Aug. 18, 1953 E. ALBANO 2,648,878

COMPLETELY REVERSIBLE WINDOW

Filed Jan. 6, 1947 3 Sheets-Sheet 1

Fig. 1.

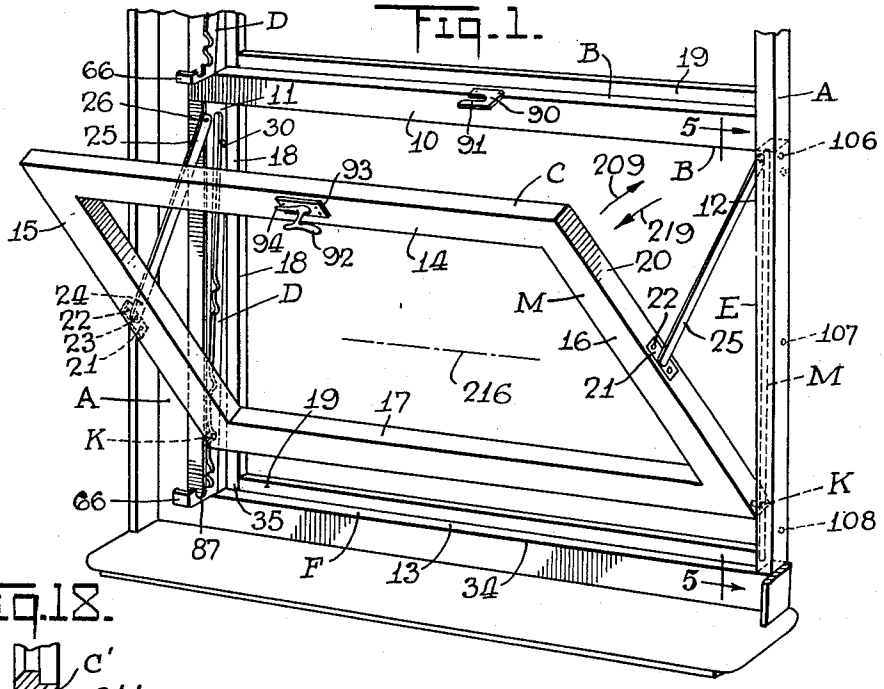


Fig. 1a.

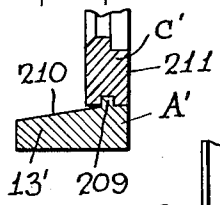


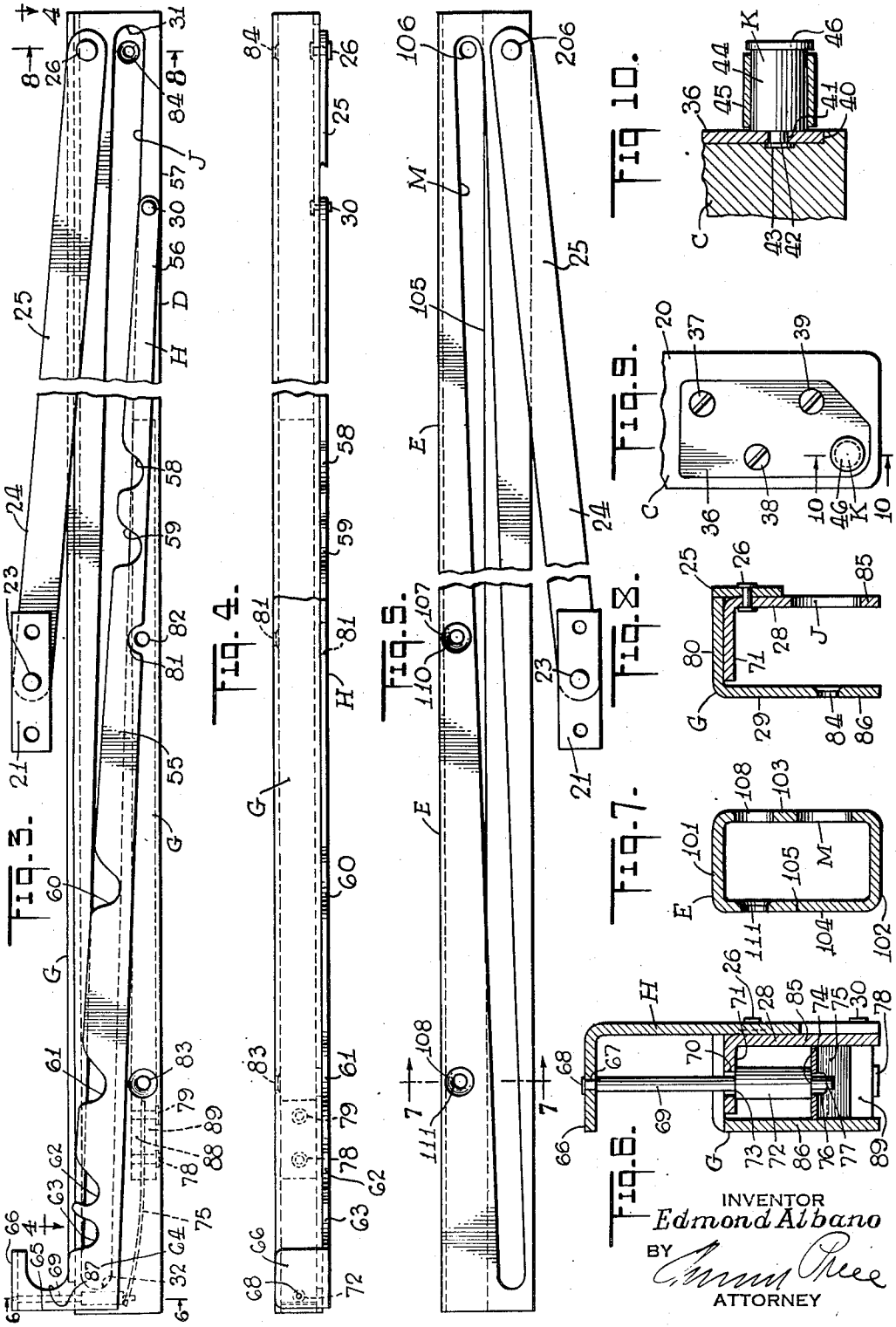
Fig. 2.

