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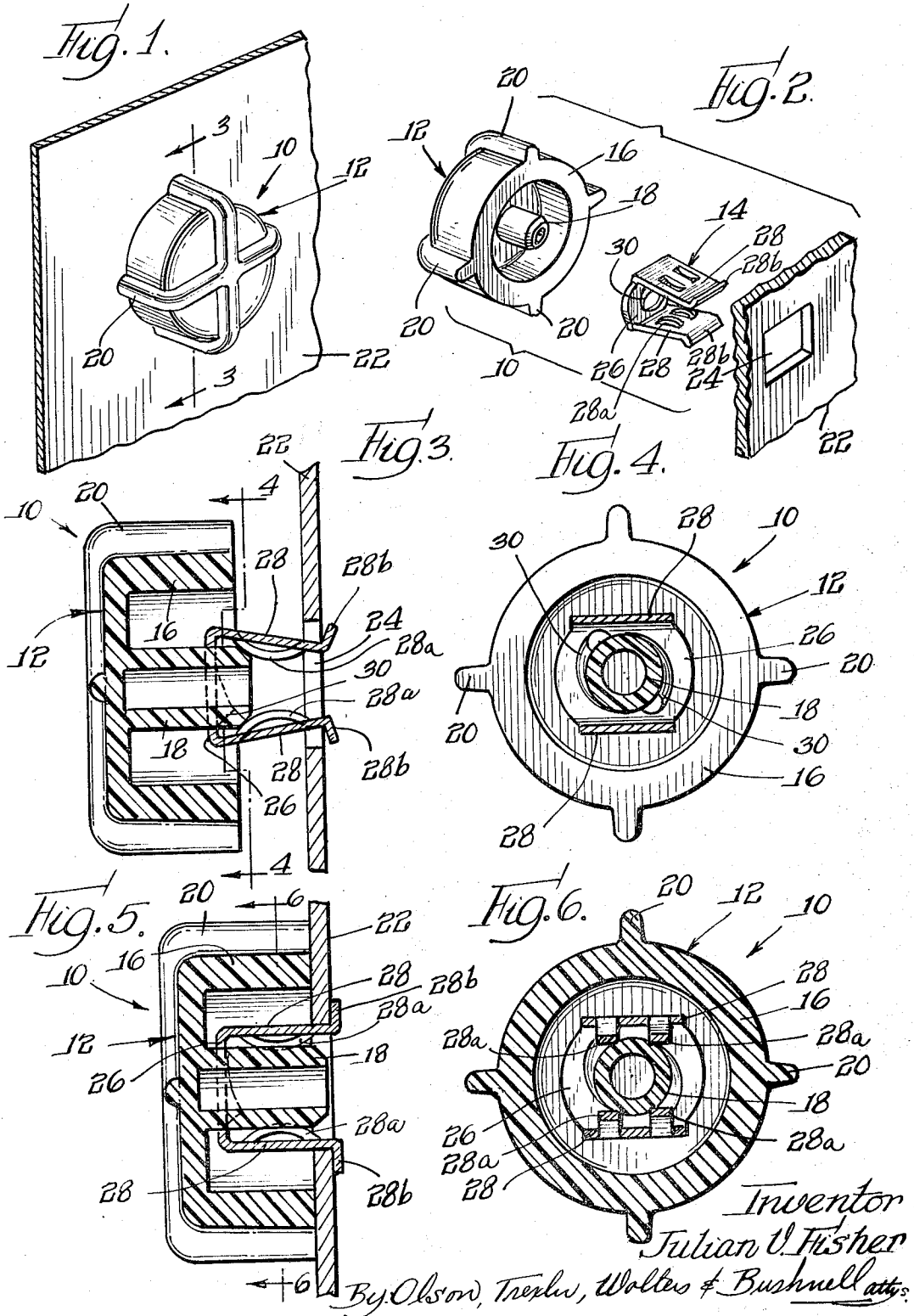
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3,300,169

