Jan. 6, 1953

R. E. CHEESMAN

2,624,082

WINDOW

Filed Nov. 20, 1947

3 Sheets-Sheet 1

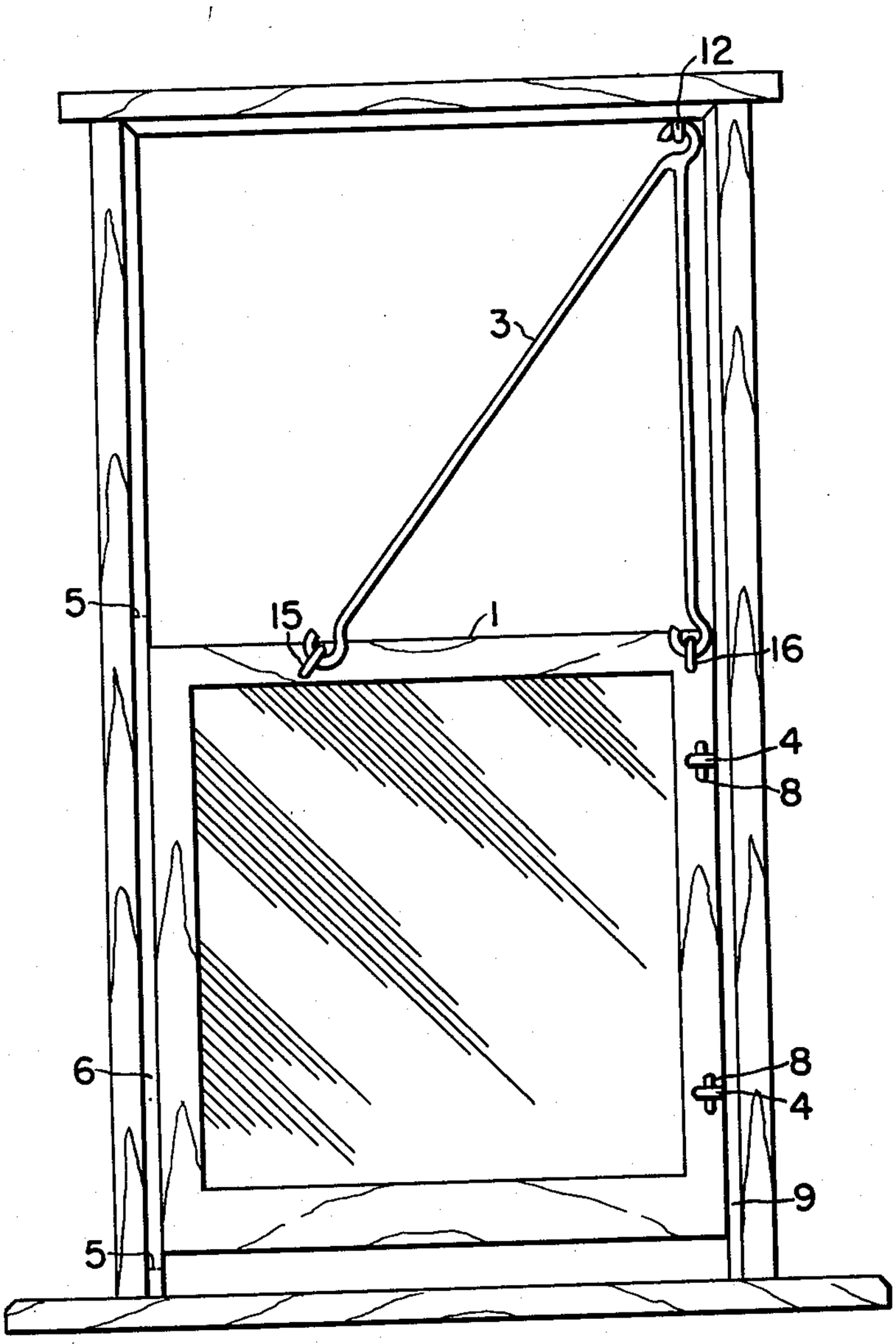

Fig. 1.

