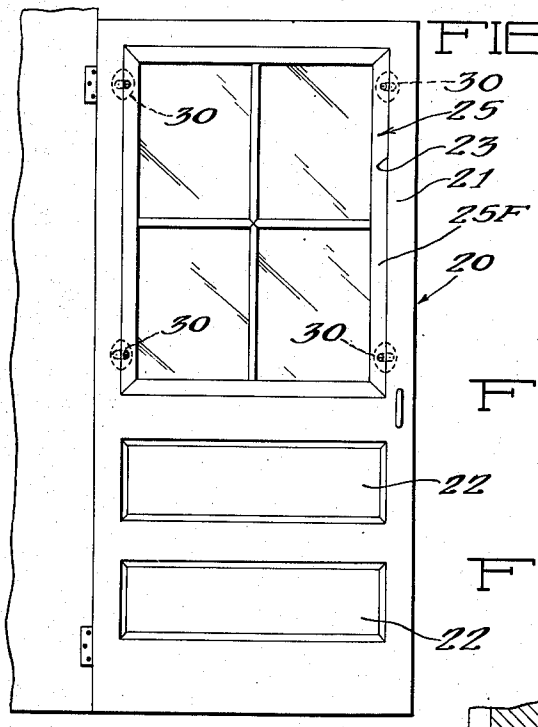


FIG. 2

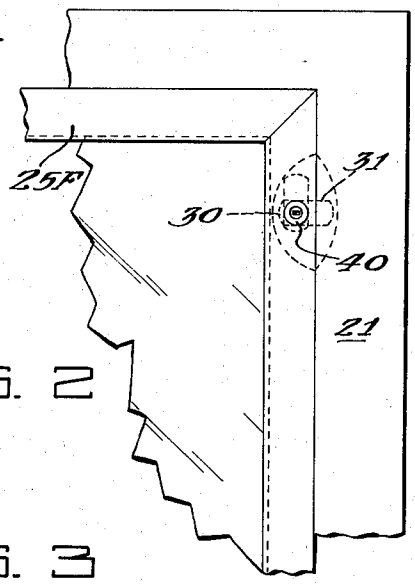


FIG. 3

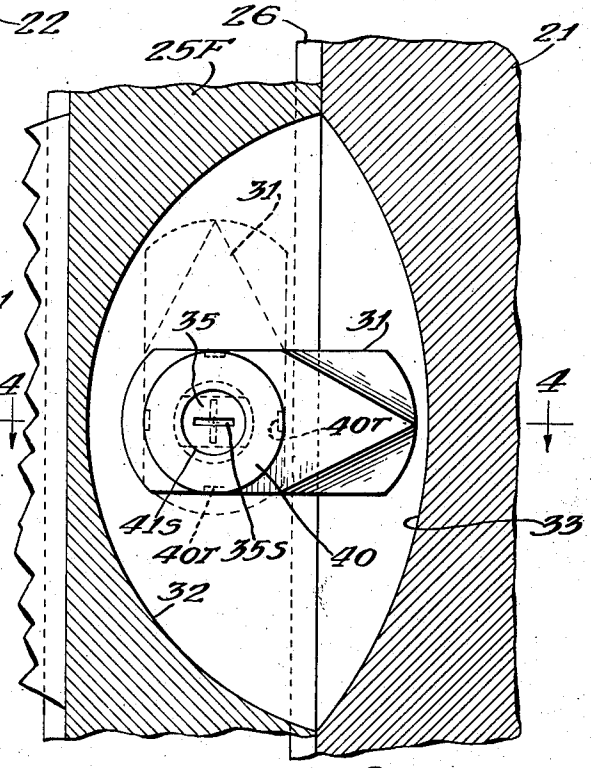
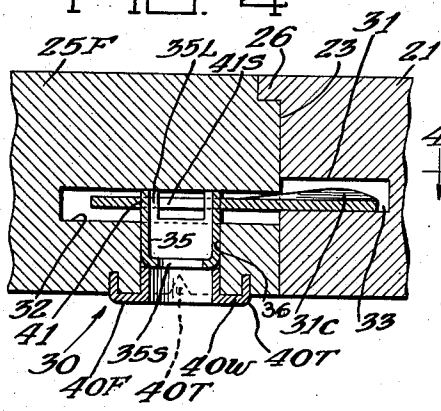


