

Sept. 24, 1968

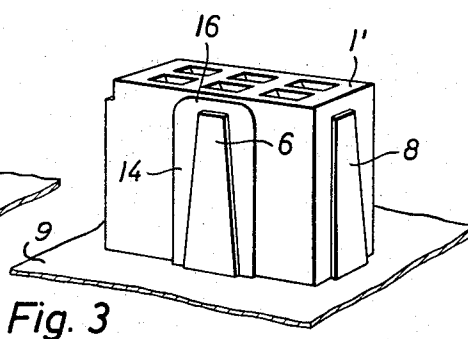
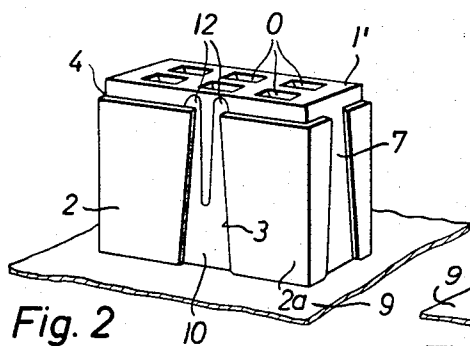
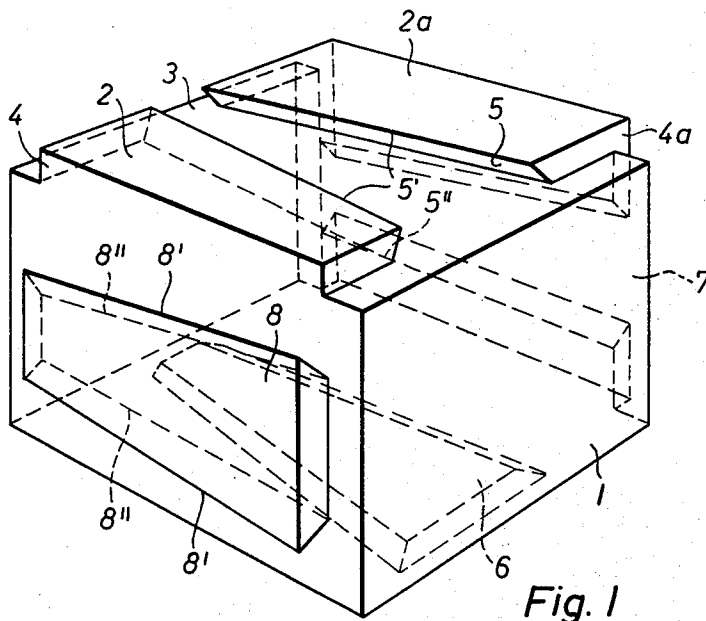
H. SIMON

3,402,954

DEVICE FOR FASTENING BODIES IN THE SHAPE OF SQUARE
PRISMS AND PROVIDED AT OPPOSITE SIDE FACES
RESPECTIVELY WITH GROOVES AND RIDGES
ON A PLATE OR THE LIKE

Filed Dec. 8, 1965

3 Sheets-Sheet 1



INVENTOR.
HANS SIMON

BY

Michael S. Shikow
Attorney

Sept. 24, 1968

H. SIMON

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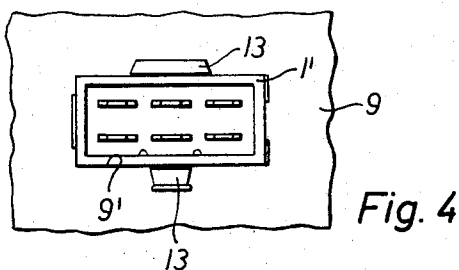