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3 Sheets-Sheet 2

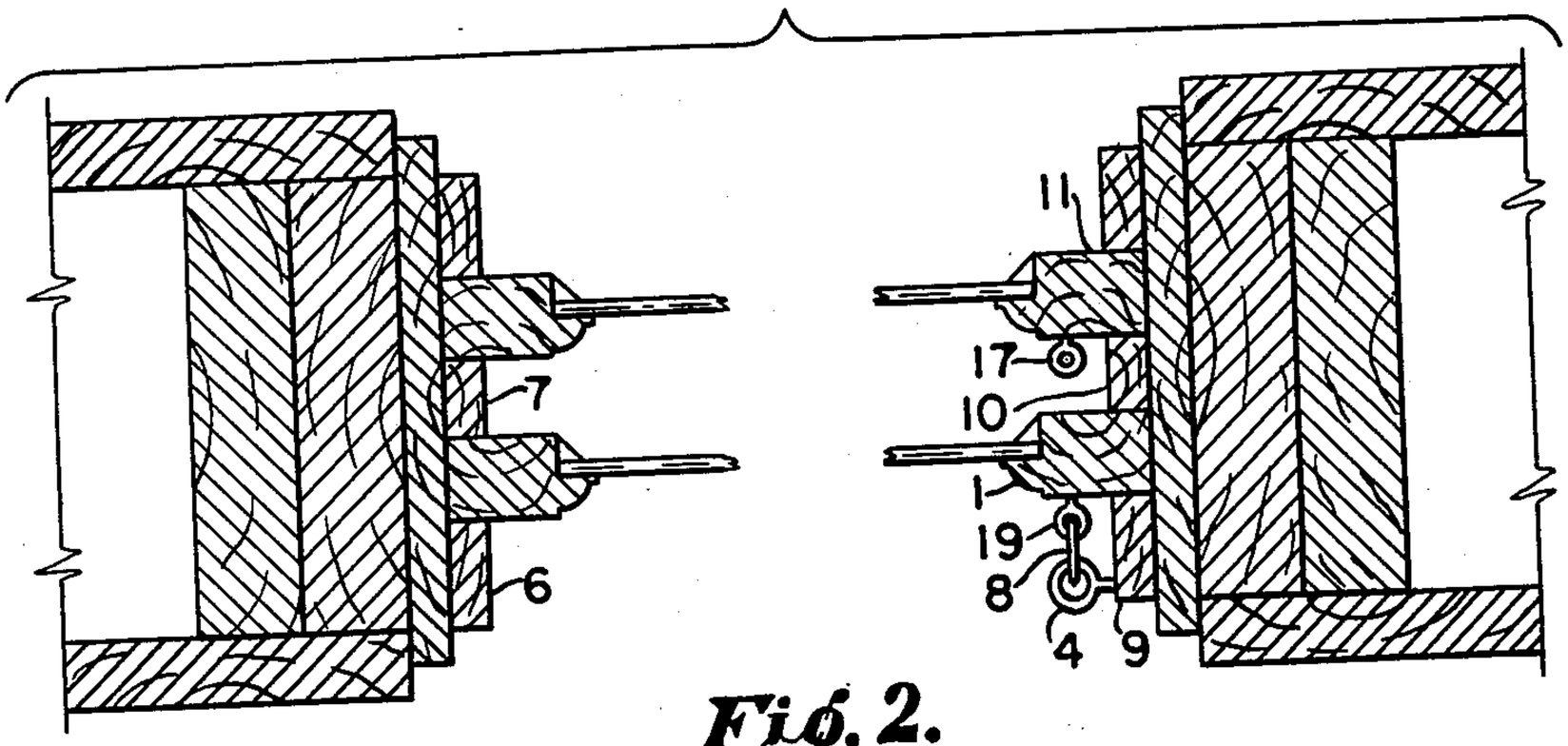

Fig. 2.