FIG. 4



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WINDOW LOCK

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FIG. 5

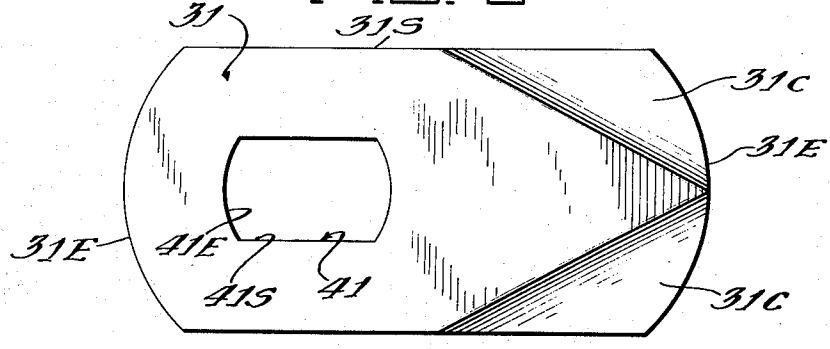


FIG. 6

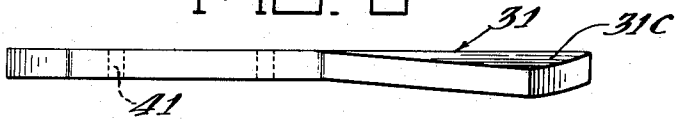


FIG. 7

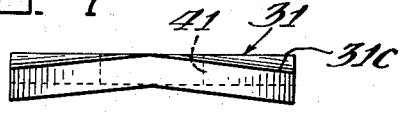


FIG. 8

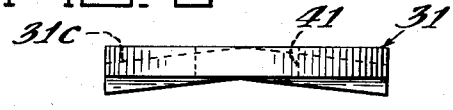


FIG. 9

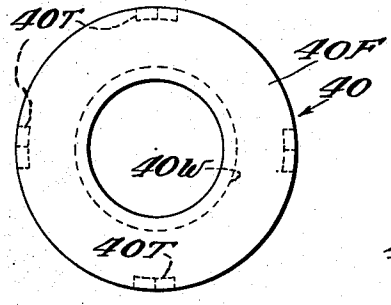


FIG. 10

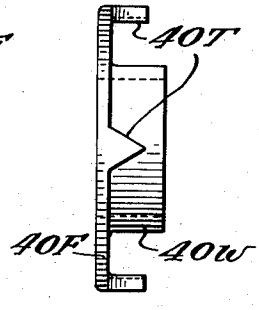


FIG. 11

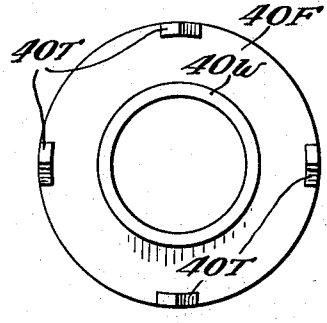


FIG. 12

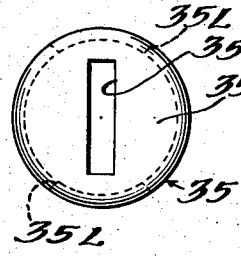


FIG. 13

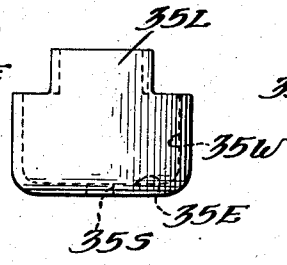


FIG. 14

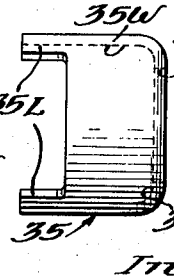
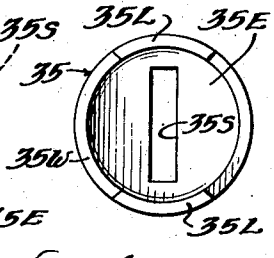


FIG. 15



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UNITED STATES PATENT OFFICE

2,634,146

WINDOW LOCK

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Application October 23, 1951, Serial No. 252,684

7 Claims. (Cl. 292—194)

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This invention relates to latches and particularly to latches adapted for use in removably securing interchangeable panels or closures in position in a main frame such as the main frame of a combination screen and storm door and the like.

