June 21, 1949. E. H. McCLINTOCK 2,473,657

WINDOW FRAME AND SASH

Filed March 9, 1945 4 Sheets-Sheet 1

Fig. 1

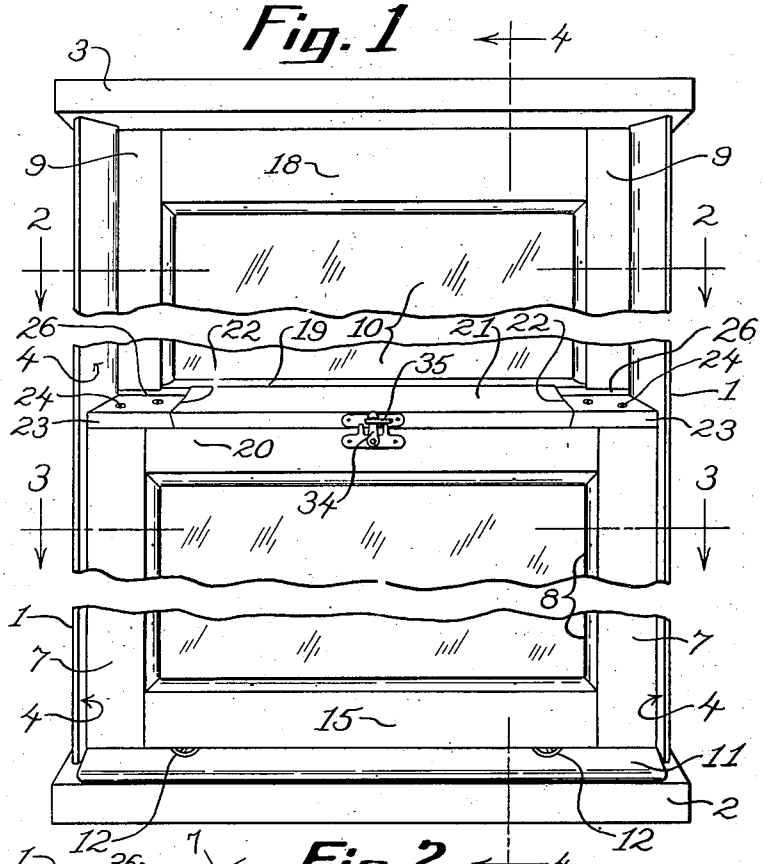


Fig. 2

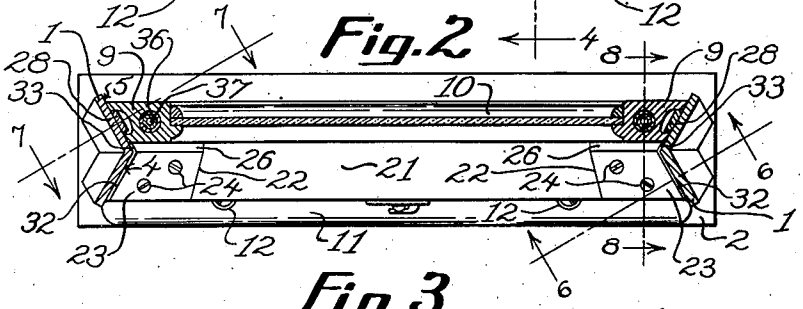
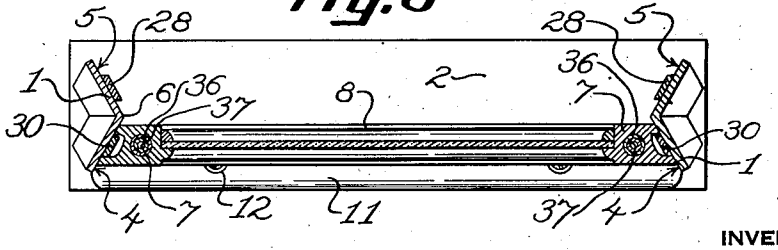