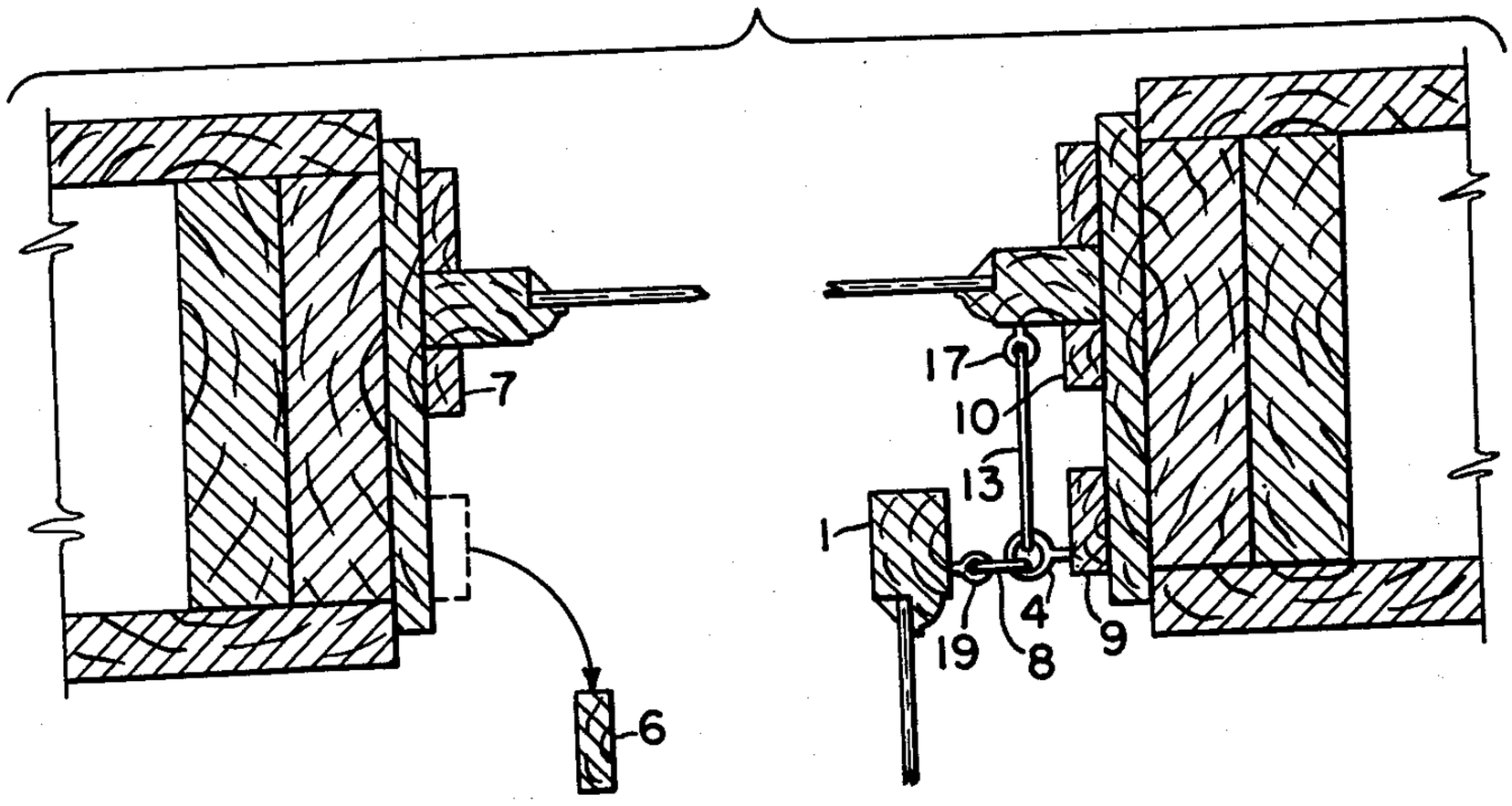

Fig. 3.