In the construction of combination screen and storm doors it is customary to provide a main frame with the lower portions of the closure permanently mounted in such frame and to provide interchangeable screen panels and storm sash adapted to be put in place interchangeably in an upper portion of the frame. In such instances, it is customary to afford rotatable latch elements at a plurality of points about the edge of the interchangeable panels so that by rotation of these latch elements, the latching elements thereof may be moved into or out of engagement with respect to slots formed at appropriate locations at the adjacent inner edges of the main frame elements of the door. Such latch structures as heretofore constructed have been relatively expensive insofar as the manufacture and assembly may be concerned, and the present invention has as its primary object the provision of such a latch structure which is economical in its form and structure. More specifically, it is an object of the present invention to afford a latch of the aforesaid character that is adapted for production by the economical process of stamping from sheet metal, and a related object is to enable such a latch to be formed from sheet metal in such a way that the latch is adapted for ready and easy mounting in its position of use.

Other and further objects of the present invention will be apparent from the following description and claims and are illustrated in the accompanying drawings which, by way of illustration, show a preferred embodiment of the present invention and the principles thereof and what I now consider to be the best mode in which I have contemplated applying these principles. Other embodiments of the invention embodying the same or equivalent principles may be used and structural changes may be made as desired by those skilled in the art without departing from the present invention and the purview of the appended claims.

In the drawings:

Fig. 1 is an outside elevational view of a combination storm and screen door equipped with latches embodying the features of the present invention;

Fig. 2 is an enlarged fragmentary portion of Fig. 1;

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Fig. 3 is a vertical sectional view showing one of the latches mounted in position;

Fig. 4 is a cross sectional view taken substantially along the line 4—4 of Fig. 3 and showing the latch member in its operative position;

Fig. 5 is a plan view of the latch arm;

Fig. 6 is a side elevational view of the latch arm;

Figs. 7 and 8 are end elevational views of the right and left hand ends of the latch arm, respectively;

Fig. 9 is a front elevational view of the retaining member of the latch;

Fig. 10 is a side elevational view of the retaining member;

Fig. 11 is a rear elevational view of the retaining member;

Fig. 12 is a front elevational view of the operating member of the latch;

Figs. 13 and 14 are side elevational views of the operating member, one such view being displaced 90° from the other; and

Fig. 15 is an inside end elevational view of the operating member as viewed from the left in Fig. 14.

For purposes of disclosure the invention is herein illustrated as mounted in position in a combination door 20 having a main frame 21, and within the lower portions of this main frame 21, permanent panel sections 22 are afforded. In the upper section of the main frame 21, a rectangular opening 23 is afforded within which a replaceable closure panel 25 may be mounted. In Fig. 1, this closure panel 25 is illustrated as constituting a storm sash panel and in accordance with usual practice; a similar screen panel is afforded which may be substituted for the panel 25 at appropriate seasons of the year. The panel 25 includes a rectangular frame 25f, and this rectangular frame may be moved in what will be termed an outer direction into the opening 23 to engage a shoulder 26 that is formed on the frame 21 about the opening 23 at the outer side of the door. The panel 25 is held in this position and against the shoulder 26 by a plurality of latch structures 30 and it is to such latch structures that the present invention pertains.

The latch structure 30 in a broad sense embodies an elongated latch arm 31 that is disposed within the arcuate slot 32 that is formed in the outer side edge of the frame 25F, and this arm is adapted to be rotated about an axis that is perpendicular to the forward face of the panel 25 until the outer end of the latching arm 31 enters into and engages with a generally similar

arcuate slot 33 formed in the inner edge of the opening 23 of the frame. The latch arm 31 is supported within the slot 32 by an operating member 35 that is extended into the slot 32 transversely thereof through a bore 36 that is extended from the front of the frame of the panel 25 and into the slot 32. The operating member 25 is held in position axially within the bore 36 by a retaining member 40 as will hereinafter be described in some detail.