SUPPORT ASSEMBLY FOR SHELVES

Filed Oct. 22, 1965

2 Sheets-Sheet 1



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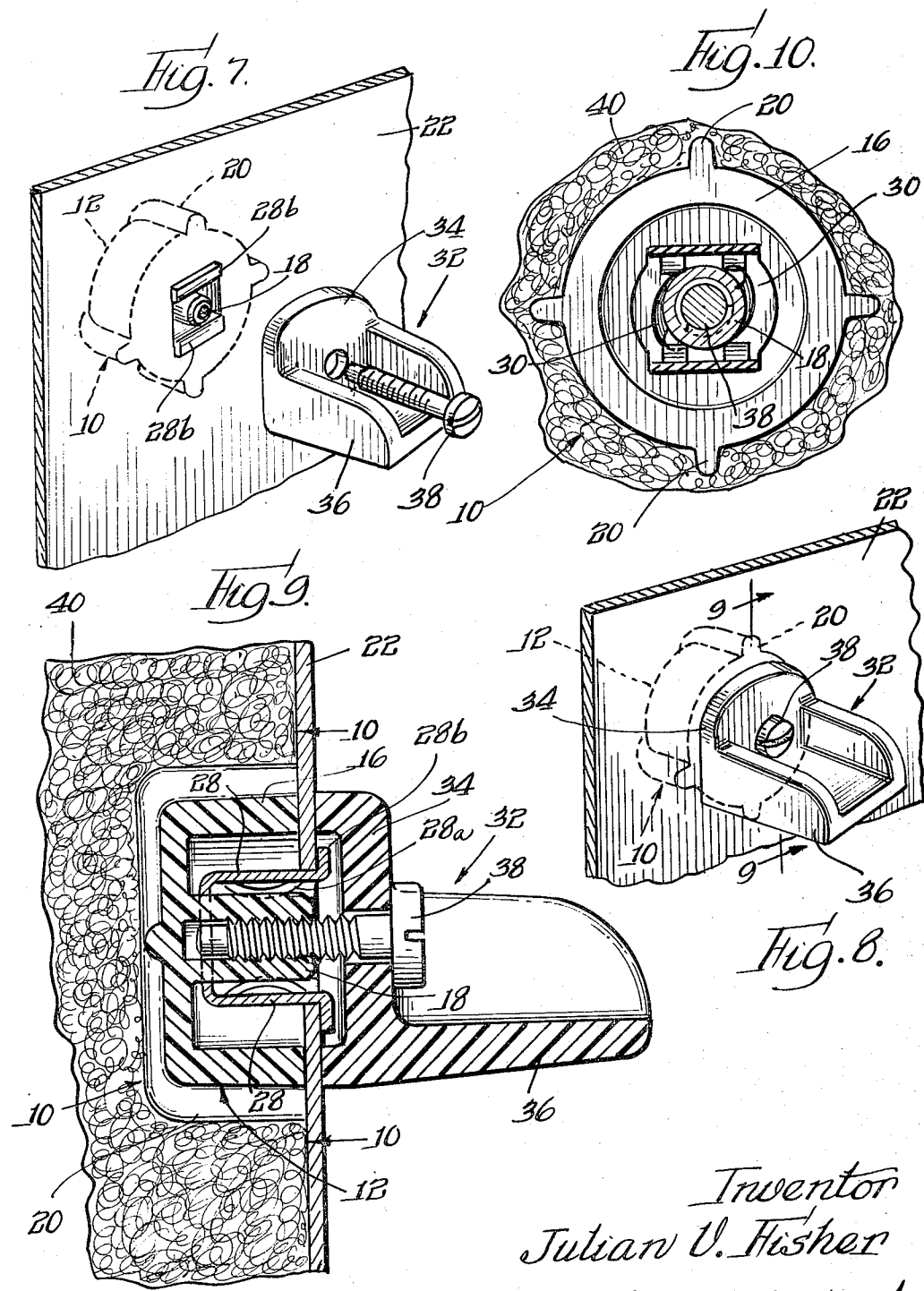
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## SUPPORT ASSEMBLY FOR SHELVES

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12 Claims. (Cl. 248—239)

This invention relates generally to supports for shelves and the like, and more particularly to a shelf support assembly adapted to be secured with facility within an aperture of a sheet metal panel.

The present invention has a very practical application in instances where shelves are to be mounted within a chamber or area bounded by sheet metal panels, as for example the interior of a refrigerator. It is an object of the present invention to provide a shelf support of extremely simple and practical construction which may be attached to, or detached from, a sheet metal panel such as the wall of a refrigerator, with the utmost ease and without the necessity of using assembly tools of any kind.

A further object of the present invention is to provide a shelf support assembly which may be anchored in place by merely inserting a shank portion thereof within a preformed aperture of a workpiece such as a sheet metal panel and thereafter imparting rotation to the shelf support so as to effect firm anchorage thereof to the panel.

It is a further object of the present invention to provide a shelf support anchorage device consisting of a fastener shank portion adapted for association with a work aperture, and a non-corrosive rotatable shelf support portion cooperatively associated with the fastener portion so that when rotation is imparted to the shelf support portion, it will cause the fastener portion to become permanently affixed to the apertured panel.

