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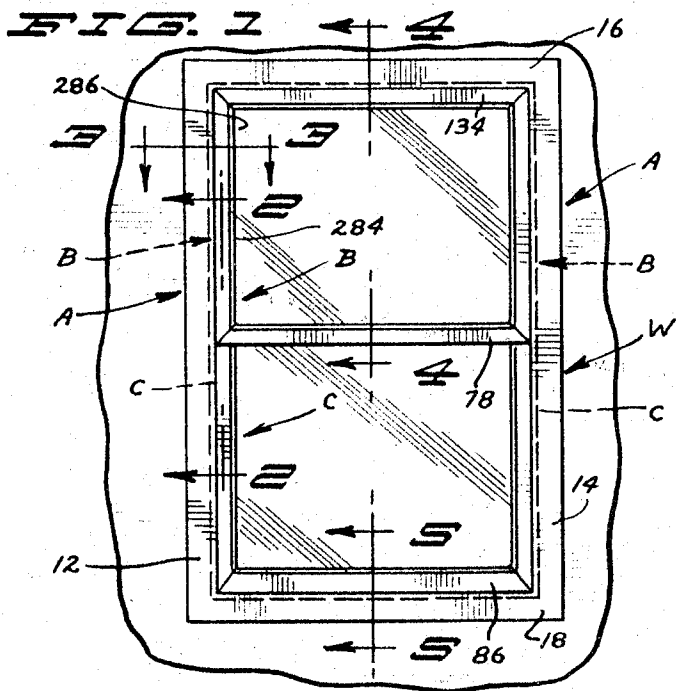
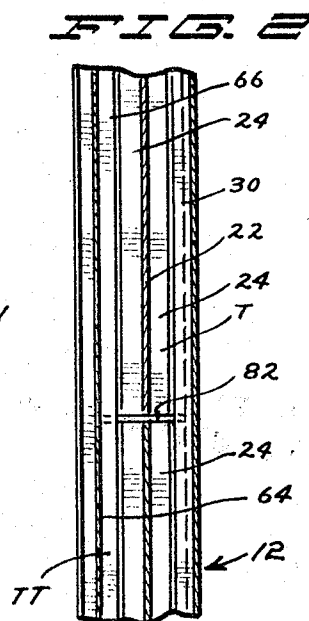
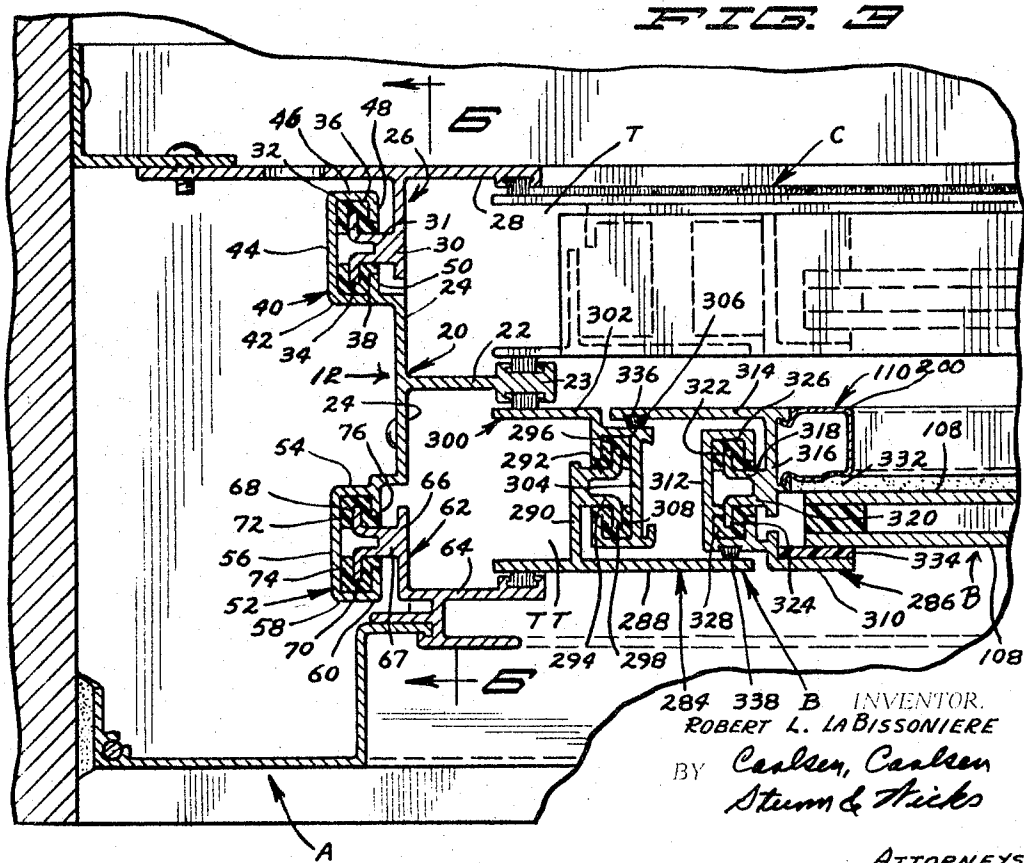
R. L. LA BISSONIERE