Fig. 4

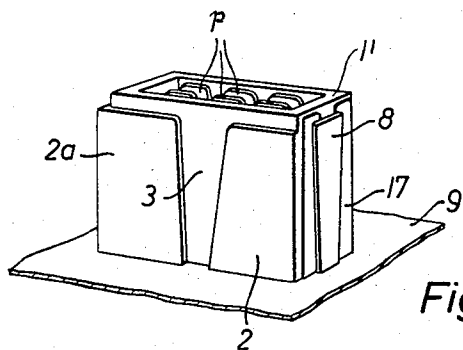


Fig. 5

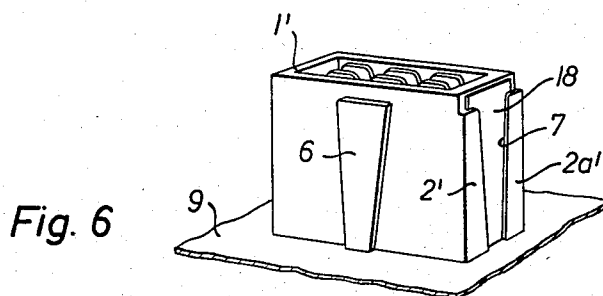


Fig. 6

INVENTOR.
HANS SIMON
BY *Michael S. Strike*
Attorney

Sept. 24, 1968

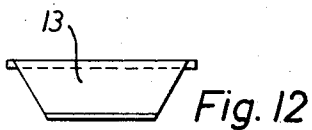
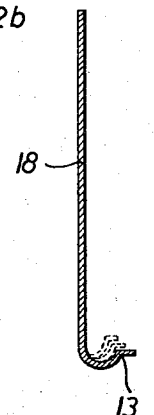
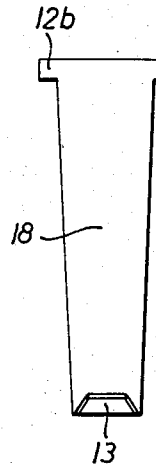
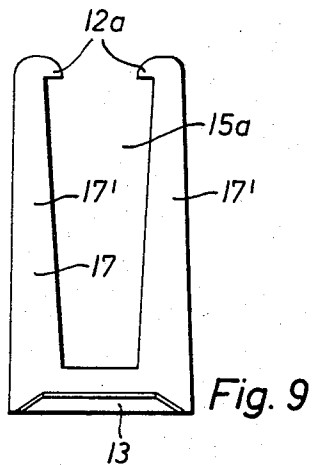
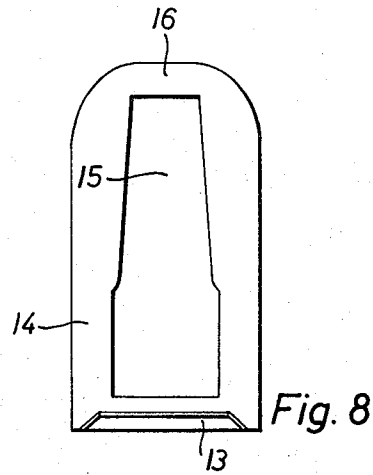
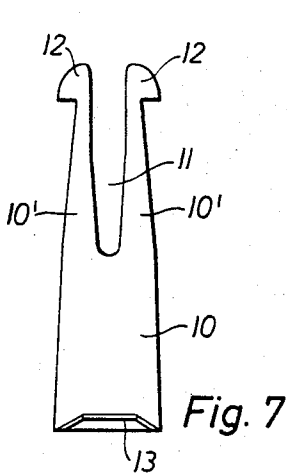
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3 Sheets-Sheet 3



INVENTOR.

HANS SIMON

BY

Michael S. Schiller
Attorney

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3,402,954

DEVICE FOR FASTENING BODIES IN THE SHAPE OF SQUARE PRISMS AND PROVIDED AT OPPOSITE SIDE FACES RESPECTIVELY WITH GROOVES AND RIDGES ON A PLATE OR THE LIKE

Hans Simon, Bruchhausener Strasse,
Unkel (Rhine), Germany

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S 50,950

14 Claims. (Cl. 287—189.36)

ABSTRACT OF THE DISCLOSURE

A holding device for releasably holding a body, which may be substantially in the form of square prisms and provided at opposite side faces thereof respectively with dove-tail shaped grooves and ridges which end at a short distance from opposite end faces of the body, in a cutout of a plate or the like.