The foregoing and other objects and advantages will be more apparent from the following description when considered with the accompanying drawing wherein:

FIG. 1 is a fragmentary perspective view of a panel having mounted thereon a shelf support member or assembly of the type contemplated hereby;

FIG. 2 is a perspective exploded view of the parts shown in FIG. 1 for the purpose of more clearly illustrating the shelf support assembly components;

FIG. 3 is an enlarged vertical sectional view taken substantially along the line 3—3 of FIG. 1 prior to the final assembly of the shelf support member and its companion shank member to the apertured workpiece or panel;

FIG. 4 is a vertical sectional view taken substantially along the line 4—4 of FIG. 3;

FIG. 5 is a vertical sectional view similar to FIG. 3, disclosing the shelf support assembly parts secured in final position to the workpiece or panel;

FIG. 6 is a vertical sectional view taken substantially along the line 6—6 of FIG. 5;

FIG. 7 is a perspective view of a modified form of the shelf support contemplated by the present invention;

FIG. 8 is a view similar to FIG. 7 showing the shelf support mounted in position upon a panel;

FIG. 9 is an enlarged vertical sectional view of the part as shown in FIG. 8, said view being taken substantially along the line 9—9 of FIG. 8; and

FIG. 10 is a transverse vertical sectional view taken substantially along the line 10—10 of FIG. 9.

Referring now to the drawing more in detail wherein like numerals have been employed throughout the various figures to designate similar parts, one embodiment of the shelf support assembly unit is designated generally by the numeral 10. This assembly unit 10 comprises a shelf support member 12, and an anchoring member or fastener shank 14. The shelf support member 12 is preferably formed of non-corroive material such as a suitable plastic

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compound and includes a cylindrical body portion 16 and a central axially extending cylindrical portion 18 housed within the cylindrical body 16. The exterior of the body 16 is provided with a plurality of circumferentially spaced peripheral ribs 20, continuations of which extend transversely of the outer or closed side of the body 16. As will later be described, rotation must be imparted to the shelf support member 12 in order to bring about its permanent association with a workpiece or panel 22 provided with an aperture 24 as clearly shown in FIGS. 2, 3 and 5. The aforementioned ribs 20 facilitate manual gripping of the shelf support 12 when rotation is to be imparted thereto.

The anchor member or fastener shank 14 may be formed of suitable spring sheet stock and includes a transverse body portion 26 from which extend two yieldable arms 28. The transverse body portion 26 of the shank 14 is apertured to accommodate the cylindrical member 18 as clearly shown in FIG. 3. The material of the transverse body 26 is formed and axially deflected so as to present a pair of helical elements 30 which function as thread helices for impinging the periphery of the member 18 as the shelf support member 12 is rotated from the position shown in FIG. 3 to its final mounted position as shown in FIG. 5. By relatively rotating the support member 12 and the anchor member or shank 14 so as to move the two parts into the assembled relation shown in FIG. 3, the assembly may be handled as a single unit. With these parts thus assembled, the free extremities of the arms 28 of the shank 14 may be inserted within the complementary non-circular aperture 24.

With the arms 28 inserted within the aperture 24 of the workpiece or panel 22, rotation may be imparted to the shelf support member 12. The complementary non-circular relationship of the aperture 24 and the complementary noncircular cross-section of the shank 14 insures said shank against rotation within the workpiece 22. With the shank 14 thus secured against rotation within the workpiece 22, continued rotation of the shelf support member 12 from the position illustrated in FIG. 3 causes the forward tapered or chamfered extremity of the member 18 to be moved into engagement with struck-out cam sections 28a on the arms 28. This shifts the arms 28 outwardly or laterally, causing lip portions 28b, provided at the free extremities of the arms 28, to be moved into overlapping and interlocking relationship with respect to the oppositely disposed wall edges defining the noncircular aperture 24. When the shelf support member 12 is rotated to its final position as shown in FIG. 5, these lip portions 28b cooperate with the clamping side of the member 12 to secure the assembly in permanent association with the workpiece or panel 22. The coaction between the thread helices 30 of the anchoring shank 14 and the periphery of the softer stud member 18 of the shelf support 12 causes the clamping side of said support to be secured firmly against the surface of the workpiece or panel 22. As previously pointed out, the ribs 20 along the periphery of the member 12 facilitate manual rotation of the member. The assembly may be detached from the workpiece as easily as it was applied thereto.