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Aug. 18, 1953 E. ALBANO 2,648,878

COMPLETELY REVERSIBLE WINDOW

Filed Jan. 6, 1947 3 Sheets-Sheet 2



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Aug. 18, 1953 E. ALBANO 2,648,878

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Filed Jan. 6, 1947 3 Sheets-Sheet 3

Fig. 11.

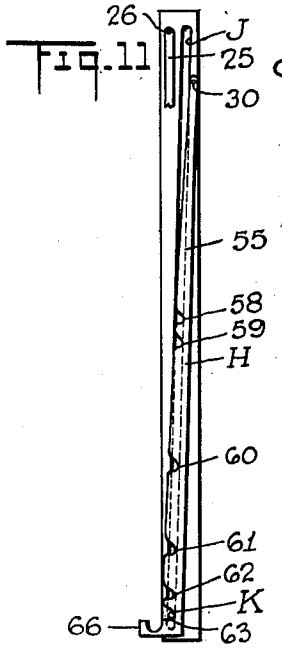


Fig. 12.

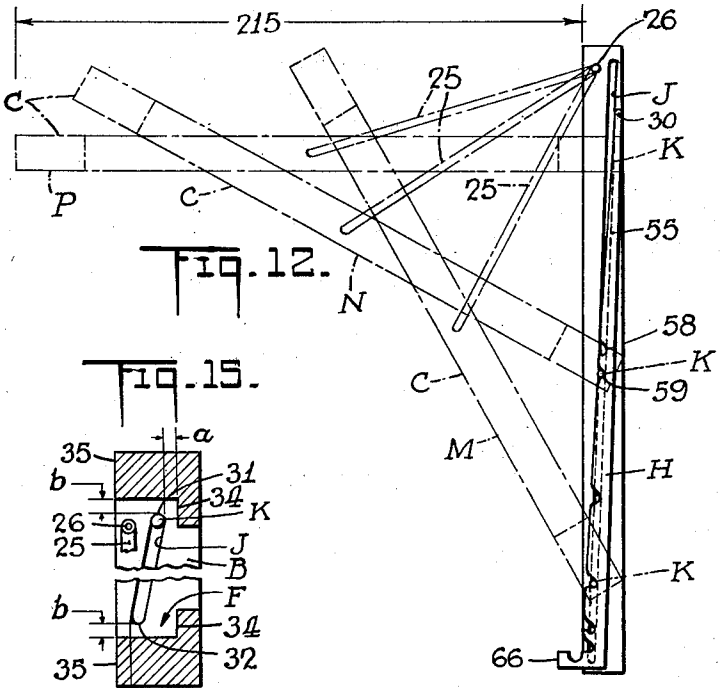


Fig. 15.

