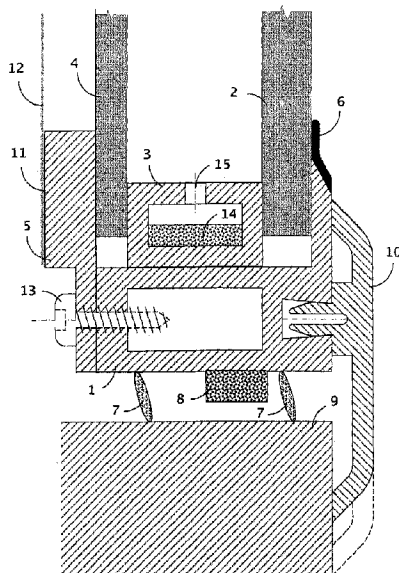




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 (72) **Inventeur/Inventor:**
 STOYKE, ECKHART, CA
 (73) **Propriétaire/Owner:**
 STOYKE, ECKHART, CA
 (74) **Agent:** NA

(54) **Titre : INSERT FENETRE INTERIEURE SECONDAIRE**
 (54) **Titre : SECONDARY INTERIOR WINDOW INSERT**



(57) **Abrégé/Abstract:**

A secondary interior window insert is described which comprises a frame, at least two panes, one or two flexible integral glass sealing lips, a spacer insert located between the panes, a sealing plate and means to tie up panes, frame, sealing plate and glass sealing lips. The device may further comprise integral friction fit seals, a jamb cover. The device is easily mountable and easily removable. All parts are recyclable. This interior insert not only reduces the heat loss of existing windows several times but also covers the window jamb that often consists of cold conducting jambs thus eliminating cold drafts from the window. The formation of condensation or ice in cold climate zones on the panes is eliminated and damage from melting ice is prevented. This window insert will reduce the heating cost and help to curb the greenhouse effect. The insert window contains several sheets of glass or plastic that create additional dead air spaces. Additional heat retention is created by adding a low-e coating to the glass and a low-e foil to the plastic window pane. The insert window frame contains a groove to retain a cover strip that extends from the frame to insulate the cold window jamb. It also represents an improvement with respects to ease of assembly by having the seals extruded as integral part of the frame.

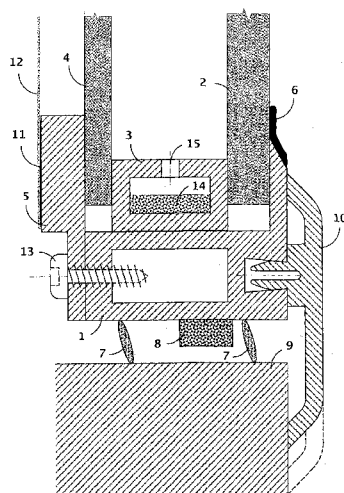
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- (72) **Inventor; and**
- (71) **Applicant :** STOYKE, Eckhart [CA/CA]; 15-26328
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Declarations under Rule 4.17:— *of inventorship (Rule 4.17(iv))***Published:**— *with international search report (Art. 21(3))*— *with amended claims (Art. 19(1))***Date of publication of the amended claims:** 6 December 2012(54) **Title:** SECONDARY INTERIOR WINDOW INSERT

(57) **Abstract:** A secondary interior window insert is described which comprises a frame, at least two panes, one or two flexible integral glass sealing lips, a spacer insert located between the panes, a sealing plate and means to tie up panes, frame, sealing plate and glass sealing lips. The device may further comprise integral friction fit seals, a jamb cover. The device is easily mountable and easily removable. All parts are recyclable. This interior insert not only reduces the heat loss of existing windows several times but also covers the window jamb that often consists of cold conducting jambs thus eliminating cold drafts from the window. The formation of condensation or ice in cold climate zones on the panes is eliminated and damage from melting ice is prevented. This window insert will reduce the heating cost and help to curb the greenhouse effect. The insert window contains several sheets of glass or plastic that create additional dead air spaces. Additional heat retention is created by adding a low-e coating to the glass and a low-e foil to the plastic window pane. The insert window frame contains a groove to retain a cover strip that extends from the frame to insulate the cold window jamb. It also represents an improvement with respects to ease of assembly by having the seals extruded as integral part of the frame.