3,462,884

INSULATED METAL FRAME AND SLIDING CLOSURE

Filed April 30, 1968

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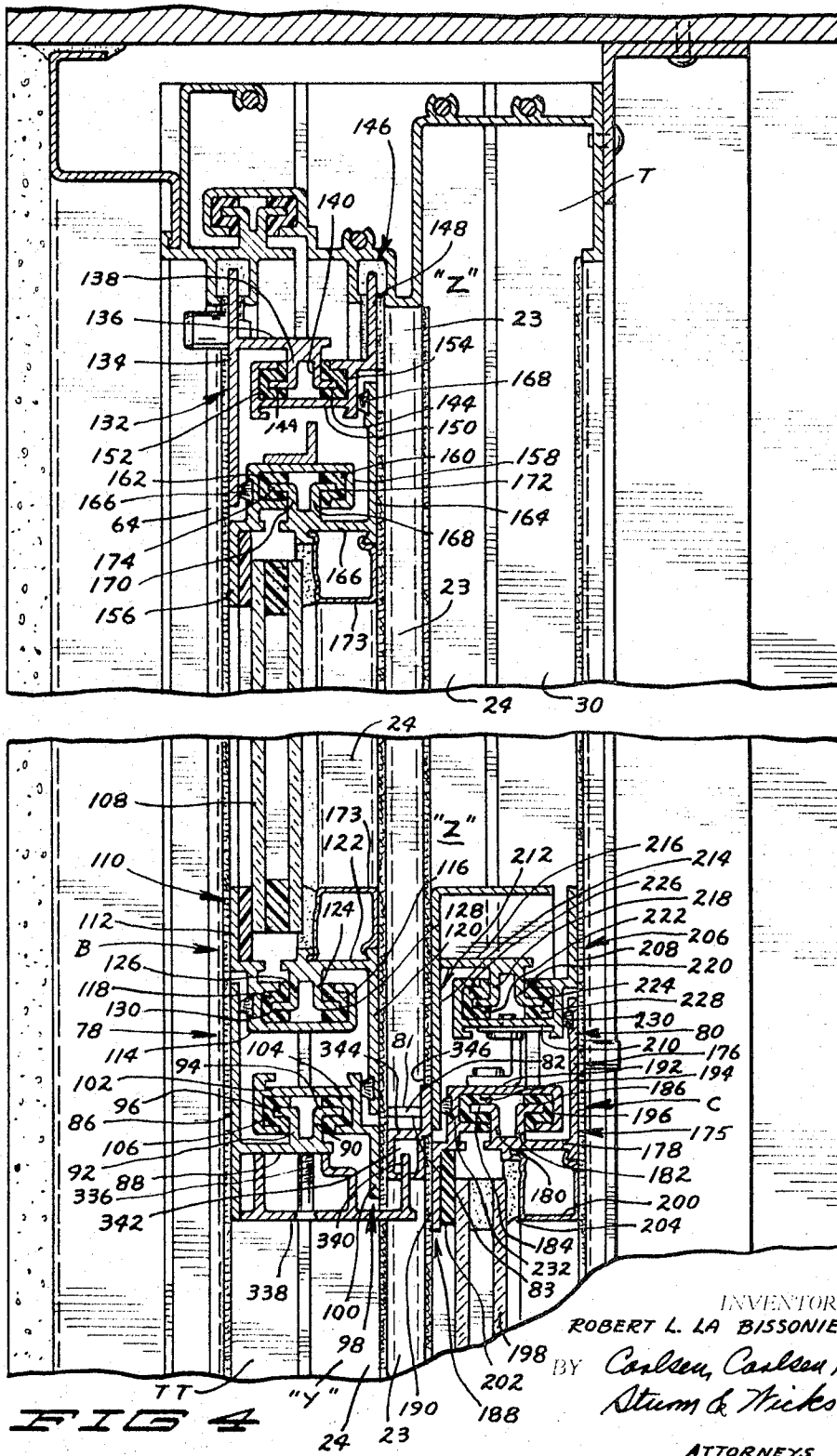
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FIG. 5

