

Oct. 26, 1937.

F. GELSTHARP

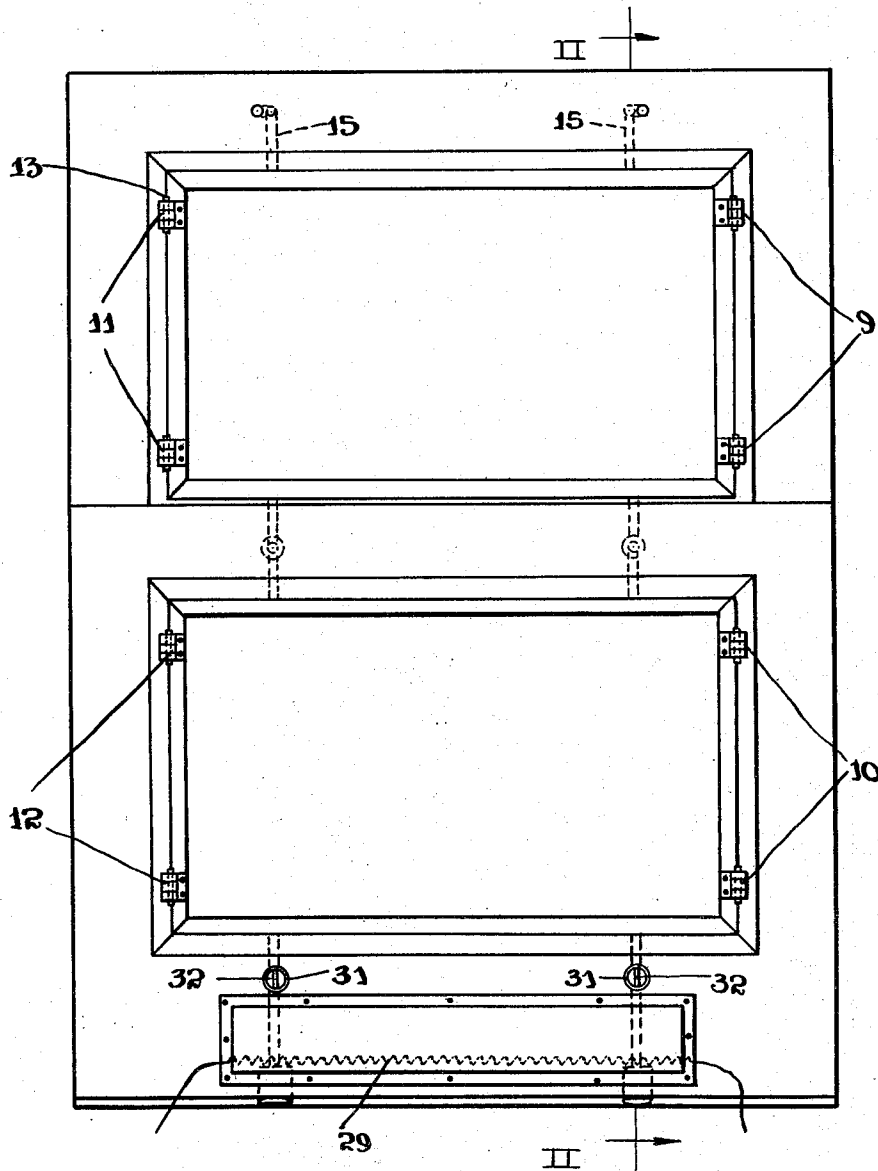
2,096,892

DOUBLE WINDOW CONSTRUCTION

Filed Nov. 22, 1935

2 Sheets-Sheet 1

Fig. 1



INVENTOR.
FREDERICK GELSTHARP

BY *Bradley & Bee*
ATTORNEYS.

Oct. 26, 1937.