WO 2012/131472 A4

Secondary Interior Window Insert

Description

The invention relates to an efficient multi-pane interior insert window which is easy to assemble, removable and allows a very effective temperature and sound insulation.

In the US patent 7,818,927 B1 a removable window insulation is described which comprises an air tight seal with a window frame, at least one pane, at least four frame members, at least four compressible seals and at least four adjusting members.

The two vertical and the two horizontal frame members are mitered on each others. Each frame member includes a pane slot formed on air inside edge thereof which receives an outer perimeter of at least on pane. The edge seal strip is attached to an outer edge of the frame member.

A cross member is secured in substantially a middle of the removable window insulator.

A window insert assembly which is mountable in an existing window frame whereby a double-panel thermal insulative window structure is provided is described in US patent 4,841,691. By assembling the window insert one thermally insulating air layer is formed which is sandwiched between a primary window pane and the original window. The assembly uses a spring-loaded window frame construction.

Although there are many window insulating insert assemblies there is still a need for alternative and / or improved and further developed window insulating insert systems. It is therefore an object of the present invention to provide a window insert which is very efficient, easy to assemble and removable, exhibiting an outstanding insulation air tightness and water tightness, which keeps heat in and cold out in winter and works in

summer the other way round, which further exhibits a good sound insulation, which can be inexpensively produced and mounted by persons who are no experts.

Thus, the object of the present invention is a secondary interior window insert comprising a frame 1, at least two panes 2, 4..., one or two flexible integral glass sealing lips 6, a spacer insert 3 located between the panes, a sealing plate 5 and means to compress the panes between frame and seal plate 5 by inwardly pointing glass sealing lips 6.

Preferentially the closing of the assembly is achieved by inserting the clip 16 on the seal plate in the tapered recess 17 of frame 1.

A further advantageous embodiment of the present invention is a secondary interior window insert comprising at least two panes 2, 4... which are separated by a spacer insert 3 located between the panes and a dead air space, a sealing plate 5, a flexible glass sealing lip 6 integral to the frame, a frame 1 with integral friction fit seals 7, a jamb cover 10 and means to tie up panes, frame and the sealing plate 5 that also serves to support a double-sided adhesive tape 11 to attach a shrink foil where the window is not exposed to direct UV radiation thus creating an additional dead air space.

Attachment of components can be either by screws 3 or clip-on devices 16 fitting into a retaining recess 17 and a clip 16. Preferably the pane facing the interior of the room is a glass pane, the pane facing the existing window can be a plastic pane.

The hollow spacer serves the double function of maintaining the optimum space between the window panes and serving as a receptacle for silica gel to prevent condensation on the window panes. Drill holes 15 allow moist air to reach the drying agent.

In a further advantageous embodiment of the invention of the insert window exhibits a seal crush protection spacer. The seal crush protection spacer can be integral to the frame.

Details and advantages of the invention will further be described, explained and illustrated in the following with reference to the schematical drawings whereby the drawings are

given as examples and shall not limit the invention and whereby the disclosure of the figures may be used as combination to characterize the invention as well as single features of the objects presented in the drawings which may be used for characterizing the invention as well.

Fig. 1 shows schematically a cross section of an interior insert window according to the invention.

Fig. 2 shows schematically an interior view of a window according to the invention.

Fig. 3 shows schematically an exterior view of a window according to the invention.

Fig. 4 shows schematically a cross section of a further embodiment of the invention.

Fig. 5 shows schematically a cross section of an add on window for openable windows according to the invention.

The schematically shown cross section (Fig. 1) of an interior insert window according to the invention comprises a frame 1 with integral sealing lips 6, the sealing lips 6 are flexible glass sealing lips and integral to the frame. 10 is a jamb cover which serves inter alia to insulate an existing window jamb 9. 2 and 4 are window panes which are made of glass or plastic. A spacer 3 is positioned between the panes, the spacer may exhibit a hole which can be filled with a drying agent for instance silica gel 14 and may exhibit a drilled aperture to connect the airspace between the panes with the drying agent. 7 are friction fit seals which are integral to the frame 1. 8 is a seal crush protection spacer which may be glued on the frame 1 or may be put loose between the frame and the window jamb. 5 is a seal plate which can be pressed against the window pane 4 and the frame 1 with the aid of a metal screw 13. The insert window can further exhibit a double sided adhesive tape 11 and a shrink foil 12 to create an additional dead air space.