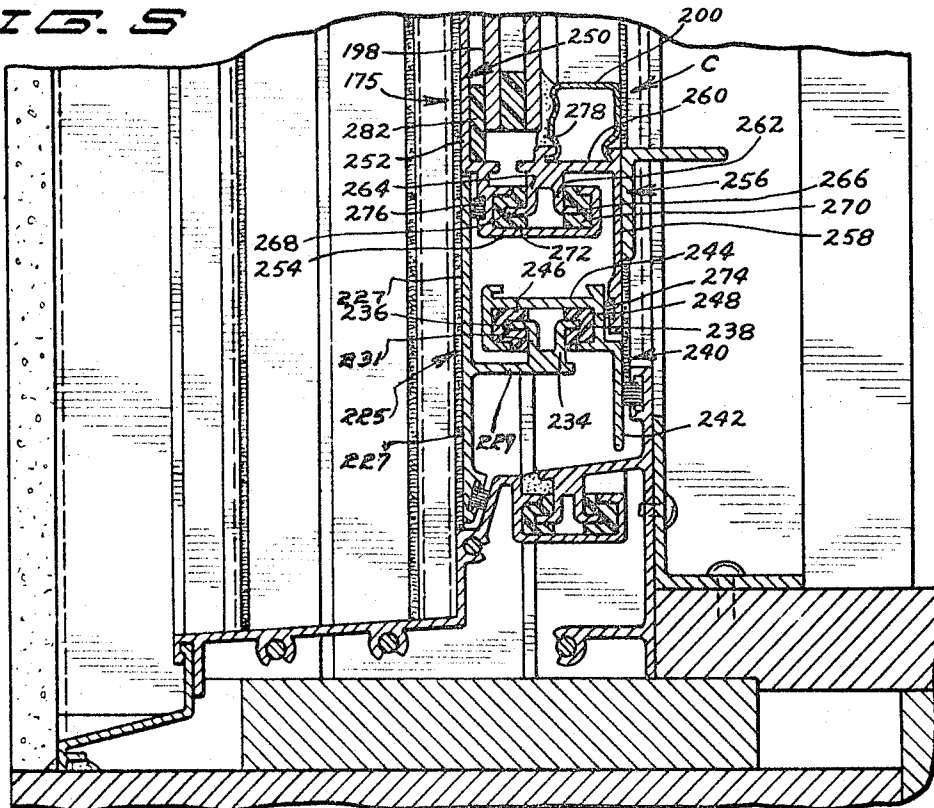
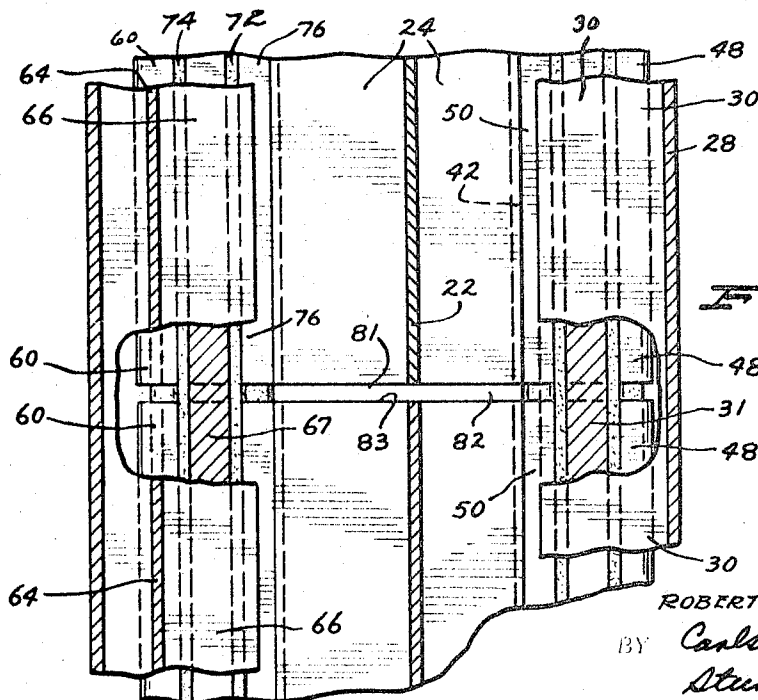


FIG. 6



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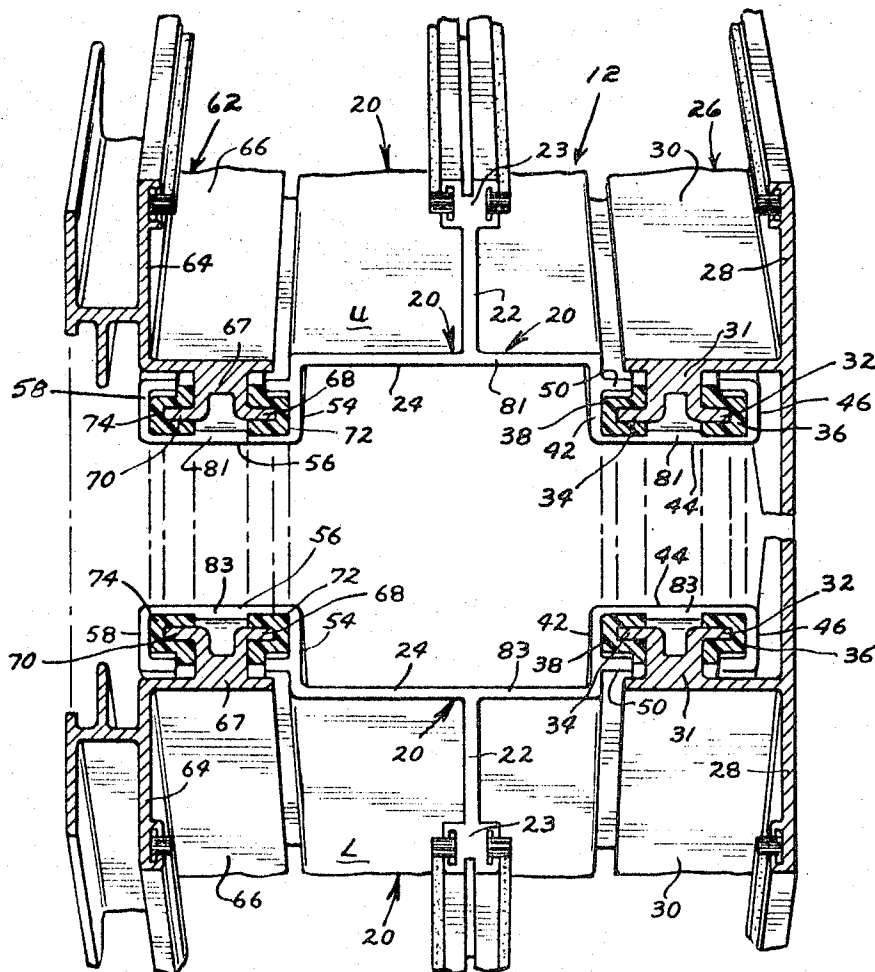