Fig. 3



INVENTOR
EDWARD H. McCLINTOCK
BY Chapin & Neal
ATTORNEYS

June 21, 1949. E. H. McCLINTOCK 2,473,657

WINDOW FRAME AND SASH

Filed March 9, 1945 4 Sheets-Sheet 2

Fig. 4

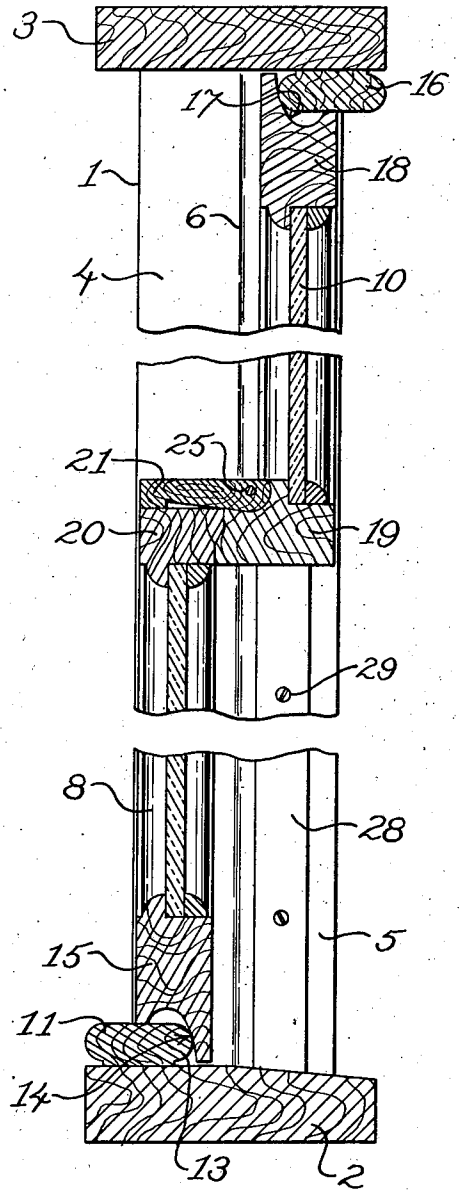


Fig. 5

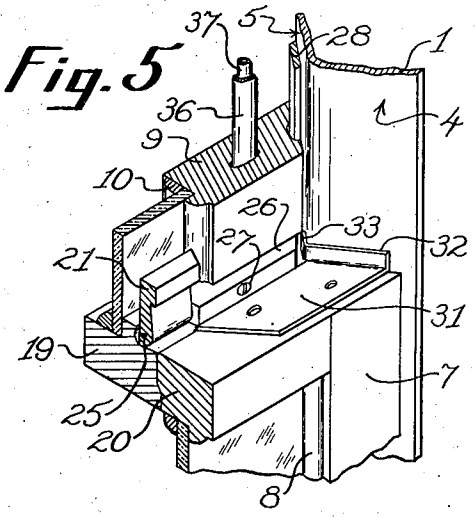


Fig. 6

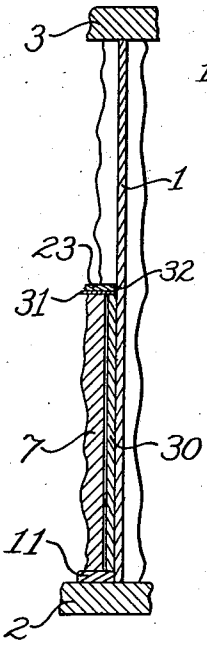
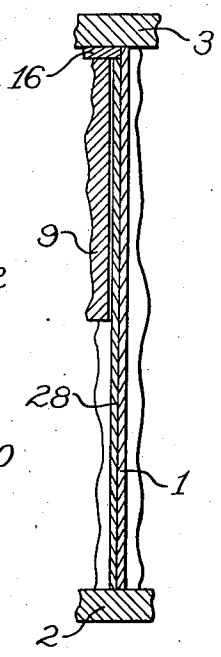