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3 Sheets-Sheet 3

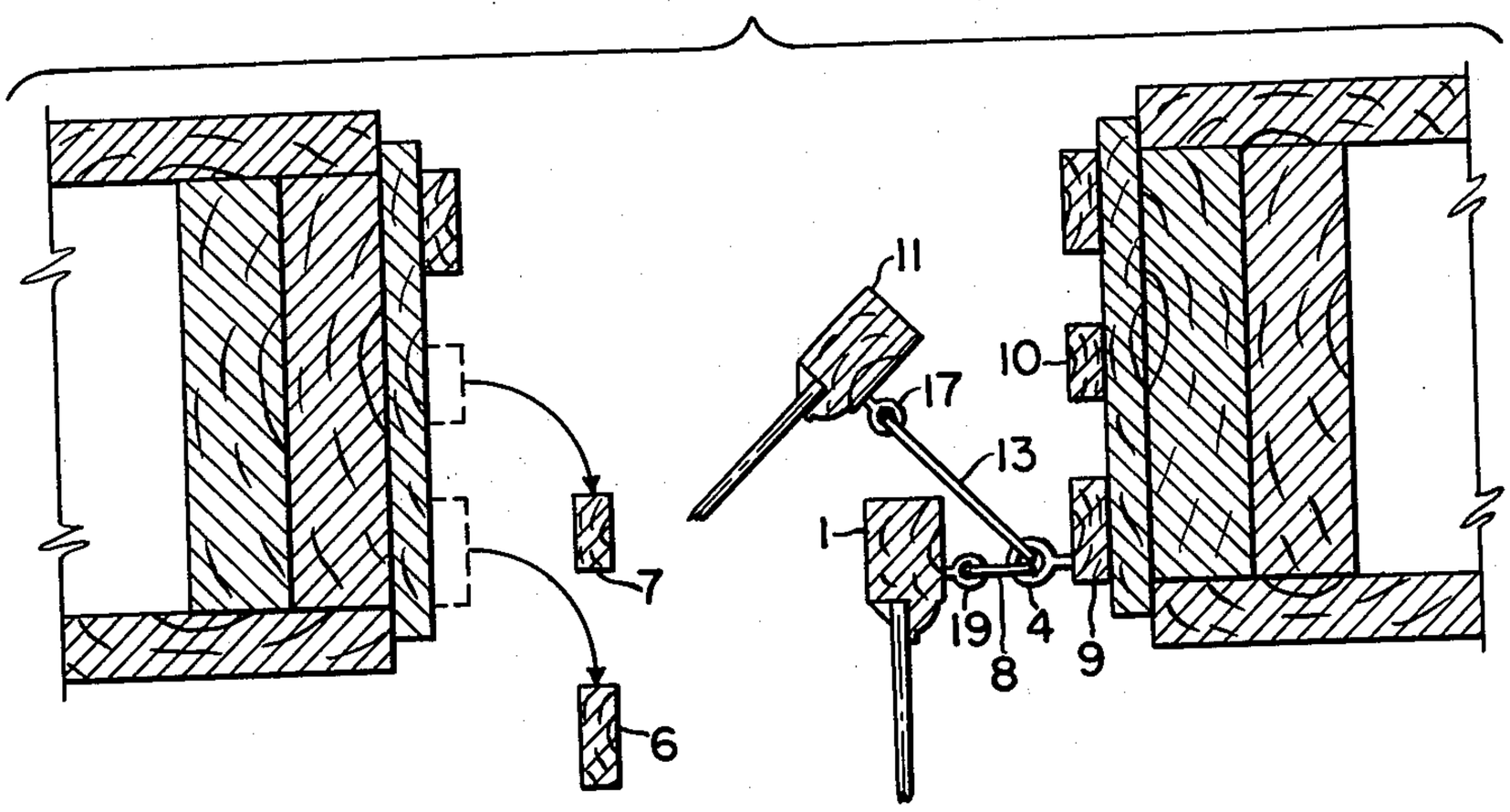

Fig. 4.

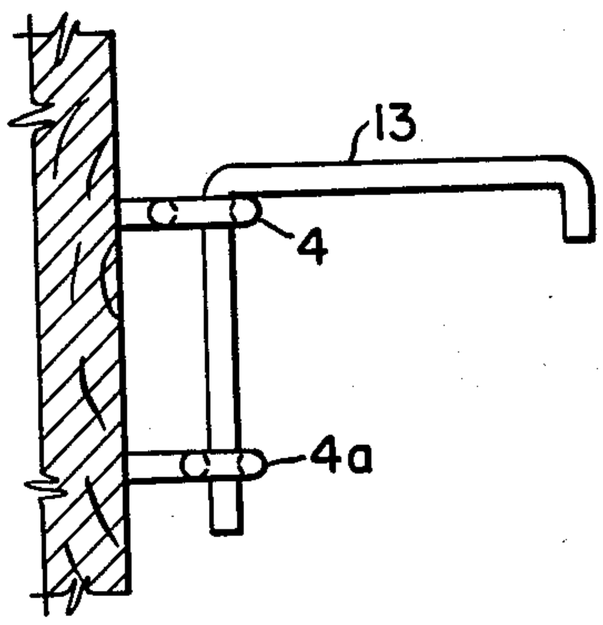

Fig. 5.