Fig. 14.

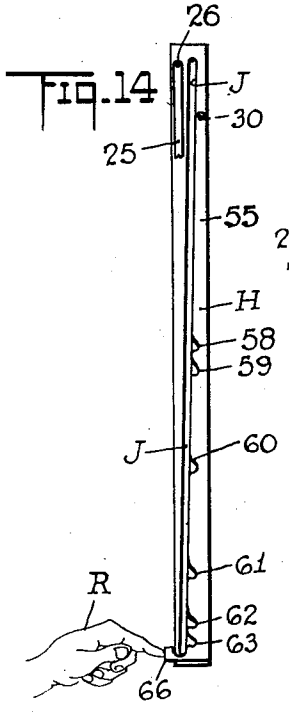


Fig. 16.

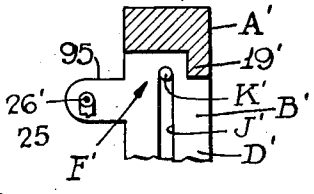


Fig. 17.

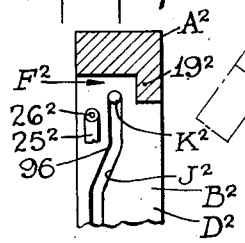
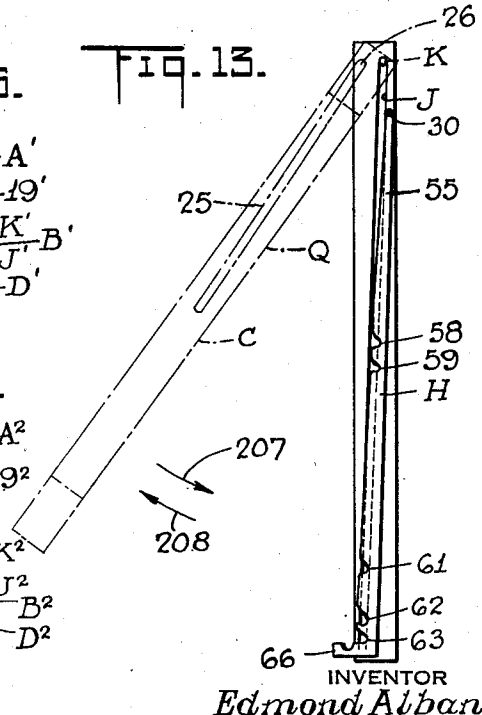


Fig. 13.



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Patented Aug. 18, 1953 2,648,878

UNITED STATES PATENT OFFICE

2,648,878

COMPLETELY REVERSIBLE WINDOW

Edmond Albano, New York, N. Y.

Application January 6, 1947, Serial No. 720,440

10 Claims. (Cl. 20—42)

1

The present invention relates to reversible windows and it particularly relates to completely reversible window sashes for interior or exterior use.

It is among the objects of the present invention to provide a completely reversible window sash construction, of inexpensive and durable construction, readily capable of use interiorly or exteriorly of a dwelling, office or factory, in which the sash may be completely reversed and may also be held in any desired intermediate open position and thereafter readily released to be moved to either completely reversed position closing the window opening.

Another object is to provide a completely reversible light-weight window sash construction which will enable complete opening of the window frame with full ventilation and full closure in either direction eliminating costly and heavy frame constructions with sliding counter-weights as is customary with vertically sliding sashes and the expensive metal frames and relatively inaccessible swinging members characteristic of casement type windows.

A further object is to provide a completely reversible sash construction in which both sides of the window may be readily cleaned from the interior of a building by merely reversing the sash eliminating the need for exterior window cleaning with attachments on the exterior of a building, and avoiding reaching out of a window to clean the same from the interior.

Still further objects and advantages will appear in the more detailed description set forth below, it being understood, however, that this more detailed description is given by way of illustration and explanation only and not by way of limitation, since various changes therein may be made by those skilled in the art without departing from the scope and spirit of the present invention.

A particular feature of the present invention resides in connecting a swinging sash desirably of rectangular form to a rectangular frame by flat parallel swinging arms pivotally connected to the exact middle portions of the opposite sides of the sash at one end and at the upper ends.

The sides of the frame are provided with tracks or grooves which receive and guide sliding pins or rollers on the opposite sides of the ends of the sash. These tracks extend substantially the full length of opposite sides of the frame and they extend alongside of and slightly beyond the pivotal connections of the swinging arms to the upper end of the frame.