FIG. 7

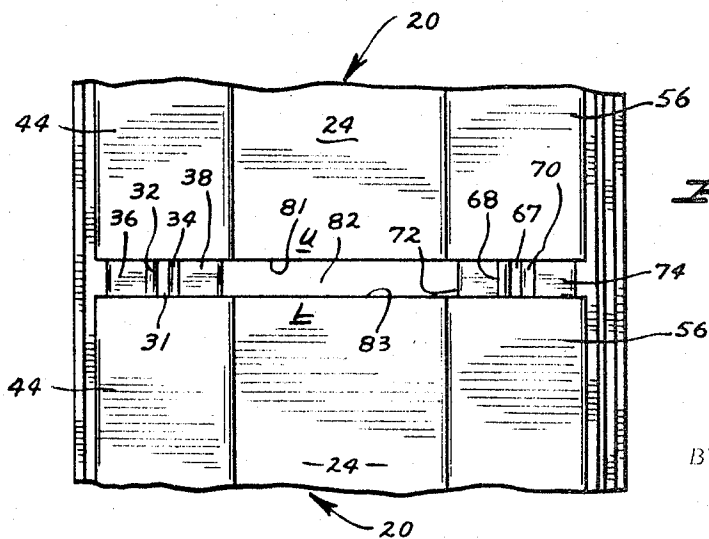


FIG. 8

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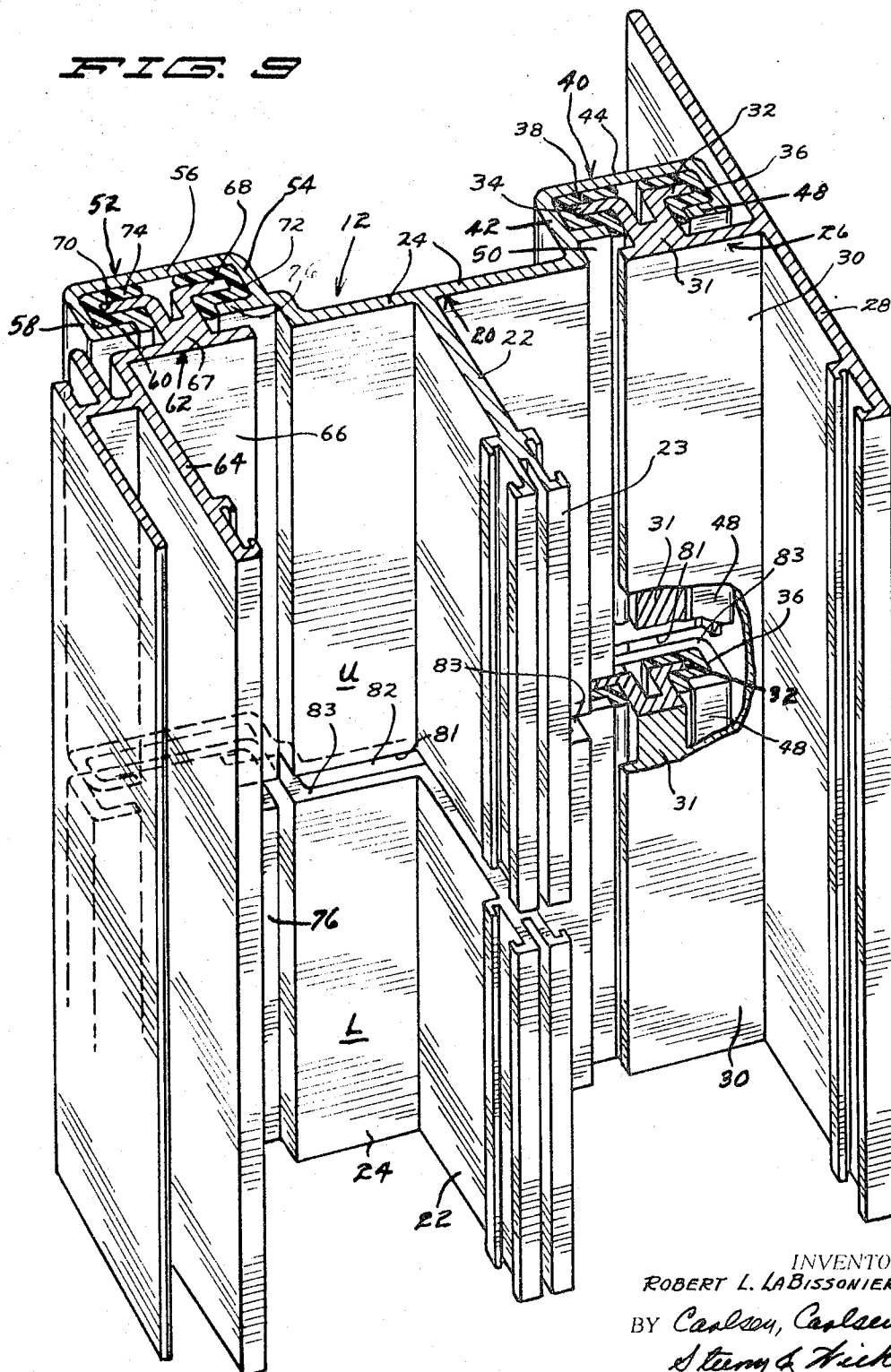
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FIG. 9



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INSULATED METAL FRAME AND SLIDING CLOSURE

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12 Claims

ABSTRACT OF THE DISCLOSURE

The disclosure relates to windows and includes a frame having two parallelly disposed ways or tracks. The ways are formed with an elongated center portion common to both ways and a spaced elongated side portion on either side of the center portion insulated therefrom and parallel thereto. An inner closure having insulated inner and outer frame portions is slidable along one of the ways and an outer closure having insulated inner and outer frame portions is slidable along the other way. With the closures in closed positions the same have overlapping frame parts, and the center portion of the frame is divided transversely at the overlap of the closures which forms two sections. Insulating means is positioned between the sections.