The three elements 31, 35 and 40 that constitute each latch 30 are under the present invention adapted for production by the rapid and economical processes of sheet metal stamping. Thus, the latching arm 31 is formed from sheet metal in a generally flat form having parallel side edges 31S and rounded end edges 31E. One end of this arm 31 is formed so as to provide for quick and easy association with the operating member 35, and for this purpose the arm 31 has a non-circular opening 41 formed therein. The opening 41 as herein shown has parallel sides 41S and arcuate ends 41E which are so sized and related that they afford a ready and easy means for effecting a rotative interlock between the operating member 35 and the latch arm 31, as will be described in detail hereinafter. It will also be noted that at its other end the arm 31 is formed to afford similar cam surfaces 31C that are symmetrical with respect to the longitudinal center line of the arm, and these cam surfaces 31C are afforded for camming cooperation with the slot 33 so as to assure tight clamping of the panel 25 against the shoulder 26.

The operating member 35 is of generally cup-shaped form to afford a cylindrical side wall 35W and end wall 35E, and the joining corner between these walls has a substantial radius so as to facilitate the forming operation. The end wall 35E has a diametric slot 35S formed therein of a size adapted to receive the end of a screw driver, thus to provide for imparting rotative movement to the member 35. The cylindrical wall 35W has its other end formed to afford two longitudinally extending lugs 35L that constitute partial continuations of the wall 35W and are diametrically spaced. The width of the lugs 35L and the diameter of the wall 35W are so related to the size and form of the opening 41 that the lugs 35L will fit into the opening 41 adjacent to arcuate ends 41E and with the side edges of the lugs 35L closely adjacent to the sides 41S of the opening 41. This fit is reasonably snug and affords a mounting for the latch arm 31 as well as a rotation-transmitting connection between the operating member 35 and the latch arm 31.

The retaining member 40 is also formed by stamping to afford a cylindrical wall 40W of the same diameter as the wall 35W and at one end this wall 40W has a flat or washer-like flange 40F extended outwardly therefrom and in a plane disposed at right angles to the axis of the wall 40W. At spaced points about the edge of the flange 40F, pointed anchoring teeth 40T are formed so as to extend from the flange 40F in the same direction as and parallel to the wall 40W, and these teeth are of a length that is less than the length of the wall 40W for purposes that will appear hereinafter.

It will be apparent that the three elements 31, 35 and 40 of the present latch device are all adapted to be made from sheet metal by the economical processes of sheet metal stamping, and it will also be evident that these elements of the present latch device may be readily and easily put in place on a door panel or the like, and the latch arm thereof may be readily operated through latching and non-latching movements.

Thus, in the installation of the latch device of the present invention, the slot 32 is so located in the edge of the frame 25 that the outer side of the slot is spaced from the inside face of the frame 25F, the lower side as viewed in Fig. 4 consitituting such inside door face, that this spacing is equal to the combined lengths of the operating member 35 and the retaining member 40. With this relationship, the driving of the retaining member 40 into position as shown in Fig. 4, serves to locate the ends of the lugs 35L in engagement with or relatively close to the remote or outer side of the slot 32 as shown in Fig. 4, and this assures that the latching arm 31 will be properly engaged with and supported by the lugs 35L at all times. The bore 36 is preferably made of such a size that the sleeves or cylindrical walls of the retaining member 40 and the operating member 35 have a snug fit within the bore 36.

After the slot 32 and the bore 36 have been formed, the inner end of the latch arm 31 is inserted into the slot 32 with the cam surfaces 31C facing toward the inner side of the frame in which the bore 36 is provided, and the operating member 35 is inserted as shown in Fig. 4 into the bore 36 and the lugs 35L are extended through the opening 41 in the arm 31. This movement of the operating member 35 is continued until the ends of the lugs 35L are engaged with or are closely adjacent to the outer side of the slot 32 as shown in Fig. 4. When this has been done, the latch arm 31 is supported in position by the lugs 35L of the operating member 35 and the engagement of the lugs 35L with the opening 41 is such that a rotative driving or operating connection is afforded between the operating member 35 and the latch arm 31.