Fig. 7



INVENTOR
EDWARD H. McCLINTOCK
BY Chapin & Neal
ATTORNEYS

June 21, 1949. E. H. McCLINTOCK 2,473,657

WINDOW FRAME AND SASH

Filed March 9, 1945 4 Sheets-Sheet 3

Fig. 10

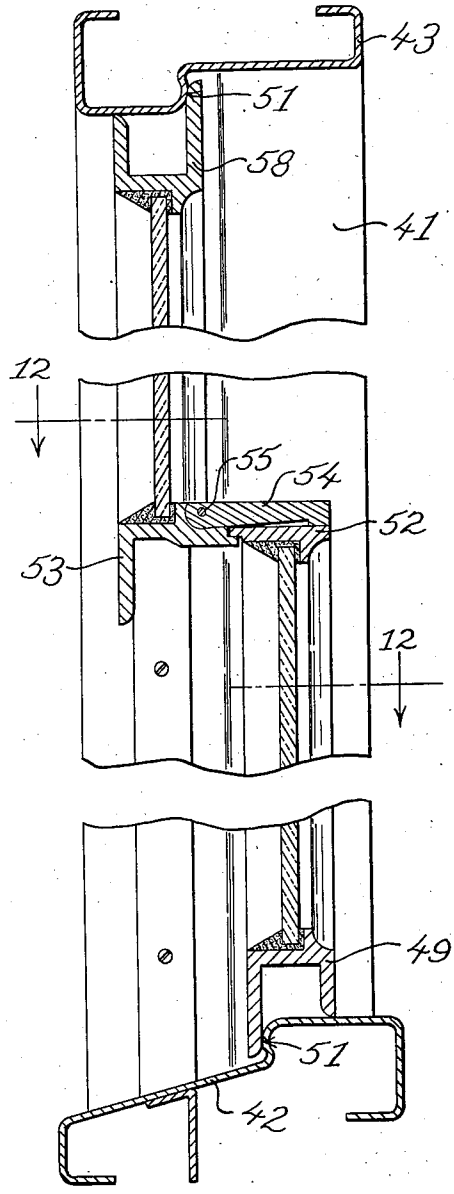
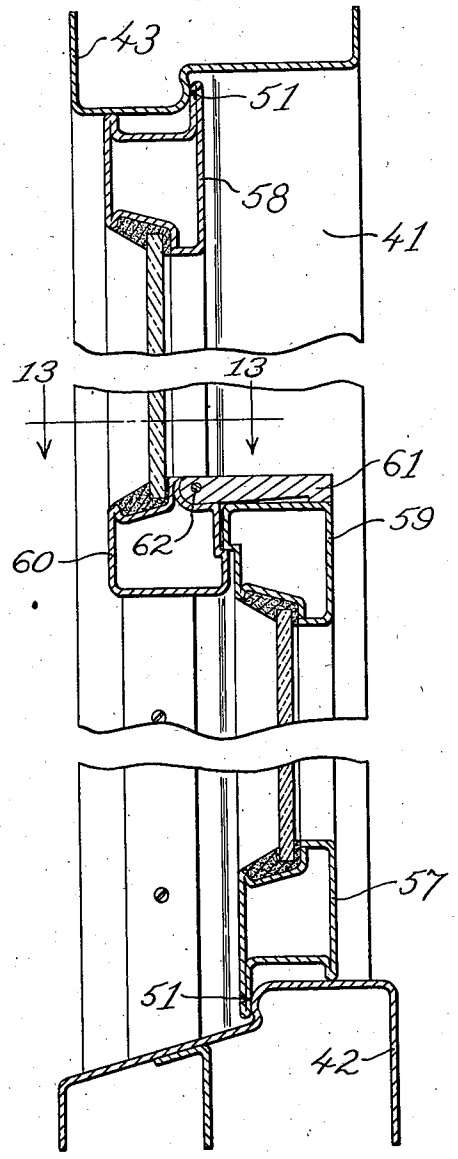