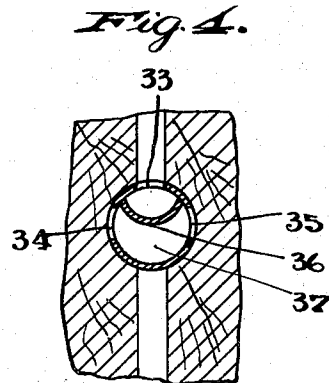
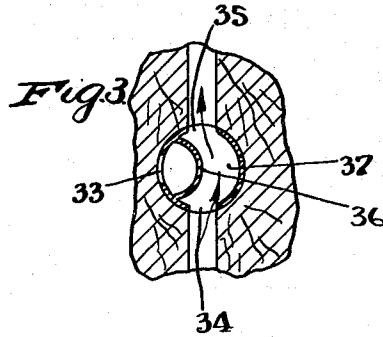
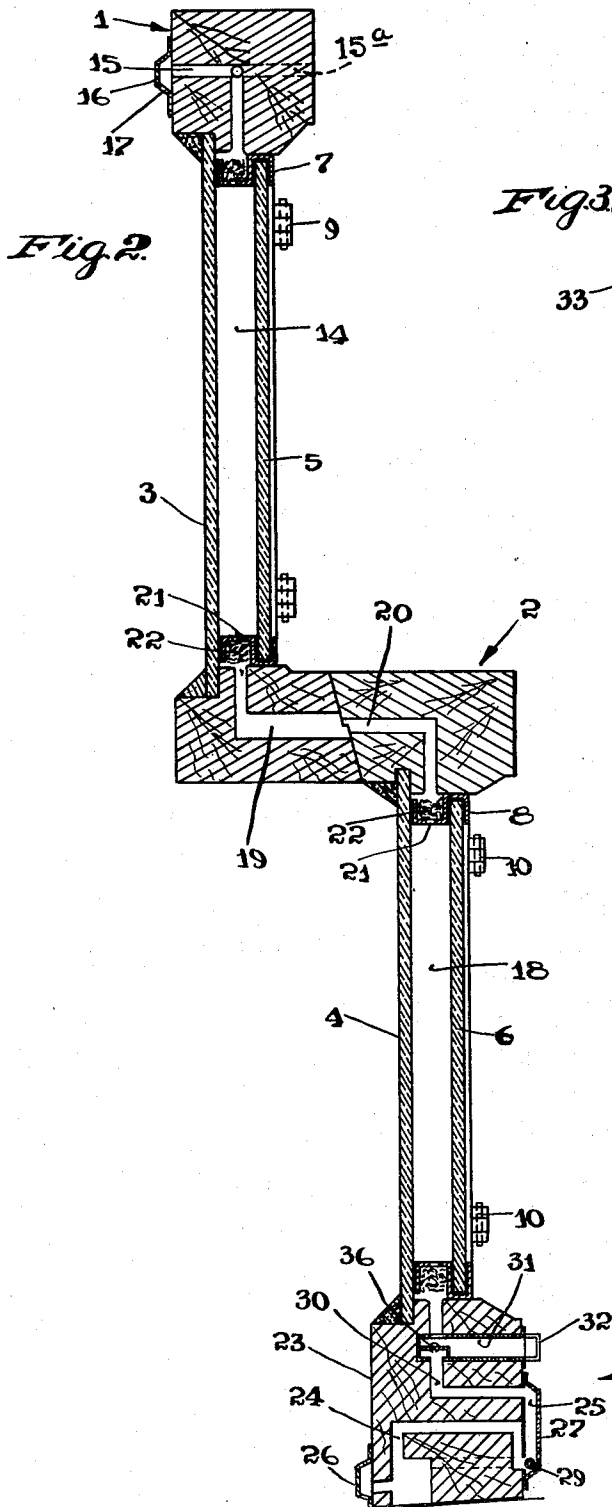
F. GELSTHARP

2,096,892

DOUBLE WINDOW CONSTRUCTION

Filed Nov. 22, 1935

2 Sheets-Sheet 2



INVENTOR.

FREDERICK GELSTHARP

BY

^Y *Bradley & Bee*
ATTORNEYS.

UNITED STATES PATENT OFFICE

2,096,892

DOUBLE WINDOW CONSTRUCTION

Frederick Gelstiharp, Tarentum, Pa., assignor to
Pittsburgh Plate Glass Company, Allegheny
County, Pa., a corporation of Pennsylvania

Application November 22, 1935, Serial No. 51,126

9 Claims. (Cl. 20—56.5)

The invention relates to a double window construction. Heretofore satisfactory double glazed units have required the use of special non-efflorescence glass (non-blooming) and hermetical sealing has been necessary to prevent moisture entering the space between the glass sheets and condensing on their inside surfaces when adverse temperature and humidity conditions exist. The object of the present invention is to provide a structure permitting the use of ordinary plate or window glass and one in which condensation is prevented on the inner faces of the glass sheets.

Briefly stated, these results are secured by providing an improved construction permitting ready access to the inner faces of the sheets for cleaning and providing for ventilation of the space between the sheets of such character that condensation is prevented. More particularly, means are provided for permitting ingress of air between the glass sheets either from the interior or exterior thereof depending on weather conditions. In cold weather, the admission of air to the insulating space will be from the outside, while in hot weather with a relatively lower temperature inside than outside (due to air conditioning), the admission of air to such space will be from the inside. One embodiment of the invention is illustrated in the accompanying drawings, wherein:

Figure 1 is a front elevation showing the invention as applied to ordinary wood sash. Fig. 2 is a section on the line II—II of Fig. 1. And Figs. 3 and 4 are enlarged sections through the control valve showing it in two different positions.