It has already been suggested to provide bodies in the form of square prisms, for instance toy building blocks, electrical sockets, or the like, at opposite side faces thereof with elongated grooves and ridges of dove-tailed cross section which preferably uniformly decrease in width in longitudinal direction so that the bodies may be interconnected with each other by inserting the ridge on one side face of one body into the side face of a body adjacent thereto.

It is an object of the present invention to provide for an arrangement in which bodies of the aforementioned type may be securely held on a plate or the like.

It is a further object of the present invention to provide for an arrangement in which bodies of the aforementioned type may be securely held on a plate or the like and easily removed therefrom again if desired.

It is an additional object of the present invention to provide for an arrangement of the aforementioned type in which the means for holding the body to the plate can be manufactured at very reasonable cost.

With these objects in view, the arrangement of the present invention mainly comprises a body having at least one substantially plane side face and raised means projecting from the side face and forming a pair of shoulder faces extending transverse to the side face and facing away from each other, in which the body extends with an end portion of a given cross section at least beyond one of the shoulder faces. The arrangement includes further a plate formed with an opening therethrough having a cross section substantially equal to that of the one end portion of the body and the latter extends with said one end portion thereof through the opening with one shoulder face abutting against one face of the plate, and at least one holding member of sheet material having an elongated portion extending along and abutting against the side face of the body and through the opening in the plate and having at one end at least one projecting means in the plane of the sheet material and abutting against the other of the shoulder faces of the body and at the other end thereof a portion extending transverse to the plate and having at one end at least one projecting means engaging the other face of the plate for releasably holding the body in the opening of the plate.

If the body is provided at opposite plane side faces thereof with ridges and grooves as mentioned above, two holding members may be used on the opposite side faces of the body for anchoring the latter securely to the plate. Depending on whether the holding member has to cooperate with a ridge on one side face or a groove

on the other side face of the body, the holding member, while accomplishing basically the same function, has to have slightly different form. For instance, if the holding member has to cooperate with a groove formed on one side face of the body, the holding member may have an elongated portion of substantially trapezoidal shape which engages with elongated longitudinal edges thereof respectively the undercut side faces of the groove and which has on one end thereof outwardly extending projections in the plane of the elongated portion of the holding member and on the other end thereof which extends through the cutout in the plate a transverse portion extending transverse to the plane of the elongated portion of the holding member and engaging the face of the plate opposite the face thereof on which the shoulder face of the body rests. In such an arrangement the elongated portion of the holding member may be formed with a central cutout extending from the end of the holding member which carries the projecting portions into the latter so as to form a pair of resilient arms facilitating the assembly of the arrangement.

If the holding member has to cooperate with a raised portion or ridge of trapezoidal shape on one side face of the body, then the elongated portion of the holding member is preferably formed with a cutout of corresponding trapezoidal shape so that the inner edges of the cutout will engage the undercut side faces of the raised portion on the side face of the body, whereby the part of the elongated portion closing the cutout at the one end of the elongated body engages the shoulder face of the ridge distant from the shoulder face which engages the plate.

On the other hand, the cutout may be open at the one end of the elongated body to form from the latter a pair of resilient arms and each of the arms has at the free end thereof an inwardly extending projection for engagement with the shoulder face of the body opposite the shoulder face thereof which engages the plate.

The shape of the elongated portion of the holding member and the arrangement of the projections and the transverse portion thereon will also depend on the shape and orientation of the groove or the ridge with which the holding member has to cooperate, that is the construction of the holding member will vary depending on whether the ridge or the groove tapers toward or away from the plate on which the body is mounted.