Fig. 11



INVENTOR
EDWARD H. McCLINTOCK
BY Chapin & Neal
ATTORNEYS

June 21, 1949. E. H. McCLINTOCK 2,473,657

WINDOW FRAME AND SASH

Filed March 9, 1945 4 Sheets-Sheet 4

Fig. 8

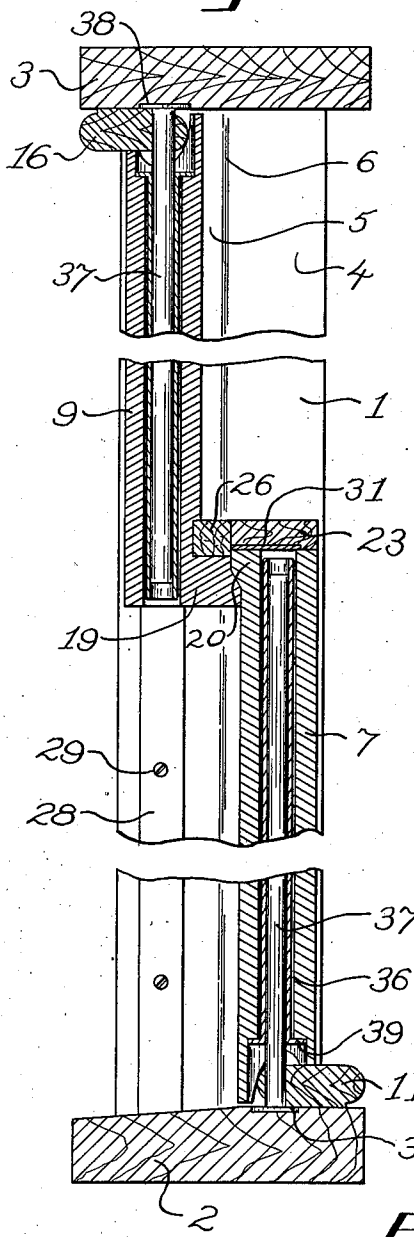


Fig. 12

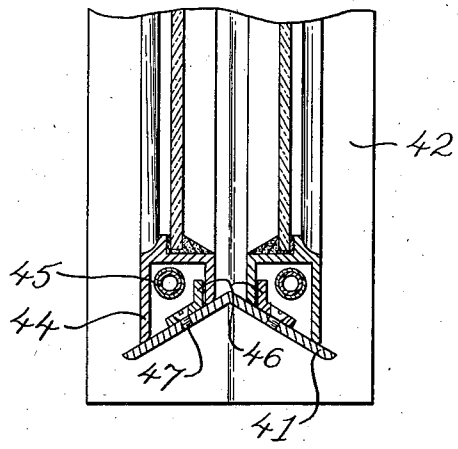


Fig. 13

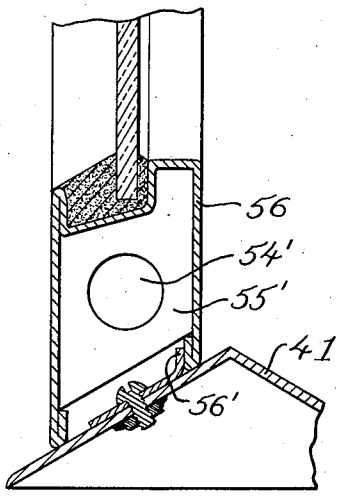
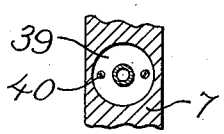


Fig. 9



INVENTOR
EDWARD H. McCLINTOCK
BY Chapin & Neal
ATTORNEYS

Patented June 21, 1949 2,473,657

UNITED STATES PATENT OFFICE

2,473,657

WINDOW FRAME AND SASH

Edward H. McClintock, West Springfield, Mass.