Figure 2 shows the interior view of a window and figure 3 the exterior view of a window according to design Fig. 1.

The pane 4 may be a plastic window pane or a glass window pane. Window 2 is in general a glass window pane. Figure 4 shows a further embodiment of the invention where the seal crush protection spacer 8 is an integral part of the frame 1. The flexible glass sealing lip is integral to the seal plate 5 which is touching here pane 2.

Figure 5 shows an alternative embodiment of the invention. This embodiment is especially suited for openable windows.

A secondary interior window insert as it is schematically described in figure 5 is designed and especially suited for a quick assembly and reduced labor requirements and can in particular be used for openable windows. It also allows complete recycling of all window parts. The four sides of the rectangular frame 1 are connected by welding or glueing. Window pane 2 is placed into the frame and the spacer insert 3 placed on top of the pane 2 and the second pane on top of the spacer 4. The clip 16 is now pressed into the recess 17 provided in frame 1. This embodiment of the invention can be performed without a screw. A double-sided adhesive tape 11 is used for attachment to the existing openable window. The flexible sealing lips 6 are extruded such that they protrude into the space of the window panes to create a tight seal when by closure a pressure on the assembled parts is exerted. In order to vary the window pane thickness on the side of the window facing, the interior of the room, the pane next to the so called clip-on closure can be selected to be thinner by the amount the front pane becomes thicker. The rear pane is not exposed to wind pressure nor has direct contact by humans and therefore needs not to be as strong as the front pane. This allows to use only the optimal dead air space of e.g. 12 mm between the panes without having to resort to different spacer dimensions, that require extra extrusion tools. The addition of reflective coatings (not shown) on the panes can be performed. Low-e coating is particularly suited.

In cases where the recess when installing the insert window in an existing window is too shallow an embodiment as illustrated in Figure 4 can be used. Here the loose or glued single seal crush protector as given in Figure 1 is replaced by two extruded seal crush

protectors integral to the frame that reduce the labor amount even further at the expense of having seal crush protectors on all sides of the window where they are not required.

Without a jamb cover and a separate seal crush protector this design requires only three instead five extrusion components. The frame can be either welded or glued. In the latter case angle pieces will be inserted into the rect-angular hollow spaces in the frame of all three designs.

The embodiment which is illustrated in figure 4 can comprise a frame 1, sealing lip 6, window pane 2 and 4, a spacer 3, the cover plate 5, with integral sealing lip 6, the sealing lip 6, a drill hole 15, silica gel 14, friction fit seals 7, a double-side tape 11, a shrink foil 12, a fastening screw 13, and integral seal crush protectors 8.

A device according to the invention as illustrated in figure 1 can comprise the following parts:

Frame (1) with integral sealing lips (6)

Glass window pane (2)

Spacer insert (3)

Plastic window (4)

Seal plate (5)

Flexible glass sealing lip (6) integral to frame

Friction fit seals (7) integral to frame

Seal crush protection spacer (8)

Existing window jamb (9)

Jamb cover (10)

Double-sided adhesive tape (11)

Shrink foil (12)

Metal screw (13)

Silica gel filling (14)

Drill hole (15)

The assembled interior insert windows according to the invention serves to increase the heat retention of an existing window by up to three more dead air spaces. This is achieved by creating two or three additional dead air spaces between an existing double glazed window and the panes of glass and plastic and optional by the shrink foil.

The cover plate 5 tied down by metal screws 13, holds the assembled panes in place and pushes the glass pane against seal 6 to create water tightness. In the case of low-e coating being added to the glass pane 2 (not shown) or a low-e foil to the plastic pane 4 (not shown), heat retention is increased further. The interior insert window also serves to reduce the heat loss of the existing window jambs 9, by extending the frame 1 by means of the jamb cover 10 that is inserted into a groove of frame 1 by means of a friction fit. It creates a dead air space around the jamb. The spacer 8 prevents the crushing of the friction fit seals 7 to maintain their flexibility.