The holding member is preferably of resilient sheet metal and preferably the transverse portion at the end of the holding member which extends through the plate is curved at a radius of curvature which is a multiple of the thickness of the sheet material from which the holding member is formed and in the assembled arrangement the transverse portion of the holding member has a concave surface facing the face of the plate opposite the face thereof which is engaged by the shoulder face of the body. The projections on the arms of the holding member when the latter is provided with a central cutout open at one end have preferably also curved end faces to facilitate slipping of the arms into the groove or over the ridge on the side faces of the body.

The novel features which are considered as characteristic for the invention are set forth in particular in the appended claims. The invention itself, however, both as to its construction and its method of operation, together with additional objects and advantages thereof, will be best understood from the following description of specific embodiments when read in connection with the accompanying drawings, in which:

FIG. 1 is a schematic perspective view of a body on which the holding members according to the present invention may be used;

FIGS. 2 and 3 are perspective views of arrangements

according to the present invention in which prismatic bodies in the form of electrical sockets are respectively held by holding members on a plate;

FIG. 4 is a bottom view of the arrangement according to the present invention;

FIGS. 5 and 6 are perspective views similar to FIGS. 2 and 3 with the bodies respectively mounted in reverse position on the plate;

FIGS. 7-10 are front views of holding members of different configuration according to the present invention;

FIG. 11 is a longitudinal cross section through the holding member shown in FIG. 10; and

FIG. 12 is a bottom view of the holding member shown in FIG. 9.

FIG. 1 is a schematic perspective view of a body which may be used in the arrangement according to the present invention and which has at least one plane side face and raised means projecting from the side face and forming a pair of shoulder faces extending transverse to the side face and facing away from each other. In the specific form shown in FIG. 1 the body is in the form of a square prism 1 provided on four faces thereof with raised means, that is the upper face of the body, as shown in FIG. 1, is provided with raised means having a pair of portions 2 and 2a which are spaced from each other forming between themselves a groove 3 of trapezoidal shape having a pair of undercut edge faces 5 facing each other and having outer edges 5' located in a plane substantially parallel to the bottom face of the groove and located closer to each other than the inner edges 5'' of the undercut side faces 5. The raised portions 2 and 2a terminate at opposite ends thereof short of the end edges of the face from which they project so as to form shoulder faces 4 and 4a extending substantially normal to the face from which the portions 2 and 2a project. The raised means on the visible side face of the body 1, as shown in FIG. 1, is in the form of a raised portion 8 of substantially trapezoidal shape having undercut edge faces having outer edges 8' located in a plane parallel to the side face from which the raised portion 8 projects and which are spaced farther from each other than the inner edges 8'' of the undercut edge faces of the portion 8 which are located in the aforementioned side face. The raised portion 8 of trapezoidal shape ends likewise short of the corresponding edges of the side face of the body to provide at opposite ends shoulder faces which are respectively located in one plane with the shoulder faces 4a and 4. The face of the body 1 opposite to the face thereof from which the raised portion 8 projects is preferably formed with a groove 7 of trapezoidal shape of the same configuration as the groove 3, whereas the face of the body 1 opposite to the face which is provided with the raised portions 2 and 2a is preferably provided with a raised portion 6 of trapezoidal shape of the same configuration as the raised portion 8.

FIGS. 2 and 3 show a body 1' similar to the body 1 shown in FIG. 1 mounted on a plate 9 and securely held on the plate by holding members according to the present invention. In the arrangement shown in FIGS. 2 and 3 the body 1' is in the form of an electrical socket formed at the upper end thereof as viewed in FIGS. 2 and 3 with a plurality of openings *o* into which correspondingly shaped prongs of a connecting element may be engaged. The plate 9 is formed with an opening 9' (FIG. 4) therethrough which has a cross section substantially identical to the cross section of the body 1' at the lower end thereof so that the body 1' abuts with shoulder faces at the lower ends of the portions 2 and 2a against the upper face of the plate 9. The body 1' is held on the plate 9 by a pair of holding members 10 and 14 which are respectively located in the groove 3 formed on one face of the body 1' between the raised portions 2 and 2a thereof and about the raised portion 6 on the opposite face of the body 1'.