Application March 9, 1945, Serial No. 581,763

3 Claims. (Cl. 189—72)

1

This invention relates to improvements in window frames and sliding sash therefor.

The invention is an improvement on that disclosed in my prior U. S. Patent No. 2,010,550, granted August 6, 1935.

In accordance with the principle of my prior patent, the stiles or sides of the window frame are formed with two sets of oppositely diverging surfaces, one set for the upper and one set for the lower sash, and each sash is shaped to fit like a wedge in its set of surfaces. The arrangement is such that when the sash are closed and locked, they are wedged into the frame to provide a very effective seal closure. The arrangement is also such that, when the sash are unlocked, a slight lateral push will release them from wedging contact with the frame and enable them to slide freely.

In general, the invention seeks to improve the appearance of the sash and frame and make them easier to clean. It is desired to avoid the use of cords, chains, ribbons or other type of balance for the lower sash, which would be visible when such sash is closed; the usual parting bead on the stiles of the frame; projections above the meeting rails of the sash; and the usual side stops which are visible and bear against the exterior surfaces of the sash.

This invention has for an object to provide stops on the stiles of the frame, which stops retain the sash in the frame and which cooperate with grooves in those faces of the side rails of the sash that slide on the stiles, the arrangement being characterized in that the stops for the lower sash extend upwardly from the stool of the frame no more than half way to the head so as to be entirely concealed when the lower sash is closed.

The invention has for another object the provision of two thin hook-like members on the meeting rail of the lower sash, for engaging those surfaces of the stiles on which the upper sash slides, whereby to hold the upper portion of the lower sash from excessive movement away from its bearing on the frame when the sash is in its raised position and the above-named stops are effective only to hold the lower portion of lower sash.

The invention has for another object the provision of an improved means for drawing the sash together at their meeting rails, the arrangement being characterized in that the upper surfaces of said means and the upper surfaces of the meeting rails present one smooth, flat and substantially unbroken surface when the sash are closed and locked and in that the sash lock does not project above the meeting rails. This arrangement further provides weathertight meeting rails.

The invention also has for an object the provision of sash balance means which are completely concealed when the sash are closed.

2

The invention will be disclosed with reference to the accompanying drawings, in which:

Fig. 1 is a perspective view of a window frame and sash embodying my invention;

Figs. 2 and 3 are sectional plan views taken on the lines 2—2 and 3—3, respectively, of Fig. 1;

Fig. 4 is a sectional elevational view taken on the line 4—4 of Fig. 1;

Fig. 5 is a fragmentary perspective view showing one of the guides used at the upper corners of the inner sash;

Figs. 6, 7 and 8 are sectional elevational views taken on the lines 6—6, 7—7, and 8—8, respectively of Fig. 2;

Fig. 9 is a detail view showing the means for fastening one of the sash balance tubes;

Figs. 10 and 11 are sectional elevational views respectively illustrating extruded-metal and sheet-metal sash embodying the invention;

Fig. 12 is a sectional plan view taken on the line 12—12 of Fig. 10; and

Fig. 13 is a sectional plan view taken on the line 13—13 of Fig. 11.

Referring to these drawings; the window frame includes two stiles 1, a connecting stool 2 and a head 3. These parts are fastened together in any suitable way. They may be made of any suitable material such as wood, plastic or metal. The inner part of each stile, or side member, consists of two plane, surfaces 4 and 5, one on each side of the median vertical plane of the stile. These surfaces are arranged at some suitable angle, greater than 90° (as herein shown 120°) to said median plane and the two surfaces, as shown, intersect in a corner 6, which is located in said median plane. The surfaces 4 of the two stiles, which are slidably engaged by the side rails 7 of the lower sash 8, diverge outwardly from said plane. The surfaces 5, which are slidably engaged by the side rails 9 of the upper sash 10, also diverge outwardly from said plane.