Referring to the drawings, 1 and 2 are the upper and lower sash of a window of ordinary sliding construction, the sash 1 being provided on its outer side with the glass sheet 3 set in putty in the usual way, and the sash 2 being provided on its outer side with a glass sheet 4 similarly mounted. The inner sheets 5 and 6 are mounted in metal frames 7 and 8 of approximately S-shape in cross section, as indicated in Fig. 2, one portion of which fits around the margin of the glass sheet, while the other portion lies between the glass sheets and acts as a spacer. The portion of the frame which surrounds the edge of the sheet is preferably lined with a thin layer of rubber and a similar layer of rubber is provided on the portion of the frame which contacts with the inner face of the glass sheet 4. The frames 7 and 8 are secured to the sash members by means of the pairs of hinges 9 and 10, so as to permit the sheets 5 and 6 to be swung to open position and give access to the inner faces of the sheets

for cleaning purposes. The other edges of the frames 7 and 8 are provided with latching members 11 and 12 which are similar to the hinges in construction, but are provided with the removable pins 13 for releasing the latches when it is desired to swing the inner sheets 5 and 6 to open position.

In order to provide for an inflow of air from the space 14 between the sheets 3 and 5, the set of passages 15 and 15a are formed in the upper rail of the sash, the outer ends of the passages 15 being preferably covered with storm protectors 16 having inlets at 17. Either one of these sets of passages may be dispensed with. Communication is provided between the space 14 and the space 18 between the sheets 4 and 6 by means of the passages 19 and 20 which register, as indicated in Fig. 2, when the sash are in closed position. The frame members 7 and 8 are perforated, as indicated at 21, to permit a flow of air across such members, and the spaces in the frames opposite these perforations are filled with felt 22 or similar material, which acts as a dust filter.

In order to provide for a flow of air to the lower edge of the space 18, suitable passages are provided in the lower rail 23 of the lower sash. There are two or more sets of these passages, as indicated in Fig. 1, the arrangement of each set being the same so that a description of one, as indicated in Fig. 2, will be sufficient. A passage 24 leads from the outer side of the sash to the space 25 on the inner side of the sash, the outer end of the passage being provided with a storm protector 26 similar to the protector 16 heretofore referred to. The chamber 25 has as its inner wall, the metal plate 27, and at the lower side of such chamber is an electric heating coil 29, the use of such heating coil being optional and not necessary to the successful operation of the ventilating construction. When this coil is used, it serves to heat the incoming air over from the exterior of the building so that such air is dried somewhat and the circulation of the system improved. The chamber 25 communicates with the lower edge of the space 18 through the passageway 30, in which is mounted a tubular control valve 31. This valve is open at its inner end and is provided with a handle 32 by means of which it may be turned. The inner end of the valve is provided with three ports 33, 34 35 and with a partition 36, the space inside the partition being cut off completely from the rest of the space inside the tubular valve.

When the valve is in the position shown in Figs. 2 and 4, the passage 30 is closed, but since

the port 33 registers with the upper portion of the passage 30, air may flow into the space 18 from the inside of the window through the hollow valve. The air thus admitted circulates upward through the space 18 and then through the passages 19 and 20 to the space 14, being discharged to the outside of the window through the passages 15. This adjustment for circulation will ordinarily be employed in hot weather when the temperature inside the house is lower than that outside, which condition is common when the atmosphere in the building is provided with a cooling system. This will prevent the deposit of any condensation on the inner sides of the sheets 5 and 6, such as might occur if the air between the glass sheets were supplied from the outside of the building and contained a large amount of moisture, the tendency under such conditions being to condense on the inner sides of the relatively cool sheets 5 and 6.

When it is desired to cut off the flow of air from the inside of the building to the space 18, the valves 31 are rotated through an angle of 90 degrees to the position shown in Fig. 3. This brings the pocket 37 in registration with the passage 30 by reason of the ports 34 and 35, so that air admitted from the outside of the building through the passage 24, the chamber 25, and the passage 30 may flow into the lower end of the space 18, while at the same time the flow of air through the valve 31 from the inside of the building is cut off. This circulation through the spaces between the glass sheets will ordinarily be employed in cold weather and under such conditions there will be no tendency to form condensation on the inner faces of the glass sheets since they are warmer than the air flowing thereover.

If it is desired to stop the inflow through all the passages to the space 18, this may be accomplished by rotating the valve 90 degrees in a counterclockwise direction from the position of Fig. 3. It will be seen that by a proper manipulation of the valve, an air circulation may be maintained through the insulating spaces between the glass sheets of such a character as to avoid condensation or frosting, so that the necessity of hermetically sealing the insulating spaces from the atmosphere is avoided, this being a desirable arrangement because of the great difficulty involved in securing a permanent seal which will not permit the inflow of moist air resulting in clouding and frosting the glass. As heretofore stated, the use of the heating coil 29 is optional. The plate 27 is relatively thin and the circulation through the space 25 relatively slow, so that the incoming air from the exterior of the building is brought to approximately room temperature as it passes through the space 25 without the use of the heater. It will be understood that the invention is applicable to windows of types other than the sliding one shown.