2

The pivotal connections and the tracks or grooves are always out of alignment so that the sliding pins or rollers may move freely substantially the full length of the frame without interference from said pivotal connections.

A particular feature of the present invention relates to the provision of inexpensive readily manufactured hardware, which may be inserted in the sides of the frame.

In the drawings are shown several embodiments of the invention by way of illustration and not by way of limitation.

Fig. 1 is a front perspective view showing the sash in a partly opened position as it is moving upwardly from its closed position.

Fig. 2 is a front perspective view showing the sash in completely opened position as it is about to move into its completely reversed closed position.

Fig. 3 is a side elevational view of the left hand sash holding and guiding fixture upon an enlarged scale as compared to Figs. 1 and 2,

Fig. 4 is an edge elevational view upon the line of 4—4 of Fig. 3,

Fig. 5 is a side elevational view of the right hand guide fixture for the sash taken upon the line 5—5 of Fig. 1 and upon an enlarged scale as compared to Fig. 1,

Fig. 6 is a transverse horizontal sectional view upon the line 6—6 of Fig. 3 upon an enlarged scale as compared to Fig. 3,

Fig. 7 is a transverse horizontal sectional view upon the line 7—7 of Fig. 5 and upon an enlarged scale as compared to Fig. 5,

Fig. 8 is a horizontal transverse sectional view upon the line 8—8 of Fig. 3 upon an enlarged scale as compared to Fig. 3,

Fig. 9 is a fragmentary, vertical side elevational view of the bottom of the sash showing the guide roller and attachment therefor to the sash,

Fig. 10 is a fragmentary vertical sectional view upon the line 10—10 of Fig. 9 showing the guide roller and upon an enlarged scale as compared to Fig. 9,

Fig. 11 is a diagrammatic side elevational view similar to Fig. 3, but upon a smaller scale,

Fig. 12 is a side diagrammatic elevational view, similar to Fig. 11, showing the sash as partly opened, fully opened and in uppermost opened position, the sash being shown in dot and dash lines.

Fig. 13 is a side diagrammatical elevational view, similar to Figs. 11 and 12, showing the sash in dot and dash lines closing downwardly from the uppermost opened horizontal position

of Fig. 12, the sash closing into reversed position as compared to Fig. 11,

Fig. 14 is a side elevational view similar to Figs. 11 and 12 showing how the sash may be released from the partly open or fully open positions of Fig. 12.

Fig. 15 is a diagrammatic side sectional view of the top and bottom of a frame forming a pocket to receive the reversible sash, showing the pivotal connection to the frame and the end positions of the guide roller of the sash in the obliquely positioned track.

Fig. 16 is a diagrammatic side sectional view, similar to Fig. 5, of the top of a frame showing an alternative track construction with the track extending vertically and the pivotal connection to the frame positioned outside of the sash receiving pocket in the frame,

Fig. 17 is a diagrammatic side sectional view, similar to Fig. 15, of the top of the frame showing another alternative track construction with the track offset around the pivotal connection, and

Fig. 18 is a fragmentary side sectional view of the bottom of the sash receiving pocket having a tongue and groove to prevent entrance of rain or weather at the bottom of the sash.

Referring to Figs. 1 and 2, the window has a frame A provided with the sash openings B. The sash openings B receive the completely reversible sash C.

The present application is particularly directed to the hardware for guiding and locking the position of the sash C which hardware is indicated by D and E in Figs. 1 and 2 and the construction of which is shown in detail in Figs. 3 to 10 and the operation of which is shown in Figs. 11 to 14.

As shown best in Figs. 1 and 2, the frame has the top portion 10, left hand and right hand side members 11 and 12 and a sill or base section 13.

The sash C is provided with a top section 14, the side sections 15 and 16 and the bottom section 17. The frame elements 10, 11, 12 and 13 are provided with inwardly projecting portions indicated at 18 and 19 which form a pocket F into which the sash C may fit in either reversed position.

The sash may swing inwardly or outwardly and if used with one side on the exterior of the building may be provided with suitable weather stripping.

The exact center of the side faces 20 of the sash C are provided with plates 21 (see Figs. 1 and 2) attached in place by the screws 22. To the plate 21 is pivotally connected at 23 the end 24 of the arm 25. The top of the arm 25 is pivotally connected at 26 to the inside face 27 of the fixture D forming part of the frame member 11. The pivotal connection 26 is on the hardware or fixture D as best shown in Figs. 3, 4, 5 and 8.