Each sash, when moved inwardly toward said plane, will become engaged wedge-like with its pair of stile surfaces and the sash will be seated tightly in the frame. Each sash, when moved outwardly slightly, will be freed from the aforesaid engagement so that it will slide freely on the frame. The sash are moved inwardly at top and bottom in the same general manner as in my prior patent and by the following means. The inner edge of the bottom stop 11, which is secured, as by screws 12 (Fig. 1), to the stool 2, is rounded as at 13 (Fig. 4) to engage a cam surface 14 on the lower rail 15 of the lower sash 8. The upper stop 16 is similarly formed to cooperate with a cam surface 17 on the upper rail 18 of the upper sash 10. When the lower

sash is moved downwardly the surface 14 will engage surface 13 and force the lower part of the lower sash toward the corners 6 of the stiles and into the position shown, in which the sash is wedged tightly in place and into sealed engagement with its stiles. Similarly, when the upper sash is pushed upwardly, its upper portion will be thrust toward the corners of the stiles by the action of cam 17 on the inner rounded edge of the upper stop 16 and wedged into place with a tightly sealed engagement with its stiles. The sash are sealed at the top and bottom of the frame by the tight engagement of the cams 14 and 17 with the lower and upper stops 11 and 16, respectively.

To complete the sealing of the sash, they must be drawn together at their meeting rails. The lower rail 19 of the upper sash and the upper rail 20 of the lower sash will be made to interfit in the usual manner and as indicated in Fig. 4. These rails will be drawn together by means which constitute an improvement on my prior patent. This means comprises a plate 21 hinged at its inner end to the rail 19 of the upper sash and having diverging ends 22 to engage complementary-formed ends one on each of two end plates 23, suitably secured, as by the screws 24, to the top of rail 20. The pivot rod 25 for plate 21 passes entirely through the plate and beyond its ends and the projecting ends of the rod are rotatably mounted one in each of two blocks 26, each suitably secured, as by a screw 27 (Fig. 5) to the rail 19. In Fig. 5, the end plate 23 has been removed to reveal an underlying part later to be described. When the plate 21 is swung downwardly into the space between the two end plates 23, its ends 22 will engage the complementary-formed ends of the plates 23 and draw the rails 19 and 20 together. The arrangement is such that the upper surface of the meeting rails is flat, smooth and unbroken with no projections whatever above it. The plates 21 and 23 are flush with the upper inner surface of rail 19. The hinge structure is such as to leave no cracks or crevices, when plate 21 is in its closed position, thus providing a weather-tight construction at the meeting rails.

To hold the sash against undue displacement away from their bearings on the frame, side stops are provided. These stops, however, are not arranged outside the sash in the usual manner. The stops for the upper sash are shown at 28. They are suitably secured, as by screws 29 (Fig. 4), to and about midway of, the surfaces 5 of the stiles. These stops are received, one in each, in grooves formed one in each of the side rails 9 of the upper sash. The stops for the lower sash are shown at 30. There is sufficient clearance between each stop and the groove in which it slides, to enable the sash to move laterally to a sufficient extent to secure the free sliding or the tight sealing functions, above described. The stops 30 are mounted similarly to the stops 28 and engage in grooves in the side rails 7 of the lower sash but they do not extend above the top rail 20 of the lower sash, when the latter is in its lowermost position. Thus, the portions of the stiles 1 which are normally exposed on the interior are smooth and unobstructed by stops, or anything else for that matter, and these portions are flat, smooth surfaces which may easily be cleaned or dusted.

Since the stops 30 do not extend above the meeting rails of the sash, it is desirable to provide a supplementary means to hold the lower sash in position, when it is raised and when only the lower portion of its side rails are engaged with the stops 30. For this purpose, a metal plate 31 (best shown in Fig. 5) is placed in under each end plate 23 and clamped between such end plate and rail 20 by the two screws 24, which hold the end plate to the rail. Each plate has an upturned flange 32 which rides on the adjacent surface 4 and an extension 33 which engages the surface 5. The flange 32 gives a bearing on the surface 4 and the extension 33 acts like a hook to limit the inward lateral movement of the sash. In Fig. 5, the plate 23 is removed to enable the plate 31 to be clearly seen.