The silica gel filling 14 or another drying agent of the spacer 3 is optional. Holes 15 can e.g. be drilled through the wall of the spacer wall 3 adjacent to the dead air space between pane 2 and 4.

The frame 1 with the panes 2 and 4 is the basic configuration of the window to add at least two additional dead air spaces to the existing window.

Depending on the orientation of the existing window to which the interior window insert is added, the window foil 12 will be omitted on south-facing windows to maximize solar gain since its reflective surface reduces the amount of visible light by 8 % and direct sunlight would shorten the life of the foil. Also, where the amount of visible light needs to be enhanced, the foil will not be installed. The addition of low-e coatings to panes 2 and 4 will depend on the financial situation of the buyer, since these coatings increase the cost of the window although they also increase the energy savings. So a compromise could be installing only one low-e coating instead of on both panes.

The hollow spacer 3 can be filled with silica gel, an air drying product and holes drilled facing the dead air space between panes 2 and 4 if the room in which the insert window is

installed has high moisture levels and the condition of the jambs makes moist air penetration likely.

The rigid frame 1 is extruded in ABS (Acrylonitrile Butadiene Styrene) or a similar benign plastic instead of PVC that produces toxic fumes in a fire but is cheaper. A flexible sealing lip 6 is extruded as integral part of the frame 1 together with the friction fit seals 7 by means of a two-component extrusion tool. The friction fit seals 7 also compensate for expansion and shrinkage of the frame 1 caused by temperature changes. The glass pane 2 is placed into the frame and is sealed against intrusion of water from window cleaning by the sealing lip 6. The spacer insert 3 creates the optimal 12 mm dead air space between glass pane 2 and plastic pane 4 that are sized to allow for thermal expansion and shrinkage of frame 1. The cover plate 5 has three different functions: It holds in place the window panes, its raised portion can be used to affix a double sided tape 11 to support a shrink foil 12 to form an additional dead air space and by turning it around with the raised portion turned downward to accommodate thinner window panes in the case of smaller windows. The shrink foil 12 is not UV resistant and will be mainly used on windows with northern exposure where it will last about 10 years. Other shaded exposures would also be eligible for shrink foil 12 installation.

The friction fit between insert window and the existing jamb is created by the friction fit seals 7 that are integral to frame 1. Since the weight of the frame 1 would crush the seals 7 and leave no dead air space on the sill, an insulating seal crush protection spacer 8 is placed onto the sill, to reduce temperature transfer from the jamb 10 to frame.

The components of the invention will be ordered from specialized manufacturers for glass panes, low-e coating, plastic sheets, plastic extrusion manufacturers by specifying the required dimensions of the components that will then be cut to size at an assembly shop.

The jamb cover 10 will be made wider than shown to cover cold jambs 9 completely, or in the case of an aluminum jamb between 2 windows, each adjacent insert window will have a jamb cover that fits over half the jamb.

In winter the insert window helps to keep the heat in and the cold out. In summer it works the other way round. In addition it also blocks noise from outside and prevents condensation or ice on the interior window pane.

It is used in place of removing the old windows if they are still in good condition but do not provide the savings and comfort enhancements of the insert window.

The insertion of the insert window takes only minutes if the existing window panes have been cleaned and dried beforehand, by simply pushing the insert window into the existing recess between the window jambs.

This window uses both glass and plastic panes, as well as low-e materials and insulates the window jambs. It does not require sealing to be attached having flexible seals extruded as integral part of the rigid frame material to form a friction fit and to seal the glass pane on the room side of the window.

Existing window inserts consist of plastic sheet or foil that easily scratch or fail upon cleaning. They do not have low-e coatings in the case of glass insert windows and do not insulate the window jamb. They therefore do not achieve the manifold heat retention effects of this window. The integral soft-seals of the frame save labor compared to seals attached manually. By making the window sheets behind the protective glass pane of plastic or foil, the weight and cost is substantially reduced without loss in effectiveness. The rigid window frame 1 with integral flexible glass sealing lips 6 and two or more friction fit sealing lips 7 can be created in a two component plastic extrusion tool.

The jamb cover 10 inserts into the frame to create a dead air space around the window jamb gives further insulation. The spacer 3 between the panes 2 and 4 is hollow and can be filled with a drying agent such a silica gel and keeps the space between window panes dry.