SUMMARY OF THE INVENTION

The invention relates to windows and more particularly to windows or doors having parallel tracks or ways for two sliding closures, the closures having overlapping frame parts when in closed positions. In such a window or door the frame includes an outer track at the lower half thereof which is exposed to the outside elements and the upper half of the inner track is exposed to the inside of the structure in which the window or door is mounted. Such a window is a conventional double hung window and with the same there is heat transfer from the exposed lower one-half of the outer track to the exposed upper one-half of the inner track via the frame. With metal frame construction, condensation can form on the upper inner track, and in this connection, it is an object of this invention to provide each of the frame members with a center portion insulated from side portions, the center portion being common to both tracks with the center portion having a slot or break transversely thereof at the overlap of the closures. As a result heat cannot transfer from the outer exposed lower portion of the center frame portion to the inner exposed upper portion of the center frame portion. Where sash with metal frames are used, the outer sash frame portions are insulated from the inner sash frame portions thereby reducing condensation on the inside of frame or sash. The above construction may also be used on the top and bottom tracks or ways for sliding door closures.

These and other more detailed and specific objects will be disclosed in the course of the following specification, reference being had to the accompanying drawings, in which—

FIG. 1 is a front elevational view of a window embodying the invention.

FIG. 2 is a sectional view on the line 2—2 of FIG. 1, showing only the frame member.

FIG. 3 is a sectional view on the line 3—3 of FIG. 1.

FIG. 4 is a sectional view on the line 4—4 of FIG. 1, portions thereof being broken away.

FIG. 5 is a sectional view on the line 5—5 of FIG. 1.

FIG. 6 is a view substantially on the line 6—6 of FIG. 3 at the center of the frame, portions thereof being broken away.

FIG. 7 is a perspective view of the side frame member from the inner side thereof and separated at the transverse cut thereof, the separated portions shown in section.

FIG. 8 is an elevational view of a central portion of the side frame member from the outer side thereof.

FIG. 9 is a perspective view of a portion of a side frame at the central area thereof, portions thereof being broken away.

Referring to the drawings in detail, FIG. 1 illustrates a double hung window W including a frame A having a sliding upper and outer sash B and a sliding lower and inner sash C. The frame A includes parallelly disposed and spaced side members 12 and 14 connected at the ends by the parallelly disposed and spaced upper and lower end members 16 and 18, respectively. The side frame members 12 and 14 are identical, and therefore only the member 12 will be described in detail. The side frame member 12 includes a T-shaped elongated center portion 20 which includes the elongated stem portion 22 which is formed with the head portion 23 at its inner edges and which terminates at its outer edge in the elongated cross bar portion 24 at a right angle to the stem. Also provided as part of frame member 12 is the angular inner side portion 26 which includes the inner flange portion 28 and extending inwardly thereof and at a right angle thereto the side flange portion 30.

The side flange portion 30 also includes the flange element 31 from which extends the marginal opposed legs 32 and 34. Each of the opposed legs 32 and 34 is positioned in a longitudinally extending recess formed in an elongated insulative plastic channel member 36 and 38, respectively.

The cross bar portion 24 of the center frame portion 20 has extending therefrom and as part thereof the marginal inner cross bar part 40 in the form of a channel which includes the inner wall portion 42 which terminates at its outer edge in the transverse wall portion 44 at a right angle thereto, and the wall portion 44 terminates at its outer edge in the right angular outer wall portion 46 which terminates in the right angular lip 48 overlying the wall portion 44. The insulative channel member 36 is positioned on the wall portion 46 and between the transverse wall portion 44 and the outer lip 48. Formed on and extending from the inner wall portion 42 is the inner lip 50. The insulative channel member 38 is positioned on the inner wall portion 42 and between the transverse wall 44 and the inner lip 50. With the opposed legs 32 and 34 in the insulative channel members as described and the channel members in the positions described, the center portion 20 is rigidly interlocked and insulatively connected to the inner side portion 26.

The cross bar portion 24 of the center frame portion has extending therefrom and as part thereof the outer cross bar part 52 in the form of a channel which includes the inner wall portion 54 formed at substantially a right angle to the bar portion 24. The cross bar part 52 corresponds to the cross bar part 40. The wall portion 54 terminates at its outer edge in the transverse wall portion 56 at a right angle thereto, and the wall portion 56 terminates at its outer edge in the right angular outer wall portion 58 which terminates in the right angular lip 60 overlying the wall portion 56.

The numeral 62 designates the angular outer side portion similar to part 26 and as part of frame 12 which includes the outer flange portion 64 and extending inwardly thereof and at a right angle thereto the side flange portion 66. The flange portion 64 corresponds to flange 28 and flange portion 66 corresponds to flange portion 30. The side flange portion 66 also includes the flange element 67 from which extends the marginal opposed legs 68 and 70. Each of the opposed legs 68 and 70 is posi-

tioned in a longitudinally extending recess formed in an elongated insulative plastic channel member 72 and 74, respectively. The cross bar portion 24 is spaced from the flange 30 and the flange 66.