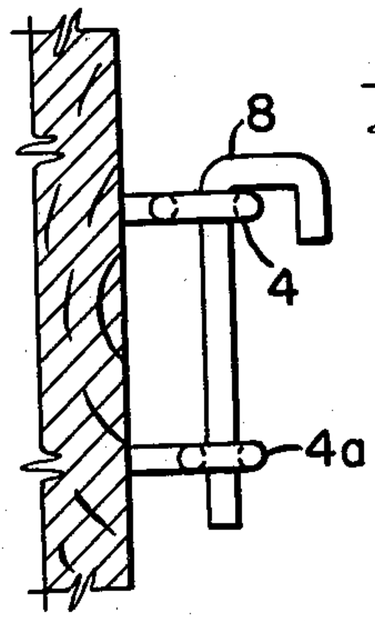

Fig. 8.

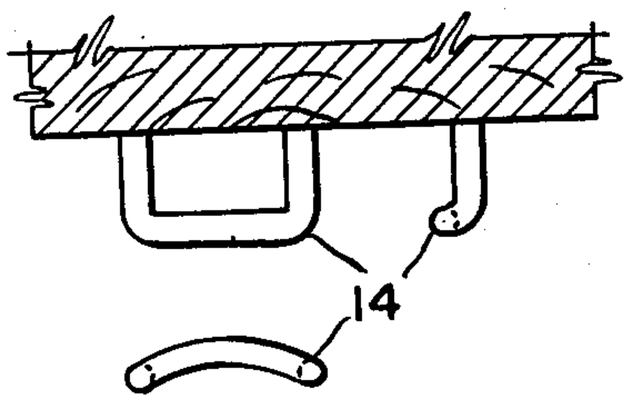

Fig. 6.

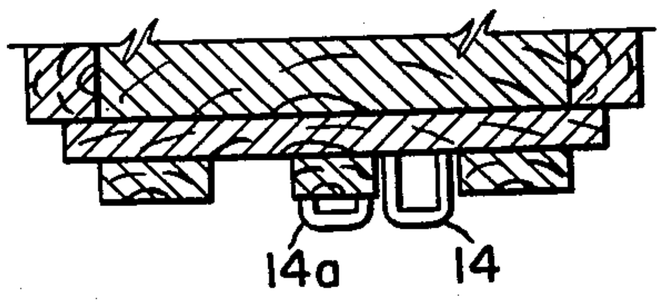

Fig. 7.

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UNITED STATES PATENT OFFICE

2,624,082

WINDOW

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Application November 20, 1947, Serial No. 787,065

3 Claims. (Cl. 20—42)

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This invention relates to a window of the sliding sash type which is constructed so as to swing on axes parallel with the direction of sliding. It also relates to means for converting a conventionally made sliding frame window into one which may be made to swing.

Among the objects of the invention is to provide an improved sliding and swinging sash window having a maximum of the desired features of such windows at a minimum of cost and unsightliness.

Another object of the invention is to provide a window closure which may be adapted to a conventional double sash window whereby the window sashes may be simply and easily opened by swinging into the room for such purposes as cleaning, repairing and the like.

Still another object of this invention is to provide means whereby a conventional window of the sliding sash type may be converted into a sliding and swinging sash window by simple and easy attachments and modifications.

It has been suggested to provide sliding sash windows with various devices designed to enable them to swing inwardly. These prior devices include sliding hinges, independently hinged secondary sashes within the main sashes and removable hinge members which leave unsightly adapting members upon the sash and frame. Heretofore, difficulties have been encountered in having both windows open at the same time, in double sash windows, or in opening the upper window without complex and expensive attachments. It has been difficult to construct such windows so they would be weather tight when closed, due to the inherent nature of their construction.

For the most part the disavantages found in prior windows of this type have been due to the fact that they have been designed so that the hinges bear the weight of the window while swinging open, and therefore were subject to large stresses. This necessitated large and heavy hinge members and extreme accuracy in fabrication in order that the window, after swinging, be guided properly back into the sliding position. Even with adequate strength and precision, the sides of the sash and frame of the conventional window will not stand the prolonged stresses, and will become lop-sided or develop looseness after continued use.

For the foregoing reasons, although having the great potential and theoretical advantages known in the art, windows of the sliding swinging type have proven quite expensive to manufacture and install, and difficult to keep in smooth working order after installation.

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I have discovered a principle of window closure of the removable hinge type which is simple and smooth in operation, and at the same time neat in appearance. In general my window sash is supported from above by a main supporting hinge-like bracket which is detachable, and provided at the side along the axis of rotation with detachable connecting members or links. One end of each link is hingedly attachable to the window sash by means such as an eye screw and at the other end to the window frame by similar means. They act as double hinges when so attached, incapable of appreciable vertical motion, but free to swing horizontally.