What I claim is:

1. In combination in a double glazed window comprising a pair of glass sheets spaced apart in a frame with a pair of passageways through the frame, one leading from the space between the glass sheets to the atmosphere on the outer side of the window, and the other to the atmosphere on the inner side thereof, and a valve common to said passageways adapted to close either one of them, leaving the other open.

2. In combination in a double glazed window comprising a pair of glass sheets spaced apart in a frame, with a pair of passageways through

the frame, one leading from the space between the glass sheets to the atmosphere on the outer side of the window and the other to the atmosphere on the inner side thereof, and a valve common to said passageways adapted to close both passageways at the same time or to close either one, leaving the other open.

3. In combination in a double glazed window comprising a pair of glass sheets spaced apart in a frame with a passageway leading through the frame from the atmosphere to the space between the sheets at the top of the window, and a pair of passageways through the frame, one leading from the space between the sheets at the bottom of the window to the atmosphere on the outer side of the window and the other leading from the space between the sheets at the bottom of the window to the atmosphere on the inner side of the window, and means for opening and closing both of the passageways.

4. In combination in a double glazed window comprising a pair of glass sheets spaced apart in a frame with a passageway leading through the frame from the atmosphere to the space between the sheets at the top of the window, and a pair of passageways through the frame, one leading from the space between the sheets at the bottom of the window to the atmosphere on the outer side of the window and the other leading from the space between the sheets at the bottom of the window to the atmosphere on the inner side of the window, and a valve common to said pair of passageways adapted to close either one of them, leaving the other open.

5. In combination in a double glazed window comprising a pair of glass sheets spaced apart in a frame with a pair of passageways through the frame, one leading from the space between the glass sheets to the atmosphere on the outer side of the window and the other to the atmosphere on the inner side thereof, means for heating the air flowing through the passageway leading to the space between the sheets from the atmosphere on the outer side of the window, and valve means for closing either passageway.

6. In combination in a double glazed window comprising a pair of glass sheets spaced apart in a frame with a pair of passageways through the frame, one leading from the space between the glass sheets to the atmosphere on the outer side of the window and the other to the atmosphere on the inner side thereof, and valve means controlled from the inner side of the window for closing either passageway.

7. In combination in a double glazed window construction, a pair of sash members one above the other in relatively sliding relation arranged so that the top bar of one member registers with the bottom bar of the other member when the sash are in closed position, a pair of spaced glass sheets in each sash member, passageways through said top and bottom bars which register when the sash members are closed, one of which passageways leads to the space between the glass sheets in the upper sash member, and the other of which leads to the space between the sheets in the lower sash member, a passageway in the upper sash member at the upper portion thereof leading from the atmosphere to the space between the sheets of such sash member, a pair of passageways in the lower member at the bottom portion thereof, one of which leads from the space between the sheets of the lower sash member to the atmosphere on the outer side of the window, and the other of which leads from the

space between the sheets of the lower sash member to the atmosphere on the inner side of the window, and means for closing either of said pair of passageways.

5 8. In combination in a double glazed window construction, a pair of sash members one above the other in relatively sliding relation arranged so that the top bar of one member registers with the bottom bar of the other member when
10 the sash are in closed position, a pair of spaced glass sheets in each sash, passageways through said top and bottom bars which register when the sash members are closed, one of which
15 passageways leads to the space between the glass sheets in the upper sash member, and the other of which leads to the space between the sheets in the lower sash member, a passageway in the upper sash member at the upper portion thereof
20 leading from the atmosphere to the space between the sheets of the upper sash member, a pair of passageways in the lower sash member at the bottom portion thereof, one of which leads

from the space between the sheets of the lower sash member to the atmosphere on the outer side of the window, and the other of which leads from the space between the sheets of the lower sash member to the atmosphere on the inner side
5 of the window, and a valve common to said pair of passageways for closing either one of them while leaving the other open.

9. In combination in a double glazed window, a sash, an outer glass sheet mounted in fixed position in the sash, an inner glass sheet in parallel
10 with the outer sheet spaced away therefrom, a metal frame of approximately S cross section surrounding the inner sheet with one of the loops of the section fitting around the edge of the
15 sheet and with the other loop lying between the margins of the two sheets and acting as a spacer, and hinge supports at one edge of said frame secured to the sash and permitting the inner sheet
20 to be swung away from the outer one.

FREDERICK GELSTHARP.