The fixture D is provided with a base structure G of U-shape as best shown in Figs. 6 and 8 which is formed of two angle members 28 and 29 (see Fig. 8). It also carries the swinging engagement bar H which is pivotally mounted upon the structure G at the pivot pin 30.

The base of the U-member G is provided with an elongated obliquely positioned slot J (see Fig. 3) which extends beyond the pivot pin 26 at its upper position 31. The slot J receives the roller or guide construction K which is positioned on

the lower end of the side faces 20 of the sash C as shown in Figs. 1 and 2.

The sliding sash pin K when at the ends 31 and 32 of the slot J as indicated in Figs. 3 and 15 will be substantially the same distance from the top and bottom of the pocket F in the frame A or opening B, said distance being indicated by the dimension *b* in Fig. 15. The sides of the pin K of the sash C as indicated by dimension *a* will also be substantially the same distance from the front 34 and back 35 of the pocket F (see Fig. 15).

By connecting the arm 25 to the exact middle at 23 of the side face 20 of the sash C, by extending the slot J obliquely past the pivot point 26 and by providing that the sash pin K at the end of its travel in slot J so that it will be the same distance from the top and bottom of the pocket F and front and back of the pocket F, it is possible to achieve a completely reversible sash structure.

Referring particularly to Figs. 9 and 10, the roller structure K includes the plate 36 held in position by screws 37, 38 and 39. The sash C is recessed as indicated at 40 to receive the plate 36. The plate 36 is provided with an opening 41 into which extends the stud 42 having an enlarged head 43. The stud carries the support member 44 carrying the roller tube 45 held in position thereon by the head 46.

The roller 45 rides in the slot J and at its extreme positions with the sash C in completely reversed position it is substantially the same distance indicated by dimension *b* in Fig. 15 from the top and bottom of the pocket F and also from the front and back of the pocket F indicated by dimension *a* in Fig. 15. It will be noted in Figs. 3 and 15 that the roller K at its extreme upper position passes alongside of and beyond the pivot 26.

The swinging member H of the hardware D as shown in Fig. 3 consists of a long bar 55 pivotally mounted at its upper end 56 as indicated at 30 between the slot J and the side 57 of the fixture or hardware D. Its forward face is provided with the recesses 58, 59, 60, 61, 62 and 63, which are normally biased to swing across the slot J to the position shown in Fig. 3. These recesses 58 to 63 are designed to engage the guide pin or roller K and hold said pin or roller K in various adjusted positions as is shown in Fig. 12, or in closed position as is shown in Fig. 11.

The bottom end 64 of the swinging element H is provided with an extension 65 which is recessed at 67 to receive the roller K in its lowermost position and to match the slot J. The forward end is turned inwardly as indicated at 66 (see particularly Fig. 6) and it has an opening 67 in which is permanently mounted the end 68 of the pin 69. The pin 69 extends through the opening 70 in the flange 71 of the member 28 and it is provided with a collar 72 inside of said flange 71.

The shoulder 73 of the collar 72 acts as a stop against the flange 71 while the shoulder 74 acts against the leaf spring 75. The leaf spring 75 has a recess 76 which receives the reduced diameter or stud extension 77 of the pin 69. The leaf spring 75 is clamped between the plate members 88 and 89 by the rivets 78 and 79.

The flanges 71 and 80 are preferably united to form the channel member G by spot welding at spaced intervals along said flanges 80 and 71.

As shown in Fig. 3, the swinging element 55 is also provided with a recess 81 to clear the

screw hole 82. The hole 82 together with the countersunk screw holes 83 and 84 in the fixture D enable the fixture to be screwed to the side element 11 of the frame A. The screw openings 82, 83 and 84 extend through both side flanges 85 and 86 of the U-shaped member G while the opening 84 is accessible through the slot J and extends only through the flange 29.

The right hand hardware as shown in Figs. 5 and 7 is of square cross sectional shape with the end flanges 101 and 102, the outside flanges 103 and the inside flange 104. It may be made of a sheet of metal, which is folded as shown in Fig. 7 with the ends abutting and spot welded as indicated at 105. The corresponding slot M in the flange 103 has the same shape and relative position as the slot J on the hardware D.