The holding member 10 best shown in FIG. 7 has a flat elongated portion therein so as to form a pair of resilient arms 10' having at the free ends thereof outwardly extending projections or noses 12 extending in the plane of the arms and having outer curved edge faces as clearly shown in FIG. 7. At the other end thereof the elongated holding member 10 has a portion 13 extending transverse to the plane of the remainder of the holding member 10. As shown in FIG. 2 the elongated portion of the holding member 10 is located in the slot 3 formed between the portions 2 and 2a of the body 1' with the bottom faces of the noses 12 engaging the upper shoulder faces 4 of the portions 2 and 2a, respectively. The elongated portion extends with the lower end thereof through the opening 9' in the plate 9 and the transverse portion 13 engages, as shown in FIG. 4 the bottom face of the plate 9. The holding member 10 is pushed from below through the opening 9' in the plate 9 into the slot 3 of the body 1' whereby the arms 10' are inwardly flexed as the noses 12 reach the upper narrow portion of the slot 3, and the arms 10' snap back again as soon as the noses 12 are pushed beyond the shoulder faces 4.

The holding member 14 which engages about the raised portion 6 of the trapezoidal shape formed on the side faces of the body 1' opposite the side face thereof in which the groove 3 is formed has a configuration as best shown in FIG. 8. As shown in this figure, the holding member 14 is formed with a central cutout 15 of trapezoidal shape substantially equal to that of the shape of the raised portion 6 and the part 16 of the elongated portion of the holding member 14 closing the cutout 15 at the upper end, as viewed in FIG. 3, engages the upper shoulder face of the raised portion 6 whereas the inner edges of the cutout engage respectively the undercut side faces of the raised portion 6 of trapezoidal shape. The holding member 14 has at its lower end, as best shown in FIG. 4, also a portion 13 extending transverse to the remainder of the holding member 14 and engaging the bottom face of the plate 9. This transverse portion 13 is flexible to such an extent to permit shifting of the holding member 14 in longitudinal direction so as to permit to snap the inner edges of the cutout 15 over the outer edges of the undercut edge faces of the raised portion 6 so that the inner edges defining the cutout 14 of the holding member may engage the undercut side faces of the raised portion 6 adjacent the inner edges thereof.

FIG. 5 and 6 show the body 1' mounted on the plate 9 in a position reversed with respect to the position shown in FIGS. 2 and 3, and in which the end of the body on which a plurality of connecting prongs *p* are formed is the upper end. In this position of the body 1', the raised portions 6 and 8 of the body and the grooves 3 and 7 have their narrower ends at the plate 9.

To hold the body 1' in this reversed position on the plate, holding members having shapes slightly different from those shown in FIGS. 2 and 3 have to be used. As shown in FIG. 5 a holding member 17 cooperates with a raised portion 8 on one side face of the body 1'. The holding member 17 best shown in FIG. 9 has an elongated flat portion formed with a central cutout 15a of trapezoidal shape corresponding to that of the raised portion 8 so as to form a pair of resilient arms 17' respectively having at the open end of the cutout 15a inwardly extending projections or noses 12a which engage over the upper shoulder face of the raised portion 8. The elongated portion of the holding member extends with the lower end thereof through the cutout 9' in the plate and has at its lower end a portion 13 extending transverse to the plane of the elongated portion of the holding members 17 which engages with its upper face the bottom face of the plate 9.