In operation, the weight of the window sash is suported from above practically wholly by the bracket. The sash is merely guided in its swinging motion by the members situated along its vertical axis of rotation.

Further details of my invention may be seen from the accompanying drawings.

Figure 1 illustrates a front view of a window, which for simplicity shows but one sash, fitted in accordance with the invention.

Figure 2 shows in broken section a double sash window in closed position, illustrating the position of the guiding double hinge member for the inner sash.

Figure 3 shows, in broken section a double sash window illustrating the position of the inner sash when swung open, and the position of the guiding double hinge for the outer sash.

Figure 4 shows, in broken section a double sash window illustrating the position of the sashes and guiding double hinges when both windows are swung open.

Figures 5, 6, 7 and 8 illustrate in detail the functional parts of the invention and variations thereof.

Referring specifically to Figure 1, the sliding sash **1** is fitted with hinge members **8** and supporting hinged bracket **2, 3.** This bracket may be one piece provided at the apex with an open link to be attached to the window frame by hooking into a member which may be a simple eye screw **12**, but is preferably a curved staple having a slightly curved bar. Such a member is illustrated by **14** in Figure 6. The short leg **2** of the bracket is attached to the sash by hooking into member **16** which may be a simple eye screw fixed rigidly to the sash at a point approximately directly below **12**. The longer leg **3** of the bracket is attached to the sash by hooking into member **15** which may likewise be a simple eye screw fixed rigidly to the sash at a point beyond a vertical projection of the center of gravity of the sash.

The lengths of the individual legs of the bracket 2, 3 are correlated with the position of members 15 and 16 as shown in the drawing, and so proportioned as to swing the sash a short distance above the sill. In order to allow the sash to swing, outside stop 6 is rendered removable in known manner, such as cutting at 5 and fitting with wood screws or snap-in fittings. The axis of swing of the sash is partially determined by eye 4 which may also be an eye screw fixed rigidly to the window frame at points adjacent the sash when in closed position. Similar eyes 19 are fixed rigidly to the sash. Each single eye 4 fixed to the frame and corresponding eye 19 fixed to the sash constitute a pair of adjacently situated eyes which approach each other to the approximate point of touching when the window is slid into position for swinging. After attaching bracket 2, 3, these two eyes are then connected by hinge link 8 which is staple-like in shape. At least one leg of the staple is preferably long enough to pass through an additional eye fixed below either 4 or 19 to lend it lateral stability when in use, as illustrated by 4*a* in Figure 5.

The inner sash is swung open in the following manner. After raising it a sufficient distance above the sill for the sake of clearance, bracket 2, 3 is attached by hooking into 12, 15 and 16 respectively. Pairs of eyes 4 and 19, so attached as to be oppositely adjacent when the sash is in this position, are connected by hinge link members 8. Inside stop 6 is then removed, the window is swung open, revolving upon vertical axes through eyes 4 and 19. Before opening, the two sashes, outer and inner, are in the position illustrated in cross section in Figure 2. After opening they are in the position illustrated in cross section in Figure 3. For best results the pairs of members 4 and 19 are so fixed to the frame and sash, respectively as to allow a minimum space between the respective members.

After opening inner sash 1, outer sash 11 is then ready to be opened. This is done by first lowering the sash to the same level as the inner sash. A bracket support identical to 2, 3 is then hooked into a bracket staple 14*a* similar to 14, fixed to the upper portion of the frame at a point above the revolving axis of the outer sash, as shown in Figure 7. Both bracket supports, for the inner sash and for the outer sash, may be hooked in bracket staple 14, or separate bracket staples may be used as shown in Figure 7.

Referring again to Figure 3, connecting members or bars 13 are attached to connect eyes 4 and 17. Bar 13 has a function similar to link 8, that is of guiding out the sash as it is swung open and guiding it in as it is swung shut. This action is illustrated in the cross sectional view, Figure 4. Eyes 17 are so positioned relative to eyes 4 as to be opposite when the window sash 11 is ready to be swung open. It will be seen that eye 4 may serve for both link 8 and link 13, but if so, the eye should be a double eye or elliptical in shape. Alternately, separate eyes may be used to swing the outer sash in which case they would be fixed slightly back and higher in the frame to allow 13 to swing free of 4 and 8. In a manner similar to the variation in link 8 shown in Figure 8, link 13 may have at least one leg long enough to pass through another eye in order to lend it lateral stability when in use.