Formed on and extending from the inner wall portion 54 is the inner lip 76. The insulative channel member 72 is positioned on the inner wall portion 54 and between the transverse wall 56 and the inner lip 76. With the marginal opposed legs 68 and 70 in the insulative channel members as described and the channel members 72 and 74 in the positions described, the center portion 20 is rigidly interlocked and insulatively connected to the outer side portion 62. The center portion 20 together with the inner side portion 26 and the outer side portion 62 make up the frame member 12.

It will be seen that the inner flange portion 28 together with the side flange portion 30 and a portion of the cross bar 24 and the stem 22 form an inner way or track T for the inner closure C. The outer flange portion 64 together with the side flange portion 66 and a portion of the cross bar 24 and the stem 22 form an outer way or track TT for the outer closure B with the center portion 20 common to both ways T and TT.

It will also be seen that heat and cold transfer is reduced from outer side frame 62 to the cross bar portion 24 of center portion 20 due to the insulative members 72 and 74 and from the center portion 20 to the inner side portion 26 due to insulative members 36 and 38. However, the lower half of the outer way or track TT where there is no sash exposed to the outer elements and there can be transfer of heat and cold from the outer or exposed half of bar 24 of the lower half of track TT as at Y to the inner half of bar 24 at the upper half of inner track T on the inner half of bar 24 as at Z where there is no sash, FIG. 4 in particular. In conventional double hung closures condensation can form depending upon temperature and humidity.

In sliding closures such as B and C, the lower frame portion 78 of the upper sash B overlaps and is in alignment with upper frame portion 80 of the lower sash C when the sashes B and C are in closed positions, particularly FIGS. 1 and 4. With the sash in closed positions the portions 22, 23 and 24 of track TT below the sash frame portion 78 indicated as Y are subjected to the outside elements, and the portions 22, 23 and 24 of track T above the sash frame portion 80 indicated as Z are subjected to the inside elements of the structure in which the frame A is mounted, particularly FIGS. 1 and 4. With the present invention a cut or slot 82 forming a break is created in the center portion 20 of frame 12 which extends transversely thereof through all of the portions of the center element 20 thereby dividing the center portion 20 into two sections, upper section *u* and lower section *l*, FIGS. 7 and 8. All the portions of the center portion 20 include the stem 22, the cross bar portion 24 and the parts making up both the marginal cross bar 40 and the marginal cross bar 52. The lower edge 81 of upper section *u* and the upper edge 83 of lower section *l* defines the slot or break 82. The slot 82 is positioned in frame 12 at a point substantially centrally of the sash frame portions 78 and 80 in overlapped position, particularly FIG. 4. The slot 82 prevents heat transfer from that portion of cross bar 24 in track TT where it is exposed to the outside elements and indicated generally by Y over to that portion of cross bar 24 in track T indicated generally by Z where it is exposed to the inside elements of a building structure. With such a transfer of heat and cold prevented or reduced to a bare minimum, consideration on the flange portion 24 and stem 22 of track T above the frame portion 80 of sash C is done away with or at a minimal. The aforementioned structure prevents condensation on the inner metal frame track as described; however, there remains the problem of heat transfer in the metal frames of the sashes B and C from outside to inside, and to make a completely insulated window unit with sash having metal frames the following construction is a part thereof.

As disclosed herein sash B and sash C each has a hopper pane hingedly mounted thereon as will be described hereinafter. However, the invention is not limited to sash having a hopper pane but sashes B and C may have fixed panes. The principle also applies to doors. In sash B, the lower outer frame portion 78 includes the vertical flange 86 which has extending inwardly therefrom the horizontal flange 88, particularly FIG. 4. The flange 88 has extending upwardly therefrom a pair of spaced flanges 90 and 92 and from which extend the opposed legs 94 and 96, respectively. Also provided is the lower inner frame portion 98 which is complementary to lower frame portion 78 and includes the vertical flange 100 to which is connected the channel 102 in which is positioned the insulative plastic channel members 104 and 106 each having a groove extending longitudinally thereof and in which the legs 94 and 96 are positioned thereby insulating frame portion 78 from portion 98 and locking the same together.

The glass pane 108 is mounted at its lower edge in the pane frame 110 which includes the outer lower vertical flange 112 to which is connected the channel 114 in which is positioned the insulative plastic channel members 116 and 118 each having a groove extending longitudinally thereof. The pane frame 110 also includes the inner lower vertical flange 120 which has extending from the upper edge thereof the horizontal flange 122 from which depends the spaced flanges 124 and 126. The flanges 124 and 126 have legs 128 and 130, respectively, said legs positioned in longitudinal grooves of insulative channel members 118 and 116, respectively, thereby rigidly connecting and insulating the outer vertical flange 112 and connected parts from inner vertical flange 120 and connected parts. The pane frame 110 is hingedly mounted within the frame portions 78 and 98 by means of conventional slide friction hinges (not shown) thereby providing a hopper type window tilting inwardly from the top.