In the shelf supporting device previously described herein the anchor member 12 provides the shelf support per se. There are instances in which a shelf support differing in shape or contour from the member 12 as shown in FIGS. 1-6 inclusive, may be desired. Thus, for example, the part to be supported may be in the form of a rod or a protuberance on a shelf. In such instances the shape of the member 12 is such as to not adapt itself readily for supporting rods and the like. In FIGS. 7-10 inclusive a modified shelf supporting or rod supporting arrangement is disclosed. In this embodiment the support member per se is designated generally by the numeral

32. The support 32 comprises a panel engaging body portion 34 and a support portion 36 of U-shaped cross-section extending laterally of the body or base 34. The support 32 is held in place by a screw member 38 as clearly shown in FIG. 9.

It will be noted that the assembly unit 10 previously described in connection with FIGS. 1-6, inclusive, is now employed as the means for accommodating the screw member 38. The device as shown in FIGS. 7-10 inclusive contemplates mounting the assembly unit 10 inside of the panel 22. Thus the assembly unit 10 is mounted upon the panel 22 exactly as previously described only it is secured to the inside or insulated side of the panel. The assembly 10 of FIGS. 7-10, inclusive, is first mounted on the inside of the panel and then surrounded by conventional insulating material 40, as shown in FIGS. 9 and 10. The hollow stud 18 may be provided with internal threads to accommodate the screw member 38 or a thread forming screw may be inserted within the unthreaded stud. The cross-sectional contour of the shelf support 32 is such as to accommodate a shelf rod or the like. It will be apparent that the device as shown in FIGS. 7-10 inclusive makes it possible to employ specially designed supports to meet special needs.

It is preferable to so form the helical impressions 30 as to require the anchor member 12 to be rotated in a counter-clockwise direction as viewed from FIG. 9 to clamp it against the inner surface of the panel 22. By so doing, tightening rotation of the screw member 38 will not have the tendency to rotatably urge the anchor member 12 in a loosening direction. That is to say, any tendency for the threads of the screw member 38 to impart rotation to the anchoring member 12 is precluded.

From the foregoing, it should be apparent that the present invention contemplates a very simple, yet rigid shelf support assembly which may be produced at a very low cost. The shelf support member per se may consist of a molded plastic part and the anchor member or fastener shank associated therewith may be produced by practicing conventional forming and stamping methods from metallic sheet stock. By having the support member and the work interlocking anchor member or shank preassembled as above described, the assembly may be handled very conveniently as a single unit. Obviously articles or parts other than shelf supports may be attached to a panel by employing the teachings of the present invention. It will also be understood that the present invention contemplates an arrangement wherein the anchoring member may serve as the shelf support per se or may be employed merely as an anchoring device to accommodate a shelf support member per se. In FIGS. 1-6 inclusive the anchoring member of the assembly unit actually functions as a supporting member, whereas in FIGS. 7-10 inclusive the same anchoring member provides a means for accommodating a support member per se.

For the purposes of illustration practical embodiments of the invention and specific structural details have been described. Obviously, the invention contemplates other modifications and changes and should only be limited by the scope of the appended claims.

The invention is claimed as follows:

1. A support assembly for shelves and the like, said assembly including a shank section of noncircular cross-section for initial insertion within a complementary non-circular work aperture, said shank section having expandable work interlocking means, a rotatable support member for shelves and the like having means rotatably engageable with said shank section to relatively shift said member and shank section axially toward each other, and means associated with said shank section engageable with said anchor member as an incident to relative rotation of said support member and shank, whereby to expand said shank section into locking engagement with the walls defining a complementary work aperture.

2. A support assembly for shelves and the like, said assembly including a shank section of noncircular cross-section for initial insertion within a complementary non-circular work aperture, said shank section having expandable work interlocking means and stud accommodating means, a support member for shelves and the like having an axially disposed stud member for rotatable association with said shank section to relatively shift said member and shank section axially toward each other, and means associated with said shank section engageable with the stud member of said support member as an incident to relative rotation of said support member and shank section, whereby to interlock said shank section into locking engagement with the walls defining a complementary work aperture.

3. A support assembly for shelves and the like, said assembly including a shank section of noncircular cross-section for initial insertion within a complementary non-circular work aperture, said shank section having work interlocking means and means for helically engaging a stud periphery, a support member for shelves and the like having an axially disposed stud member rotatably engageable with said shank section to relatively shift said member and shank section axially toward each other, and means associated with said shank section engageable with the stud member of said support member as an incident to relative rotation of said support member and shank section, whereby to interlock said shank section with the walls defining a complementary work aperture.