As shown in Fig. 5 the right hand fixture or hardware E is provided with openings 107 and 108 in the flange 103 which gives access to the openings 110 and 111 in the base flange 104 of the structure E. The opening 106 in the base flange 104 will be accessible through the slot M. By these openings 106 to 111 it is possible to attach the right hand hardware E to the frame A. The swinging arm 25 is pivotally mounted on the flange 103 by the pivot pin 206.

In operation the sash C will be held closed as shown in Fig. 11 with the guide pin or roller K held in the recess 63. Then by pressing the extension 66 inwardly against the spring 75, the element H is swung away from the slot J releasing the sash C, this release being shown in Fig. 14, the hand R actuating the extension 66. In Fig. 14, the slot J is free and the guide K may move in either direction therein.

The sash C may be swung upwardly with the guide K sliding upwardly in the track J to any position in which the guide pin K engages the recesses 62, 61, 60, 59, and 58 in the swinging member H. In position M shown in dot and dash lines in Fig. 12, and also shown in Fig. 1, the guide K engages recess 61, while in position N it engages recess 59. The sash C may then move to horizontal position P of Figs. 2 and 12. When the pin K reaches the top of the slot J having by-passed the pivot pins 26 and 206 of the swinging arms 25, it will swing inwardly as shown by arrow 207 into closed position. The sash C will then be completely reversed. In this position, the spacing of the guide K from the sides and end of the frame B will be the same as in the position of Fig. 11 (see dimensions *a* and *b* in Fig. 15).

In reverse movement, the sash C may swing outwardly as indicated at 208 in Fig. 13 to position P of Figs. 2 and 12 and then through position N shown in Fig. 12 and the position M of Figs. 1 and 12 and in direction 209 of Fig. 1 to close the opening B in the frame A, the sash C then being in original position.

During this return operation, the member 66 is pressed inwardly as shown in Fig. 14.

Where the sash C is used interiorly no pocket F is needed, but where used exteriorly the pocket F should be provided with weather-stripping to keep out the weather.

In the construction shown in Fig. 18, the sill or base section 13' has a downwardly sloping upper face 210 to drain any water downwardly and outwardly. The sill 13' also has an upwardly projecting tongue 209 which fits into the recess or groove 211 in the bottom of the sash C'. This will prevent entrance of water or rain at the sill 13'.

The sash C may be positioned to swing about a vertical axis as well as a horizontal axis as shown in Figs. 1, 2, 12 and 13. A series of swinging sashes C and frames A may be provided side by side or one above the other in a single frame as indicated sketchily in Figs. 1 and 2 with the sashes C all swinging in the same or different directions, that is with all swinging inwardly or outwardly on vertical or horizontal axes, or with any arrangement of some swinging inwardly and some swinging outwardly and some swinging on vertical axes and others swinging on horizontal axes.

In Figs. 1 and 2 the sash C may be locked in position by the plate 90 having the recess 91 and the handle 92 pivotally mounted on the plate 93 and the locking extension 94. The handle 92 also serves to conveniently enable swinging and sliding of the sash C.

In Figs. 16 and 17 are shown two alternative track arrangements, similarly functioning elements being indicated by the same numerals and letters respectively primed and provided with a superior 2.

In Fig. 16, the pivot 26' of the arm 25' is conveniently offset from the slot J' to enable bypassing of the guide K' by positioning it upon the inward extension 95 of the fixture D'.

In Fig. 17, the pivot 26^2 is offset from the track J^2 to permit bypassing of the guide K^2 by bending the track J^2 at the point 96.

In both Figs. 16 and 17 the spacing of the guides K' and K^2 at the ends of their travel in the tracks J' and J^2 should be the same as indicated by dimensions *a* and *b* in Fig. 15.

The frames A and sashes C may be made of wood, steel, aluminum, bronze, plastic and so forth. The sizes of the sashes C are controlled by the amount of throw of the sash indicated by the dimension 215 in Fig. 12. Generally the sashes C are elongated in the direction of the axis of revolution indicated by dot and dash lines 216 in Figs. 1 and 2 and are relatively shortened in the dimension of the throw 215 so that they will come too far into the room. They are also made of such size as not to place too great weight on pivotal connections 23, 26 and 206 or on arms 25. One hand on the sash C or handle 92 with other hand on extension 66 should suffice readily to swing sash C.

With casement type reversible sashes C where the axes 216 are vertical, the latching engagement bar H may be omitted since the weight of the sash C will hold it in any desired adjusted position.