The sash B further includes the upper outer frame portion 132 which includes the vertical flange 134 which has extending inwardly therefrom the horizontal flange 136. The flange 136 has depending therefrom the pair of spaced flanges 138 and 140 from which extend the opposed legs 142 and 144, respectively. Also, provided is the upper inner frame portion 146 which includes the vertical flange 148 to which is connected the channel 150 in which is positioned the insulative plastic channel members 152 and 154 each having a groove extending longitudinally thereof and in which legs 142 and 144 are positioned thereby rigidly connecting insulating frame portion 132 from portion 146. The frame portions 78 and 98 together with frame portions 132 and 146 are connected to vertical insulated frame portions hereinafter referred to by conventional securing means such as welding or the like.

The pane frame 110 further includes the outer upper vertical flange 156 to which is connected the channel 158 in which is positioned the insulative plastic channel members 160 and 162 each having a groove extending longitudinally thereof. The pane frame further includes the inner upper vertical flange 164 which has extending from the lower edge thereof the horizontal flange 166 from which extends the spaced flanges 168 and 170. The flanges 168 and 170 have legs 172 and 174, respectively, said legs positioned in the grooves of insulative channel members 172 and 162, respectively, thereby connecting and insulating the outer vertical flange 156 and connected parts from the inner vertical flange 164 and connected parts. As the pane frame 110 is hingedly closed the insulative strip 166 connected to channel 158 contacts the flange 134, and the insulative strip 168 connected to the flange 164 contacts the channel 150. The flanges 156 and 112 of pane frame 110 are connected to vertical frame portions hereinafter referred to as are flanges 164 and 120 as hereinafter referred to. The peripheral stop 173 holds the pane 108 in position against flanges 156 and 112.

Sash C includes as part of the frame portion 80 the pane frame 175 which includes the vertical flange 176 which has extending outwardly therefrom the horizontal flange 178, particularly FIG. 4. The flange 178 has extending upwardly therefrom a pair of spaced flanges 180 and 182 from which extend the opposed legs 184 and 186, respectively. Additionally provided is the upper outer frame portion 188 which is complementary to the upper inner frame portion 80 and includes the vertical flange 190 to which is connected the channel 192 in which is positioned the insulative plastic channel members 194 and 196 each having a groove extending longitudinally thereof and in which the legs 184 and 186 are positioned thereby connecting and insulating the frame portion 80 from the frame portion 188. The glass pane 198 of the pane frame 175 is mounted at its upper edge between the vertical flange 190 and the peripheral stop member 200 carried by the flange 178 by means of the plastic strip 202 and the mastic 204.

As part of the frame portion 80 of sash C is the upper inner frame portion 206 which includes the vertical flange portion 208 to which is connected the channel member 210. Also provided as part of the frame portion 80 of the sash C is the upper outer frame portion 212 which includes the vertical flange portion 214 from which extends the horizontal flange 216. The flange 216 has depending therefrom the spaced flanges 218 and 220 the legs 222 and 224 of which are positioned in longitudinally extending grooves formed in the insulative plastic channel members 226 and 228 positioned in the channel 210. Thus the frame portion 206 is connected to and insulated from the frame portion 212. The flange 176 of pane frame 175 closes upon the insulative strip 230 secured on the channel 210 and simultaneously the insulative strip 232 carried by the channel 192 contacts the flange 214.

With particular regard to FIG. 5 sash C further includes the lower outer frame portion 225 which includes the vertical flange 227. The flange 227 has extending inwardly therefrom the horizontal flange 229 from which extends the pair of flanges 231 and 234. Extending from the flanges 231 and 234 are the opposed legs 236 and 238, respectively. The numeral 240 designates the lower inner frame portion of sash C which includes the vertical flange 242 and connected to the upper edge of the flange is the channel 244 in which is positioned the insulative plastic channels 246 and 248 each formed with a longitudinally extending groove in which the legs 236 and 238 are positioned thereby connecting and insulating frame portion 225 from frame portion 240.

With further reference to FIG. 5 and as a further part of pane frame 175 is the outer lower frame portion 250 which includes the vertical flange portion 252 to which is connected the channel 254. The pane frame 175 further includes the inner lower frame portion 256 including the vertical flange 258. Extending from the flange 258 is the horizontal flange 260 from which depends the spaced flanges 262 and 264 having the legs 266 and 268 extending therefrom, respectively. The legs 266 and 268 are positioned in longitudinal grooves formed in insulative plastic channels 270 and 272, respectively, with the channels 270 and 272 positioned in the channel 254. As a result the frame portion 250 is connected to and insulated from the frame portion 256. The flange 258 of pane frame 175 has connected thereto the insulative strip 274 which contacts the end of the channel 244, and the channel 254 carries the insulative strip 276 which contacts the flange 227 when the pane frame 175 is closed. The lower edge of the pane 198 is mounted in the mastic 278 between peripheral stop 200 and flange 252 with the insulative strip 282 between the flange 252 and the pane.

The pane frame 175 is hingedly mounted within the frame portions 226 and 240 by means of conventional slide friction hinges (not shown) thereby providing a hopper type window tilting inwardly from the top. The

flange 214 and related parts and the flange 228 and related parts are connected to vertical frame portions hereinafter referred to as in flange 208 with related parts and flange 258 with related parts.