As shown in FIG. 6 an additional holding member 18 is provided which cooperates with the groove 7 formed

5

on the side face of the body 1' opposite from the side face thereof on which the raised portion 8 is provided. The holding member 18, best shown in FIG. 10, has an elongated portion and at one end thereof a pair of projections 12' extending beyond the longitudinal side edges of the elongated portion of the holding member 18 and respectively engaging with the bottom faces thereof the upper shoulder faces of the raised portions 2' and 2a' between which the groove 7 is formed. The holding member 18 extends with the lower portion thereof through the opening 9' in the plate 9 and has at its lower end a transverse portion 13 engaging with its upper face the bottom face of the plate 9. The transverse portion 13 of the holding member 18 and preferably the transverse portions of all holding members are preferably curved along a radius of curvature which is a multiple of the thickness of the sheet material from which the respective holding member is formed so as to be resiliently flexible from the position shown in dotted lines in FIG. 11 to the position shown in full lines in this figure. Thereby the holding member 18 may be shifted in longitudinal direction while the transverse portion 13 is engaged with the bottom face of the plate 9 to permit the longitudinal edges of the elongated portion of the holding member 18 to be passed by the outer edges of the undercut edge faces forming the groove 7. In other words, the shape and width of the elongated flat portion of the holding member 18 corresponds substantially to the width of the groove 7 at the bottom face thereof and in order to pass the elongated flat portion of the holding member 18 by the outer edges of the undercut side faces defining the groove 7, the elongated portion of the holding member 18 has to be shifted in longitudinal direction as mentioned above after which the holding member is released and the transverse portion will curve back to its original shape to pull the projections 12b into engagement with the upper shoulder faces of the portions 2' and 2a'.

It will be understood that each of the elements described above, or two or more together, may also find a useful application in other types of arrangements differing from the types described above.

While the invention has been illustrated and described as embodied in an arrangement for fastening bodies in the shape of a square prism and provided at the opposite side faces thereof with grooves and ridges on a plate or the like by holding members, it is not intended to be limited to the details shown, since various modifications and structural changes may be made without departing in any way from the spirit of the present invention.

Without further analysis, the foregoing will so fully reveal the gist of the present invention that others can by applying current knowledge readily adapt it for various applications without omitting features that from the standpoint of prior art, fairly constitute essential characteristics of the generic or specific aspects of this invention and, therefore, such adaptations should and are intended to be comprehended within the meaning and range of equivalence of the following claims.

What is claimed as new and desired to be secured by Letters Patent is:

1. An arrangement of the character described comprising, in combination, a body having at least one substantially plane side face and raised means projecting from said side face and forming a pair of shoulder faces extending transverse to said side face and facing away from each other, said body extending with at least one end portion of given cross section beyond one of said shoulder faces; a plate formed with an opening therethrough having a cross section substantially equal to that of said one end portion of said body and the latter extending with said one end portion thereof through said opening with said one shoulder face abutting against one face of said plate; and at least one holding member of sheet material having an elongated portion extending substantially in one plane along and abutting against said side face and through said

6

opening in said plate and having at one end at least one projecting means in said plane and abutting against the other of said shoulder faces and at the other end thereof extending through said opening a portion extending transverse to said plane and engaging the other face of said plate.

2. An arrangement as set forth in claim 1, wherein said raised means has a pair of elongated undercut edge faces extending between said shoulder faces, and wherein said elongated portion of said holding member has a pair of edges respectively engaging said undercut edge face.

3. An arrangement as set forth in claim 2, wherein said elongated edge faces gradually approach each other from one to the other end thereof, and wherein said pair of edges of said holding member gradually approach each other in the same direction and substantially to the same extent as said edge faces.

4. An arrangement as set forth in claim 3, wherein at least one of said portions of said holding member is resiliently flexible to permit engagement of said edges thereof with said undercut edge faces.