The cover plate 5 has the tool function to provide a snug compression e.g. with a five mm glass pane and a 3 mm pane, but the raised portion can also be turned around to accommodate a e.g. 4 mm glass pane and e.g. a 2 mm plastic pane in case of smaller

windows. The seal crush protection spacer on the sill side of the window made of an insulating plastic, serves to maintain an insulating air space between the frame of the insert window and the window jamb to reduce cold transfer.

The invention provides very effective window inserts to reduce heating and cooling cost while providing soundproofing on top. The window inserts are easily mounted and removed. Low material and assembly cost make this window affordable. All parts can be recycled.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS:

1. A secondary interior window insert comprising:
 - a window frame structured to form a window pane mount for at least two window panes;
 - one or more flexible integral window pane sealing lips;
 - one or more friction fit door jamb seals;
 - in which the one or more flexible integral window pane sealing lips and the one or more friction fit door jamb seals are formed integrally with the window frame via a multi-component extrusion process; and
 - in which the window frame is formed of a rigid material, and the one or more flexible integral window pane sealing lips and the one or more friction fit door jamb seals are formed of a soft material that is relatively softer than the rigid material of the window frame.
2. The secondary interior window insert of claim 1 further comprising a seal crush protection spacer adjacent the one or more friction fit door jamb seals.
3. The secondary interior window insert of claim 2 in which the seal crush protection spacer is integral to the window frame.
4. The secondary interior window insert of claim 3 in which the seal crush protection spacer is formed integrally with the window frame via the multi-component extrusion process, with the seal crush protection spacer formed of a soft material that is relatively softer than the rigid material of the window frame.
5. The secondary interior window insert of any one of claim 1 - 4 in which the multi-component process is a two-component process.
6. The secondary interior window insert of any one of claims 1 - 5 further comprising:
 - at least two window panes mounted in the window frame;
 - a sealing plate;

a spacer between the at least two window panes;

means to tie up the window frame, the at least two window panes, the sealing plate and the one or more glass window pane sealing lips; and

wherein the at least two window panes are separated by the spacer located between the at least two window panes and a dead air space.

7. The secondary interior window insert of claim 6 wherein the means to tie up the window frame comprises a tapering recess formed in the window frame and a clip formed on the seal plate, wherein the clip is inserted into the tapering recess in use.

8. The secondary interior window insert of any one of claim 6 - 7 wherein the means to tie up the window frame comprises a metal screw.

9. The secondary interior window insert of any one of claim 6 - 8 wherein at least one of the at least two window panes is a glass pane.

10. The secondary interior window insert of any one of claims 6 - 9, wherein at least one of the at least two window panes is a plastic pane.

11. The secondary interior window insert of any one of claims 6 - 10, wherein the spacer is hollow for taking up a drying agent.

12. The secondary interior window insert of any one of claim 6 - 11 wherein the spacer insert comprises an aperture for filling in a drying agent.