When the sash C swings outwardly on the exterior of a building on a horizontal axis 216, it should preferably open outwardly at the bottom from its normal closed position to exclude the weather from the exterior. When the sash C normally swings inwardly into the room from the exterior of a building it should open inwardly from the top from its normal closed position to exclude weather or rain. This latter manner of opening is shown in Fig. 1 and arrow 219.

The present application is a continuation-in-part of application Ser. No. 553,021 filed September 29, 1944, which matured into Patent No. 2,419,524 on April 29, 1947.

As many changes could be made in the above completely reversible windows and many apparently widely different embodiments of this invention could be made without departing from the scope of the claims, it is intended that all matter contained in the above description shall be in-

terpreted as illustrative and not in a limiting sense.

What is claimed is:

1. In a completely reversible window, a frame, a completely reversible swinging sliding sash therein, said sash having sliding rollers and swinging arms pivotally connected on the sides thereof and fixtures on the sides of said frame having tracks to receive said rollers and pivot mounts to receive the ends of said swinging arms, at least one of said fixtures having a swinging arm to move across said track and, said arms being notched at intervals to engage said rollers and thus hold said sash in an intermediate position, said pivot mounts being positioned adjacent one end of the inside face of said frame adjacent but out of line with and alongside of said tracks and said tracks extending slightly beyond said pivot mounts.

2. In combination with a window frame having a completely reversible swinging sash, a metal fixture taking the form of an elongated channel of rectangular cross section located between the sash and the frame being provided with a guide slot for the sash, attachment means mounting the channel on the frame between the frame and the sash, swinging mounts for the sash having a pivotal connection to said channel, said pivotal connection being positioned to one side and out of alignment with and inside of the end of said guide slot, and latching means to hold said sash in open or closed position, said latching means including a swinging spring biased lever having a plurality of recesses at intervals to engage the sash.

3. A window frame having a completely reversible swinging sash, swinging arms extending between the vertical sides of said frame and said sash, guide means positioned at the lower ends of the vertical sides of the sash and track means extending along the inside vertical sides of the frame to receive said guide means, said track means extending to, alongside of and slightly beyond the pivotal connections of the arms to the frames and swinging spring-biased lever means engaging said guide means and serving upon said engagement to hold said sash in intermediate positions between its completely reversed positions, said guide means including rollers projecting from the sides of the sash engaging said spring-biased lever means in said intermediate positions, said arms being pivotally connected to the upper end of the track means and at the sash ends to the centers of the corresponding opposite outside vertical sides of the sash.

4. A window frame having a rectangular opening therethrough receiving a completely reversible window sash completely closing said opening in either reversed position and swinging upon such reversal; in combination therewith a tubular metal fixture of rectangular cross section, the inside of said section being attached to the frame, the outside of said section having means for connection to the sash, said fixture being positioned between the frame and the sash, said means for connection to the sash consisting of a flat swinging arm extending from and having a pivotal mount upon an opposite parallel inside face of said fixture closely adjacent one end of said frame and extending to and having a sash pivotal mount centrally of the width and length of said sash and upon the outside face of said sash, and track means on said inside face of said fixture to guide said sash, said track means extending obliquely past and alongside of said fixture pivotal mount and extending at least to the ends of said rectangular opening, said tubular fixture being mounted in both sides of the frame, one side of the frame being provided with a swinging notched lever pivotally mounted at the upper end of said fixture, and being positioned between the fixture and the sash, said sash having roller guide means to engage said notched lever in order to locate the sash in a desired swinging position.

5. A window frame having a rectangular opening therein, a completely reversible window sash to close said opening completely upon each complete reversal, said sash having a greater width and depth than said opening; in combination therewith a tubular metal fixture of rectangular cross section, the inside of said section being attached to the frame, the outside of said section having means for connection to the sash, said fixture being between the frame and the sash, said means for connection to the sash consisting of a swinging pivot arm connecting said sash to said frame, said sash having a central pivotal connection to said arm on an opposite outside face of said sash and said arm also having end pivotal connections on a corresponding opposite inside face of said fixture, and the corresponding inside face of said fixture having an obliquely positioned straight guide track for said sash, said tubular fixture being mounted in both sides of the frame, one side of the frame being provided with a swinging notched lever pivotally mounted at the upper end of said fixture, and being positioned between the fixture and the sash, said sash having roller guide means to engage said notched lever in order to locate the sash in a desired swinging position.