The retaining member 40 is then put in place, and it will be noted that the sleeve or wall section 40W is somewhat longer than the anchoring teeth 40T so that the projecting end portion of the wall 40W may be inserted into the outer end of the bore 36 to properly locate the retaining member 40. When the anchoring teeth 40T have engaged the adjacent face of the frame 25F, these anchoring teeth 40T may be driven into the frame 25F, and when the inner face of the flange 40F engages the face of the frame 25F, the projecting end of the wall 40W will be engaged as shown in Fig. 4 with the end wall 35E of the operating member 35, thus to hold the operating member 35 in the proper axial position wherein it supports the latch arm 31. It will be observed that when the retaining member 40 is thus in position, the cylindrical wall 40W affords a clearance space through which a screw driver may be inserted for engagement with the slot 35S to latch or un-latch the mechanism.

As shown in Fig. 4, it will be observed that the slot 33 is offset slightly in an outward direction from the slot 32 so as to assure that the cam surfaces 31C will engage the inner face of the slot 33 and the other side or corner of the slot 32 with a camming action, and this, of course, causes the arm 31 to bear firmly against the outer side of the slot 32 and the inner side of the slot 33, thus to draw the frame 25F firmly into position in an outward direction against the shoulder 26.

From the foregoing description it will be apparent that the present invention affords a latch

mechanism that is simple and economical in structure, and this structure is simple insofar as installation and operation may be concerned. It will also be evident that the present invention enables the advantageous and economical processes of stamping from sheet metal to be employed so that such latch device may be produced at a high production rate and at a low cost.

Thus, while I have illustrated and described the preferred embodiment of my invention, it is to be understood that this is capable of variation and modification, and I therefore do not wish to be limited to the precise details set forth, but desire to avail myself of such changes and alterations as fall within the purview of the following claims.

I claim:

1. A three-element latch, for securing a separately formed closure frame in a main closure frame, and adapted to be formed by processes of stamping from sheet metal, said latch comprising an elongated and generally flat latch arm formed from sheet metal to afford an outer end and an inner end and having an opening therein adjacent said inner end with said opening defined by parallel sides and arcuate ends, an operating member formed from sheet metal to afford a cylindrical wall having a predetermined diameter and having an end wall at one end with a transverse slot formed therein to receive the end of a screw driver, said cylindrical wall having diametrically spaced extensions at its other end of arcuate form to fit into said slot adjacent said arcuate ends of the slot and adjacent to adjacent portions of said parallel sides of the slot, and a retaining member formed from sheet metal to afford a flat portion with anchoring teeth extending in one axial direction therefrom at the edge thereof and having a central opening therein defined by an integral sleeve projecting in the same axial direction as and somewhat longer than said anchoring teeth and of the same outer diameter as said cylindrical wall of said operating member.

2. A three-element latch for securing a separately formed closure frame in a main closure frame and adapted to be formed by processes of stamping from sheet metal, said latch comprising an elongated and generally flat latch arm formed from sheet metal to afford an outer end and an inner end and having an opening therein adjacent said inner end with said opening defined by parallel sides and arcuate ends, an operating member formed from sheet metal to afford a cylindrical wall having a predetermined diameter and having an end wall at one end with a transverse slot formed therein to receive the end of a screw driver, said cylindrical wall having diametrically spaced extensions at its other end of arcuate form to fit into said slot adjacent said arcuate ends of the slot and adjacent to adjacent portions of said parallel sides of the slot, and a retaining member formed from sheet metal to afford a flat portion with anchoring teeth extending in one axial direction therefrom at the edge thereof and having a central opening therein defined by an integral sleeve projecting in the same axial direction as said anchoring teeth and of the same outer diameter as said cylindrical wall of said operating member.