5. An arrangement as set forth in claim 4, wherein said raised means is in the form of a raised portion of substantially trapezoidal shape and said elongated undercut edge faces being formed by undercut edge faces of said raised portion facing away from each other and having outer edges located in a plane substantially parallel to said plane side face and spaced further from each other than inner edges of said undercut edge faces located in said plane side face, and wherein said elongated portion of said holding member is formed with an elongated cutout of trapezoidal shape similar to that of said raised portion, the inner longitudinal edges of said cutout forming the pair of edges respectively engaging said undercut edge faces of said raised means, and said projecting means of said holding member being formed by a part of said elongated portion closing said cutout at said one end of said holding member.

6. An arrangement as set forth in claim 5, wherein said elongated undercut edge faces of said trapezoidal raised portion are spaced further from each other at said one end portion of said body extending through said plate than at the other end portion of said body, and wherein said transverse portion of the holding member is resiliently flexible to such a degree so as to permit resilient shifting of said elongated portion of said holding member in longitudinal direction to permit said longitudinal edges of said cutout in said holding member to be passed by said outer edges of said undercut edge faces and into engagement with the latter adjacent the inner edges thereof.

7. An arrangement as set forth in claim 4, wherein said raised means is in the form of a raised portion of substantially trapezoidal shape and said elongated undercut edge faces being formed by undercut edge faces of said raised portion facing away from each other and having outer edges located in a plane substantially parallel to said plane side face and spaced further from each other than inner edges of said undercut edge faces located in said plane side face, and wherein said elongated portion of said holding member is formed with an elongated cutout of trapezoidal shape similar to that of said raised portion and being open at said one end of said elongated portion so as to form a pair of arms, the inner longitudinal edges of said arms forming the pair of edges respectively engaging said undercut edge faces of said raised means, and said projecting means of said holding member being formed by an inwardly extending projection at the free end of each arm.

8. An arrangement as set forth in claim 7, wherein said elongated undercut edge faces of said trapezoidal raised portion are spaced further from each other at said other end portion of said body than at said one end portion thereof, and wherein said pair of arms are resiliently flexible to permit the longitudinal inner edges thereof to be passed by said outer edges of said undercut edge

7

faces and into engagement with the latter adjacent the inner edges thereof.

9. An arrangement as set forth in claim 8, wherein said inwardly extending projections have curved inner edge faces.

10. An arrangement as set forth in claim 4, wherein said raised means includes a pair of spaced portions forming between themselves a groove of trapezoidal shape having a pair of undercut edge faces facing each other and having outer edges located in a plane substantially parallel to said plane side face and located closer to each other than inner edge of said undercut edge faces located in said plane side face of said body, and wherein said elongated portion of said holding member has an outline of trapezoidal shape similar to that of said groove, the outer longitudinal edges of said elongated portion forming a pair of edges respectively engaging said undercut edge faces of said raised means and said projecting means being formed by a pair of outwardly extending projections at said one end of said holding member.

11. An arrangement as set forth in claim 10, wherein said undercut edge faces of said raised means are spaced further from each other at the other end portion of said body than at said one end portion thereof, and wherein said transverse portion of said holding member is resiliently flexible so as to permit resilient shifting of said elongated portion of said holding member in longitudinal direction to permit said longitudinal edges of said elongated portion of said holding member to be passed by said outer edges of said undercut edge faces and into engagement with the latter adjacent the inner edges thereof.

8

12. An arrangement as set forth in claim 10, wherein said undercut edge faces of said raised means are spaced further from each other at said one end portion of said body than at the other end portion thereof, and wherein said elongated portion of said holding member is formed with an elongated cutout extending from said one end thereof thereinto so as to provide for a pair of flexible arms permitting the projections at the free end of said arms to be resiliently pushed inwardly during assembly of the arrangement.

13. An arrangement as set forth in claim 12, wherein said outwardly extending projections have curved outer edge faces.

14. An arrangement as set forth in claim 4, wherein said transverse portion at the other end of said holding member is curved with a radius of curvature which is a multiple of the thickness of said holding member and having a concave face facing the other face of said plate.

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CARL W. TOMLIN, *Primary Examiner*.

R. S. BRITTS, *Assistant Examiner*.