6. A window frame having a rectangular opening and a rectangular sash receiving pocket inside of said opening having greater width and depth than said opening and also having an inner face and an outer face and intervening side faces, and a completely reversible sash to be received in said pocket in each reversed position; in combination therewith a tubular metal fixture of rectangular cross section, the inside of said section being attached to the frame, the outside of said section having means for connection to the sash, said fixture being positioned between the frame and the sash, said means for connection to the sash consisting of a swinging arm extending from the end of an opposite inside face of said pocket to the center of the corresponding opposite outside face of the sash and being pivotally connected to said end of the inside face and the center of the outside face, a track on the inside face of the frame extending obliquely the full length of said rectangular opening and by-passing and extending beyond the pivotal connection of said swinging arm to said inside face of said fixture, said tubular fixture being mounted in both sides of the frame, one side of the frame being provided with a swinging notched lever pivotally mounted at the upper end of said fixture, and being positioned between the fixture and the sash, said sash having roller guide means to engage said notched lever in order to locate the sash in a desired swinging position.

7. In a window construction, having a frame and a completely reversible sash received therein, said sash having track engaging means at opposite sides of one end; in combination therewith a tubular metal fixture of rectangular cross section, the inside of said section being attached to

the frame, the outside of said section having means for connection to the sash, said fixture being positioned between the frame and the sash, said means for connection to the sash consisting of a swinging arm pivotally connected to the exact middle of the outside face of said sash and to the end of the opposite inside face of the fixture and having a track located in the corresponding inside opposite face of said fixture and extending substantially the full length thereof and up to and slightly beyond and alongside of the pivotal connection of said arm to said inside face of the fixture, said arm having a length between pivotal connections slightly less than the equal distance from the pivotal connection of the arm on the sash to the end of the sash, said tubular fixture being mounted in both sides of the frame, one side of the frame being provided with a swinging notched lever pivotally mounted at the upper end of said fixture, and being positioned between the fixture and the sash, said sash having roller guide means to engage said notched lever in order to locate the sash in a desired swinging position.

8. In a rectangular frame having a rectangular pocket and also having a rectangular opening, said pocket being inside of and slightly wider, deeper and longer than said opening, and a completely reversible swinging sliding sash received in said pocket having opposite riders at the ends of the vertical outside faces of said sash; in combination therewith a tubular metal fixture of rectangular cross section, the inside of said section being attached to the frame, the outside of said section having means for connection to the sash, said fixture being positioned between the frame and the sash, said means for connection to the sash consisting of a track and a swinging arm pivotally connected to the inner end of the opposite inside face of said fixture, said pivotal connection being placed alongside of and spaced from said track and out of alignment with said track and said arm being also pivotally connected to the center of the outside vertical face of said sash, said tubular fixture being mounted in both sides of the frame, one side of the frame being provided with a swinging notched lever pivotally mounted at the upper end of said fixture, and being positioned between the fixture and the sash, said sash having roller guide means to engage said notched lever in order to locate the sash in a desired swinging position.

9. A window frame having a completely reversible swinging sash; in combination therewith a tubular metal fixture of rectangular cross section, the inside of said section being attached to the frame, the outside of said section having means for connection to the sash, said fixture being positioned between the frame and a sash, said means for connection to the sash consisting of a swinging arm extending between the vertical sides of said frame and said sash, said arm being pivotally connected at its fixture end to the upper end of the inside vertical side of the fixture and at its sash end to the center of the corresponding opposite outside vertical side of the sash, said fixture including track means extending along the inside vertical side of the frame to guide the sash, said track means extending to, alongside of and slightly beyond the pivotal connection of the arm to the fixture, said tubular fixture being mounted in both sides of the frame, one side of the frame being provided with a swinging notched lever pivotally mounted at the upper end of said fixture, and being positioned between the fixture and the sash, said sash having roller guide means to engage said notched lever in order to locate the sash in a desired swinging position.

10. In a completely reversible swinging window construction of the type having a frame and a completely reversible swinging sash which revolves on a horizontal axis and one end of which is always attached to and slides in the sides of the frame, a hardware attachment to be positioned between the sides of the sash and the sides of the frame comprising a vertical channel of rectangular cross section having a guide slot extending from adjacent the upper end to adjacent the lower end of the channel on the side of the channel adjacent and alongside the sash, an arm to be pivotally connected centrally to the adjacent side of the sash at one end and to the slotted side of the channel at the other end, said attachment being mounted upon the side of the frame between the frame and the sash and a latching lever pivotally mounted on one side of the attachment and said sash having an engagement roller sliding in said slot and engaging said latching lever.

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