4. A support assembly for shelves and the like, said assembly including a shank section of noncircular cross-section for initial insertion within a complementary non-circular work aperture, said shank section having work interlocking means and means for helically engaging a stud periphery, a support member for shelves and the like having an axially disposed externally unthreaded stud member rotatably engageable with said shank section to relatively shift said member and shank section axially toward each other, and means associated with said shank section to be engageable with the stud member as an incident to relative rotation of said support member and shank section, whereby to interlock said shank section with the walls defining a complementary work aperture.

5. A support assembly for shelves and the like, said assembly including a shank section of noncircular cross-section for initial insertion within a complementary non-circular work aperture, said shank section having work interlocking means and stud accommodating means, a support member for shelves and the like having an axially disposed stud member rotatably engageable with said shank section to relatively shift said member and shank section axially toward each other, said support member including an annular body portion spaced radially from said stud member to accommodate said shank section when said support member and shank section are drawn axially toward each other, and means associated with said shank section engageable with the stud member of said support member as an incident to relative rotation of said support member and shank section, whereby to interlock said shank section with the walls defining a complementary work aperture.

6. A support assembly for shelves and the like, said assembly including a shank section of noncircular cross-section for initial insertion within a complementary non-circular work aperture, said shank section including axially extending and laterally yieldable elements providing work interlocking means, a support member for shelves and the like rotatably engageable with said shank section to relatively shift said member and shank section axially toward each other, and means associated with said shank section engageable with a portion of said support member as an incident to relative rotation of said support member and shank, whereby to interlock said shank section with the walls defining a complementary work aperture.

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7. A support assembly for shelves and the like, said assembly including a shank section of noncircular cross-section for initial insertion within a complementary non-circular work aperture, said shank section having work interlocking means, a support member for shelves and the like rotatably engageable with said shank section to relatively shift said member and shank section axially toward each other, said support member having a work clamping side, said shank section including laterally extending means for clampingly engaging the side of a workpiece oppositely disposed from the clamping side of the support member, and means associated with said shank section engageable with a portion of said support member as an incident to relative rotation of said support member and shank, whereby to interlock said shank section with the walls defining a complementary work aperture.

8. A support assembly for shelves and the like, said assembly including a shank section of noncircular cross-section for initial insertion within a complementary non-circular work aperture, said shank section including a transverse body portion apertured to accommodate a stud and laterally yieldable extensions from said body providing work interlocking means, a support member for shelves and the like having an axially disposed stud member telescopically associated with said shank aperture whereby upon relative rotation of said parts said shank section and member will shift relatively axially toward each other, said support member having an annular area surrounding said stud member for accommodating said shank section as the parts are drawn together, said support member having a work clamping side means in the vicinity of the outer extremity of said stud section engageable with the side of a workpiece oppositely disposed from the side adapted to be clampingly engaged by said support member, and means for initiating the expansion of said shank section as an incident to relative rotation of said support member and shank section.

9. A support assembly for shelves and the like, said assembly including a shank section of noncircular cross-section for initial insertion within a complementary non-circular work aperture, said shank section having work interlocking means, a support member for shelves and the like having an external periphery rotatably engageable with said shank section to relatively shift said member and shank section axially toward each other, said anchor support member also having a screw accommodating aperture and means associated with said shank section engageable with a portion of said support member as an incident to relative rotation of said support member and shank, whereby to interlock said shank section with the walls defining a complementary work aperture.

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10. A support assembly for shelves and the like, said assembly including a shank section of noncircular cross-section for initial insertion within a complementary non-circular work aperture, said shank section having work interlocking means and stud accommodating means, a support member for shelves and the like having an axially disposed stud member having an external peripheral surface rotatably engageable with said shank section to relatively shift said member and shank section axially toward each other, said stud member also having an axial, screw accommodating aperture and means associated with said shank section engageable with the stud member of said support member as an incident to relative rotation of said support member and shank section, whereby to interlock said shank section with the walls defining a complementary work aperture.

11. In combination with an apertured panel, a support assembly for shelves and the like including a shank section having a portion of noncircular cross-section extending through the panel aperture and a portion for interlocking with a stud periphery, a panel clamping member having a stud presenting an external periphery engageable with said shank section for clamping the assembled parts in position upon said panel as an incident to relative rotation between said panel clamping member and stud, said panel clamping member having an axially disposed screw accommodating aperture, a support member engaging the side of the panel oppositely disposed from said panel clamping member, and screw means extending into the axial aperture of the anchor member for securing said support means to said panel.

12. In combination with an apertured panel, a support assembly for shelves and the like as set forth in claim 11, wherein the shank section is of sheet metal and has a helically formed impression for engaging the stud of the panel clamping member.

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