13. The secondary interior window insert of any one of claim 1 - 12 further comprising a jamb cover.

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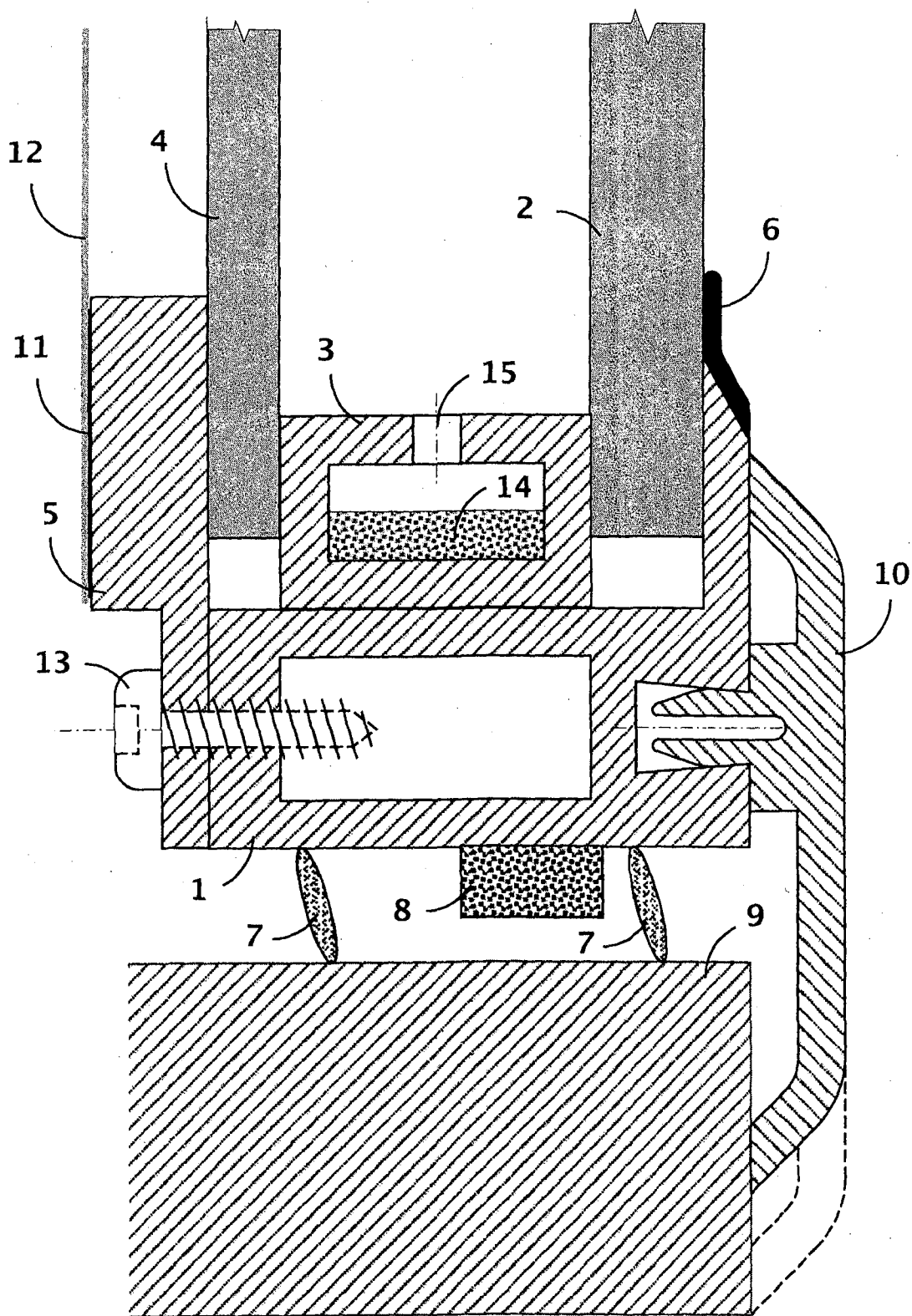