The outer sash is swung open by removing a suitable section of center stop 7, and the window then can revolve upon vertical axes through eyes 4 and 17. It will be noted that in both cases the window sashes have what might be termed a double axis of rotation, due to the pairs of eyes and the connecting links or bars which form a double hinge.

The materials from which the members of my window closure may be made varies over a wide range of materials. They are preferably made of metal, and for ease and economy of fabrication are of the general character of stiff wire. Due to the manner of suspension and swinging, they may be made very light in weight, since the supporting forces are principally tension. Although the hinge links are subjected to compressive forces, these are very slight, and the normal size and weight sash requires only reasonably stiff wire. Bracket staples 14 and 14*a* may be driven into the upper portion of the frame or may be fixed upon a small plate which is attached by screws.

The point of suspension of the top of the brackets, i. e., the position of the bracket staples, should be approximately above the axes of rotation of the sashes. Laterally, taking a point at the outer edge of the center stop of the upper frame, the staples may be placed at any point from there to and including the inside vertical edge of the window frame.

The long leg of the bracket must be attached at a point beyond the vertical projection of the center of gravity of the sash. The short leg should extend approximately vertically downward.

The bracket 2, 3, the bracket staples 14 or 14*a* and the bracket eyes are hereinafter referred to as the bracket assembly. The hinge-link assemblies consist of the two eyes, one in the sash and one in the frame, and the connecting link 8 or 13. These assemblies may be placed along the edge of the sash in any suitable manner and number. I prefer to use two for each sash positioned approximately as shown in Figure 1. However, in many cases three or four may be used as desired.

Contrary to the detachable hinge type swinging and sliding sash windows known heretofore, the window of my invention has a minimum of attachments placed permanently thereon. The eyes are small and neat in appearance, whereas the staples in the top of the frame are insignificant in appearance and practically unnoticeable.

In window sashes which employ the conventional sash cord, this may be handled in known manner while swinging open the sash. The cords on the hinged or rotating side may be left attached to assist in supporting the sash. The cords on the opposite or swinging side may be left attached or may be disengaged while swinging open the sash. If disengaged the knotted ends of the cords may be placed upon a conveniently placed hook for that purpose or may be allowed to ascend to the sash cord hole in the upper corner of the window frame.

While the invention has been described in connection and combination with the sashes, it is to be understood that it need not be in such combination, but is intended to include the combination of bracket assemblies alone. These assemblies may be used to convert an ordinary window into a swinging sliding sash type. Included also are the hinge-link assemblies which are used in cooperation with the bracket assemblies.

It is also to be understood that the invention is not to be limited to the specific embodiments disclosed herein. For example the eyes shown to be attached to the window, may themselves be

detachable. The bracket may be of flexible material like picture cord or the like, since it must possess only tensile properties. Other variations within the scope of the invention will be apparent to those skilled in the art.

Having described my invention, I claim:

1. A window comprising a frame, sliding sashes, means for solely and stably suspending the sashes, each from a point in the upper edge of the window frame substantially above it, removable stops, connection means on the sashes and corresponding connection means on the frame, and detachable open links connectig said connection means, thereby forming a double hinge.

2. A sliding and swinging sash window comprising a frame provided with at least two guideways for sliding sashes, a lower sash and an upper sash, detachable inner and intermediate stops, suspension means for supporting the sashes in a lowered position, said suspension means attached to the upper edge of the frame to permit horizontal rotation of the sashes, and means for guiding the sashes in and out of the guideways on the side opposite the removable stops, said guiding means comprising a detachable open link double hinge said suspension means constituting the sole substantial vertical support for the window when swung open.

3. In a window of the character described comprising a sliding and swinging sash having a swinging side and a hinged rotating side and

normally running in guideways provided at the swinging side of said sash, a frame having detachable inner and intermediate stops, the combination of a two-legged suspending bracket detachably mounted at the approximate upper extremity of the sash, the apex of said bracket detachably and rotatably mounted at the upper region of the window frame, said bracket constituting the sole substantial vertical support for the sash when swung open, with a hinge link detachably mounted at the rotating side of the sash.

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