Pane frame 175 flange 176 with related parts and flange 258 with related parts are connected by vertical frame portions hereinafter referred to. Each of the sashes B and C includes side frame portions and cooperating pane frame portions which support the hopper panes and inasmuch as these are substantially identical only the side frame portion 284 of sash B and the side frame portion 286 of the pane frame 110 will be described, see particularly FIG. 3. The side frame 284 includes the outer flange 288 and extending inwardly therefrom is the flange 290 from which extends the pair of flanges 292 and 294. Extending from the flanges 292 and 294 are the opposed legs 296 and 298, respectively. The numeral 300 designates the inner frame portion which includes the inner flange 302 and connected thereto is the channel 304 in which is mounted the insulative plastic channel members 306 and 308 each formed with a longitudinally extending groove in which the legs 296 and 298 are positioned thereby connecting the insulating outer frame flange 288 from inner frame flange 302.

The side frame portion 286 of pane frame 110 includes the outer flange 310, to which is connected the channel 312. The side frame 286 also includes the inner flange 314 from which extends the right angularly disposed flange 316 and extending from the flange 316 are the spaced flanges 318 and 320. Formed on the flanges 318 and 320 and the legs 322 and 324, respectively, which are positioned in longitudinal grooves of the plastic insulative channels 326 and 328, respectively, which are positioned in the channel 312. As a result the outer flange 310 is connected to and insulated from the inner flange 314. The pane 108 is mounted between the peripheral stop 200 carried by the flange 316 and the flange 310 by means of the mastic strip 332 and the insulative strip 334. When the pane frame 110 is closed, the insulative strip 336 carried by the flange 314 contacts the channel 304, and the insulative strip 338 carried by the channel 312 contacts the flange 288.

With particular reference to FIG. 4, the horizontal flange 88 of sash B has connected thereto by means of the bolt 336 the lower horizontal stop flange 338. Formed on the inner edge of the flange 338 is the vertically extending sealing leg 340 which engages in the soft sealant material 342 of the channel 344 formed as part of the flange 346 connected to flange 214 when the sashes B and C are in closed positions.

I claim:

1. Closure means comprising:

- (a) a frame of heat conducting material having
- (b) two parallelly disposed ways, said ways being formed
- (c) with an elongated center portion common to both ways and
- (d) a spaced elongated side portion on either side of said center portion and parallel thereto,
- (e) an inner closure slidable along one of said ways,
- (f) an outer closure slidable along the other way,
- (g) said closures when in closed positions having overlapping parts,
- (h) said center portion of the frame being divided transversely thereof at the overlap of the closures to form in the frame
- (i) two sections with a slot therebetween, and
- (j) insulating means in the slot between said sections.

2. Closure means according to claim 1 in which the center portion of the frame is insulated from the side portions of the frame.

3. Closure means according to claim 1 in which

- (a) the center portion is T-shaped in cross section and formed with

- (b) an elongated stem element which separates the ways and
 - (c) an elongated cross bar element,
 - (d) the side portions are angular in form having
 - (e) elongated flange elements,
 - (f) corresponding flange elements having
 - (g) marginal parts,
 - (h) said center portion having corresponding cross bar elements having
 - (i) marginal parts overlying the marginal leg parts of the flange elements,
 - (j) insulating means between the parts of said center and side portions,
 - (k) said center portion being formed with a slot extending across said stem element, the cross bar element and the marginal parts of said cross bar elements to divide the center portion into two sections and
 - (l) insulating means within said slot.
4. Closure means according to claim 1 in which
- (a) the closures are provided with inner and outer frame members,
 - (b) a panel disposed between said frame members, and
 - (c) insulating means between said closure frame members.
5. Closure means according to claim 1 in which
- (a) the closure means is in the form of a double hung window,
 - (b) the closures are in the form of sash,
 - (c) the frame is to be built into the wall of a building,
 - (d) the ways are vertical, and
 - (e) the separation between the sections of the center and the insulation means therein is horizontal.
6. Closure means according to claim 5 in which
- (a) the sash are constructed from heat conducting material and are formed with
 - (b) inner and outer frame members receiving therebetween
 - (c) a window pane,
 - (d) said sash being insulated from the window frame, and
 - (e) insulation between said inner and outer frame members.
7. Closure means according to claim 6 in which:
- (a) a seal is provided between the overlapping parts of the sash when in closed position, and
 - (b) the separation between the sections of the center portion and the insulating means therebetween are situated above the seal.
8. Closure means according to claim 4 in which the center portion of the frame is insulated from the side portions of the frame.
9. Closure means according to claim 5 in which the

center portion of the frame is insulated from the side portions of the frame.

10. An insulated metal frame for sliding closures comprising:

- (a) two parallelly disposed ways,
- (b) said ways having an elongated center portion common thereto and
- (c) a spaced elongated side portion on either side of said center portion and parallel thereto,
- (d) said center portion of the frame being divided transversely thereof to form in the same
- (e) two sections, and
- (f) insulating means between said sections.

11. The insulated metal frame for sliding closures according to claim 10 in which the center portion of the frame is insulated from the side portions.

12. The insulated metal frame for sliding closures according to claim 10 in which

- (a) the center portion is T-shaped in cross section and formed with
- (b) an elongated stem element which separates the ways and
- (c) an elongated cross bar element,
- (d) the side portions are angular in form having
- (e) elongated flange elements,
- (f) corresponding flange elements having
- (g) marginal leg parts,
- (h) said center portion having corresponding cross bar elements having
- (i) marginal parts overlying the marginal parts of the flange elements,
- (j) insulating means between the parts of said center and side portions,
- (k) said center portion being formed with a slot extending across said stem element, the cross bar element and the marginal parts of said cross bar elements to divide the center portion into two sections, and
- (l) insulating means within the slot.

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