FIG. 1

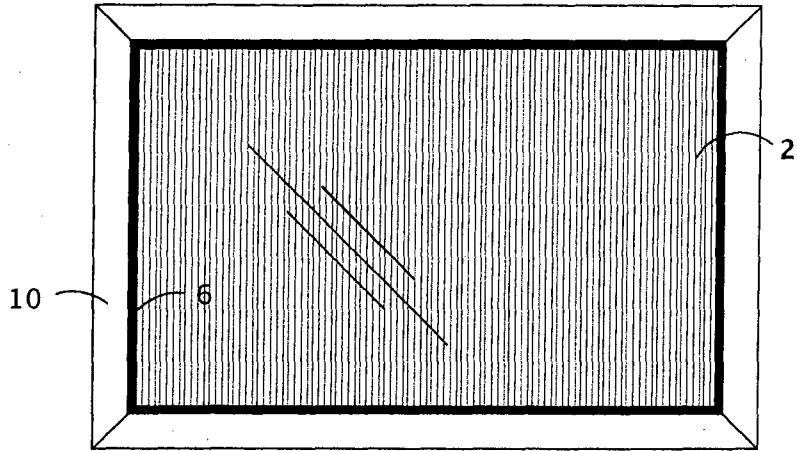


FIG. 2

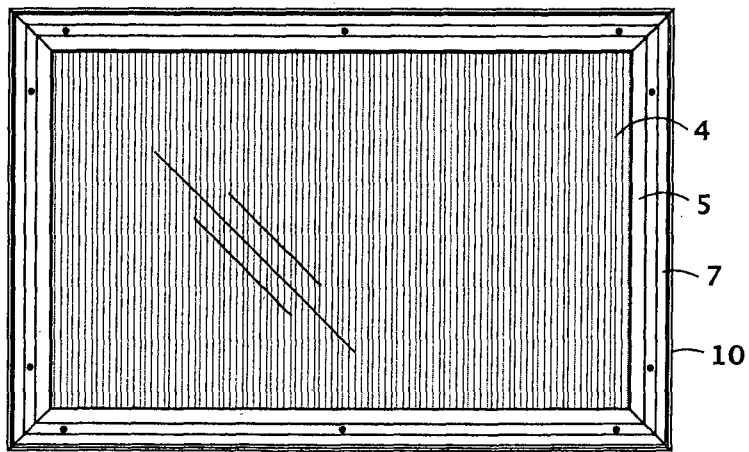


FIG. 3

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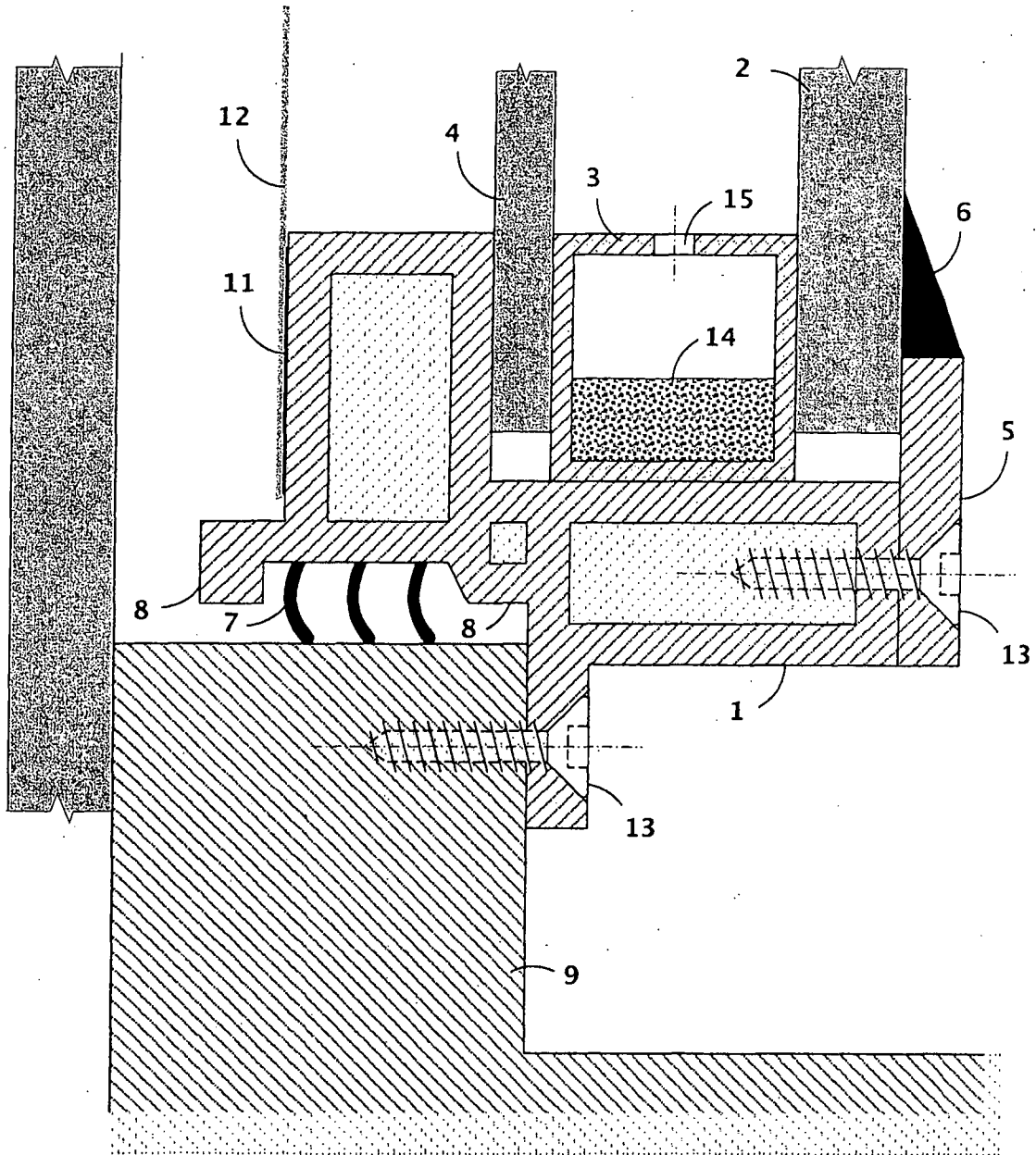