3. A three-element latch for securing a separately formed closure frame in a main closure frame and adapted to be formed by processes of stamping from sheet metal, said latch comprising an operating member formed from sheet metal to

afford a cylindrical wall having a predetermined diameter and having an end wall at one end with a transverse slot formed therein to receive the end of a screw driver, said cylindrical wall having at least two circumferentially spaced lugs at its other end, an elongated and generally flat latch arm formed from sheet metal to afford an outer and an inner end and being cut away adjacent said inner end to receive said lugs and afford a supporting and rotation-transmitting connection between said operating member and said latch arm, and a retaining member formed from sheet metal to afford a flat portion with anchoring teeth extending in one axial direction therefrom at the edge thereof and having a central opening therein defined by an integral sleeve projecting in the same axial direction as said anchoring teeth and of the same outer diameter as said cylindrical wall of said operating member.

4. A three-element latch for securing a separately formed closure frame in a main closure frame and adapted to be formed by processes of stamping from sheet metal, said latch comprising an operating member formed from sheet metal to afford a cylindrical wall having a predetermined diameter and having an end wall at one end with a transverse slot formed therein to receive the end of a screw driver, said cylindrical wall having at least two circumferentially spaced lugs at its other end, an elongated and generally flat latch arm formed from sheet metal to afford an outer end and an inner end and being cut away adjacent said inner end to receive said lugs and afford a supporting and rotation-transmitting connection, and a retaining member formed from sheet metal for holding said operating member in a predetermined axial position and having a flat portion with anchoring teeth extending in one axial direction therefrom at the edge thereof and having a central opening therein to afford access to said operating member and having integral means disposed at the edge of said central opening and projecting in said one axial direction from said flat portion to engage said operating member and to hold the same in a predetermined axial position.

5. A three-element latch for securing a separately formed closure frame in a main closure frame and adapted to be formed by processes of stamping from sheet metal, said latch comprising an operating member formed from sheet metal to afford a cylindrical wall having a predetermined diameter and having an end wall at one end with a transverse slot formed therein to receive the end of a screw driver, said cylindrical wall having circumferentially spaced lugs at its other end formed as extensions of said cylindrical wall, an elongated and generally flat latch arm formed from sheet metal to afford an outer end and an inner end and being cut away adjacent said inner end to receive said lugs and afford a supporting and rotation-transmitting connection between said operating member and said arm, and a retaining member formed from sheet metal to afford a flat portion with anchoring teeth extending in one axial direction therefrom and having a central opening therein defined by an integral sleeve projecting in the same axial direction as said anchoring teeth and of the same outer diameter as said cylindrical wall of said operating member.

6. A three-element latch for securing a separately formed closure frame in a main closure frame and adapted to be formed by processes of stamping from sheet metal, said latch comprising an elongated and generally flat latch arm formed

from sheet metal to afford an outer end and an inner end and having an opening therein adjacent said inner end with said opening defined by parallel sides and arcuate ends, an operating member formed from sheet metal to afford a cylindrical wall having a predetermined diameter and having an end wall at one end with a transverse slot formed therein to receive the end of a screw driver, said cylindrical wall having diametrically spaced extensions at its other end of arcuate form to fit into said slot adjacent said arcuate ends of the slot and adjacent to adjacent portions of said parallel sides of the slot, and a retaining member formed from sheet metal to afford a flat portion with anchoring teeth extending in one axial direction therefrom at the edge thereof and having a central opening therein and means for engaging said one end of said operating member in place.

7. A latch of the character described for securing a separately formed closure frame in a main closure frame and adapted to be formed by processes of stamping from sheet metal, said latch comprising an elongated and generally flat latch arm formed from sheet metal to afford an outer end and an inner end and having an opening therein adjacent said inner end with said opening defined in part by parallel sides, an operating member formed from sheet metal to afford a

cylindrical wall having a predetermined diameter and having an end wall at one end with a transverse slot formed therein to receive the end of a screw driver, said cylindrical wall having diametrically spaced extensions at its other end of arcuate form to fit into said slot with arcuate outer faces of said extensions adjacent to the ends of said slot and with the side edges of said extensions adjacent to the parallel sides of the slot, and a retaining member formed from sheet metal to afford a flat portion with anchoring teeth extending in one axial direction therefrom at the edge thereof and having a central opening therein defined by an integral sleeve projecting in the same axial direction as said anchoring teeth and of the same outer diameter as said cylindrical wall of said operating member.

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