In the event that it is desired to conceal the side stops of the upper sash, when the latter is in raised position, plates similar to 30, may be fixed to the under side of the lower rail of the upper sash, these plates having hook-like parts, similar to 33, to engage the surfaces 4.

In order to hold the plate 21 in the position shown, any suitable form of latch may be used. It can be small because it is subject to no substantial stress. It should not project above the meeting rails of the sash and it should preferably be thin and flat so as not to offer any substantial obstruction to dusting. Such a latch is shown at 34, pivoted to rail 20, and engaging a catch 35 on a side edge of plate 21. No parts of this fastening device project above the meeting rails.

With the sash described, any suitable form of sash balance may be provided. Telescoping tubes 36 and 37 (Fig. 8) are shown as indicating in part such a sash balance. The details of the sash balance are not important to the present invention and are not shown. Insofar as this invention is concerned, the only important thing is the location of the sash balances inconspicuously and so that they do not interfere with cleaning or dusting. Thus, the tubes are mounted in vertical holes in the side rails of the sash. One tube, as 37, of each telescoping pair is fixed to the stool 2, in the case of the lower sash, as by clamping a base flange 38 between the stop 11 and stool 2, while the other tube, as 36, has a base flange 39 which is secured to the sash as by screws 40 (Fig. 9). The inner tubes 37 of the sash balances for the upper sash have their end flanges 38 clamped between the upper stop 16 and the head 3 of the window frame. The outer tubes 36 have their end flanges 39 fastened to the upper sash in the same way as described in connection with the lower sash. When the sash are closed, all parts of the sash balances are completely concealed. They show only when the sash are opened. The arrangement does away with the use of cords, chains or ribbons which usually show above the lower sash and which are dust catchers and hard to clean.

In Fig. 10, the invention is shown as adapted for sash of extruded metal. In this case, the frame is composed of angle-iron stiles or sides 41 suitably secured to a sheet metal stool 42 and to a sheet metal head 43. The side rails 44 of each sash are channel shaped in cross section (Fig. 12) with one leg longer than the other so as to adapt the rail for sliding on the inclined surface of the stile. The sash balances may be located in the space within the channels as indicated at 45 in Fig. 12. The stops 46 are located within the channel-like rails and are suitably secured, as by screws 47, to the stiles. The lower rail 49 of the lower sash and the upper rail 50 of the upper sash are formed similarly to the side rails. The shorter leg of each horizontal rail seats on the stool 42 or head 43, as the case may be, while

the longer leg acts as a cam, cooperating with the rounded surface 51 provided on the stool or on the head, as the case may be. The meeting rails 52 and 53 are drawn together by a plate 54, pivoted at 55, to the upper sash and engaging the top rail of the lower sash in the same manner as heretofore described.

For sheet-metal sash, the arrangement shown in Fig. 11 may be used. The frame is the same and comprises the parts 41, 42 and 43. The side rails 56 of the sash are formed of sheet metal of channel-like cross section with one leg of the channel shorter than the other for the purpose above described. Side stops 56' are fixed as indicated in Fig. 13 to the stiles and are disposed in the space between the channels. The sides of the channels are interconnected at intervals by stiffening plates 55' which are provided with holes 54' to receive the sash balance tubes. The bottom rail 57 of the lower sash and the top rail 58 of the upper sash are of similar cross section and respectively cooperate with the stool 42 and head 43 in the same manner as described in connection with Fig. 10. The meeting rails 59 and 60 are drawn together by a plate 61, pivoted to the rail 60 at 62 in the same manner as described in the first form of the invention.