FIG. 4

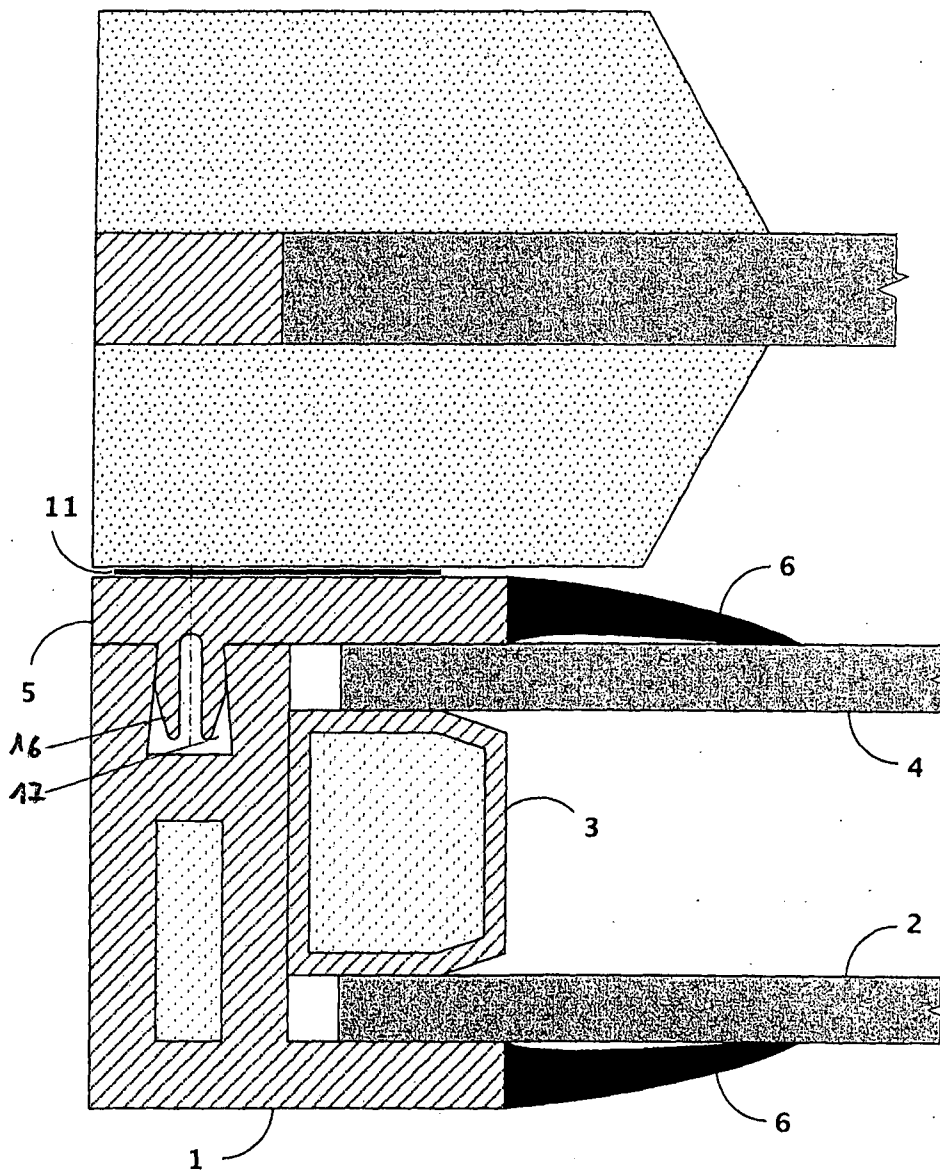


FIG. 5