In all forms of the invention, it will be clear that the sash will operate, as in my prior patent, so as to become wedged into and tightly sealed in the frame, when the sash are closed and locked, and so as to slide freely in the frame when released, as by a slight lateral push, from their wedging engagement with the frame. Tight sealing of the sash without the use of weather-strips is thus secured and yet the sash can slide freely when required. The sash can move in or out by expansion and contraction and yet be able to slide freely when open and fit tightly in the frame when closed.

It will be noted that when the sash are closed, substantially all that is exposed of each stile is the upper half of the surface 4 and this is smooth, flat and unbroken and easy to clean. The appearance of the frame is unmarred by the usual sash cords, chains or ribbons and by the usual parting bead. So also, there are no side stops visible to mar the appearance of the frame and make it difficult to clean. The concealment of the sash balances materially aids in the improvement of the appearance of the frame. The meeting rails of the sash present one smooth, flat surface, unbroken by any sash lock and therefore easy to clean. The small latch and catch on the inner face of the top rail of the lower sash does not project above the top of the meeting rails and, being on a vertical surface, is not so likely to collect dust and dirt. It is contemplated that there need be no interior finish around the frame. That is, the plaster may be brought up to the inner edge of each stile 1 and made flush therewith, thereby eliminating still other surfaces that are dust catchers and require frequent cleaning. This arrangement is especially suitable for hospitals for example.

The invention thus provides a window frame which is of the general class of my patent, above identified, and which has been improved to eliminate unsightly and dirt-catching parts.

I claim:

1. In combination, a window frame having stool and head and stiles, the inner and confronting faces of the stiles being substantially in the

form of opposed and vertically-disposed wedges with the points of the wedges disposed in the median vertical plane of the frame, upper and lower sash slidably mounted one on the confronting wedge faces on one side of said plane and the other on the confronting wedge faces on the other side of said plane, and means for limiting the movement of the sash away from said plane, said means including two members secured one to each end of a horizontal rail of one of said sash and extending across said plane and in outwardly diverging relation to slidably engage one with each of the confronting wedge faces on which the other sash is slidably mounted.

2. In combination, a window frame having stiles and interconnecting horizontal end members, each stile having two angularly-disposed plane vertical surfaces located one on each side of a median vertical plane of the frame, each pair of confronting surfaces of the stiles diverging outwardly away from said plane, upper and lower sash slidably engaged with one and one with the other of said pairs of surfaces, the outer edges of the side rails of each sash being shaped to fit and engage with one pair of said confronting surfaces and provided with grooves one in each said edge, stops secured one to each said surface and engaged one in each said groove, the stops for one of said sash extending from the end member which such sash engages when closed toward the meeting rail of such sash a distance not greater than the height of such sash and members fixed one to each end of the meeting rail of such sash and extending across said median plane and slidably engaged with the surfaces on which the other sash slides.

3. In combination, a window frame having a stool and head and interconnecting stiles, each stile having two angularly-disposed plane vertical surfaces located one on each side of a median vertical plane of the frame, each pair of confronting surfaces of the stiles diverging outwardly away from said plane, upper and lower sash slidably engaged one with one and one with the other of said pairs of surfaces, the outer edges of the side rails of each sash being shaped to fit and engage with one pair of said confronting surfaces and provided with grooves one in each said edge, stops secured one to each said surface and engaged one in each said groove, the stops for the lower sash extending upwardly from the stool toward the meeting rail by a distance not greater than the height of the lower sash, and two members secured one near each upper corner of the lower sash and having parts extending laterally across said plane and arranged in outwardly diverging relation and slidably engaged one with each of the confronting surfaces on which the upper sash is slidably mounted.

EDWARD H. McCLINTOCK.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
675,165	Pubanz	May 28, 1901
1,224,626	Flagg	May 1, 1917
1,911,292	Reynolds	May 30, 1933
2,010,550	McClintock	Aug. 6, 1935
2,217,543	Gaines	Oct. 8, 1940