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H. L. BAKER

3,403,641

BRACKETS FOR ASSEMBLING KNOCKDOWN CABINETS

Filed Nov. 24, 1967

3 Sheets-Sheet 1

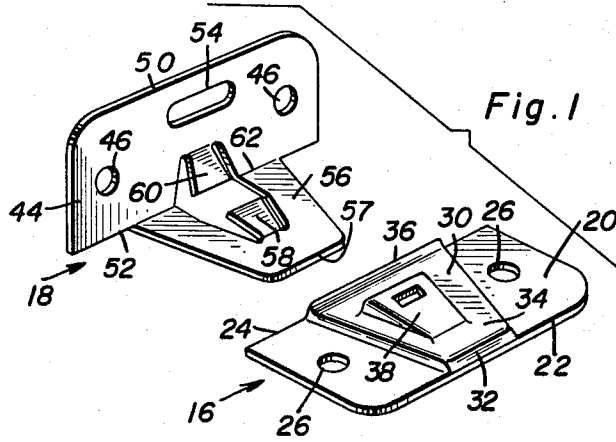


Fig. 1

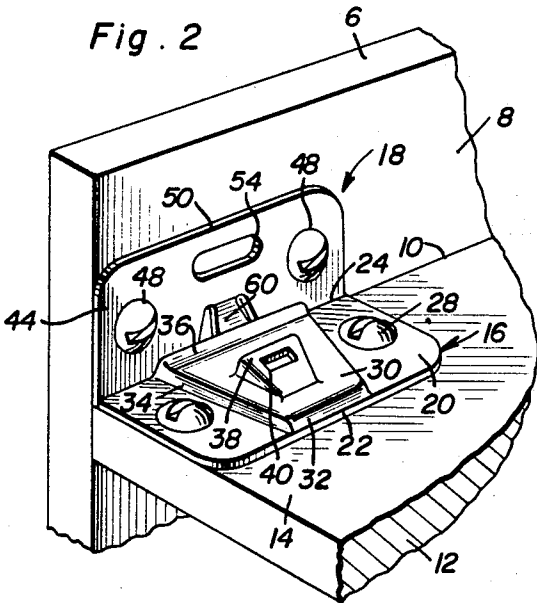


Fig. 2

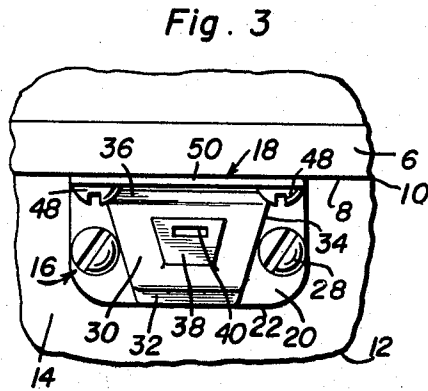


Fig. 3

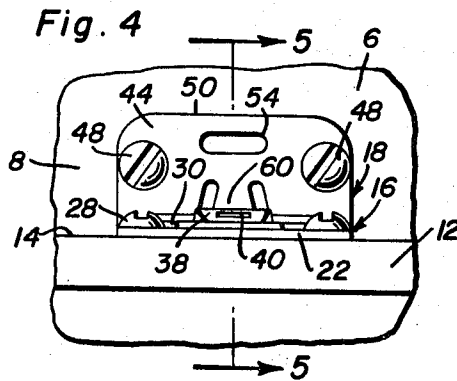


Fig. 4

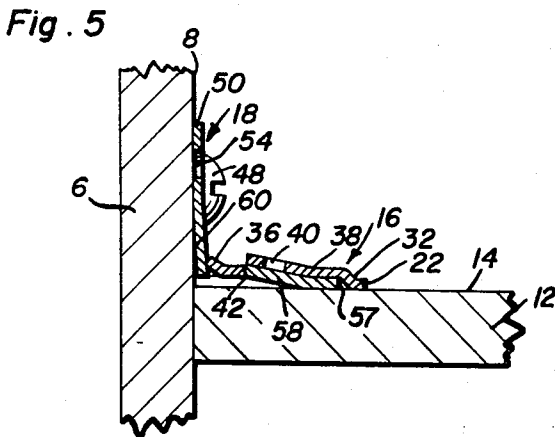


Fig. 5

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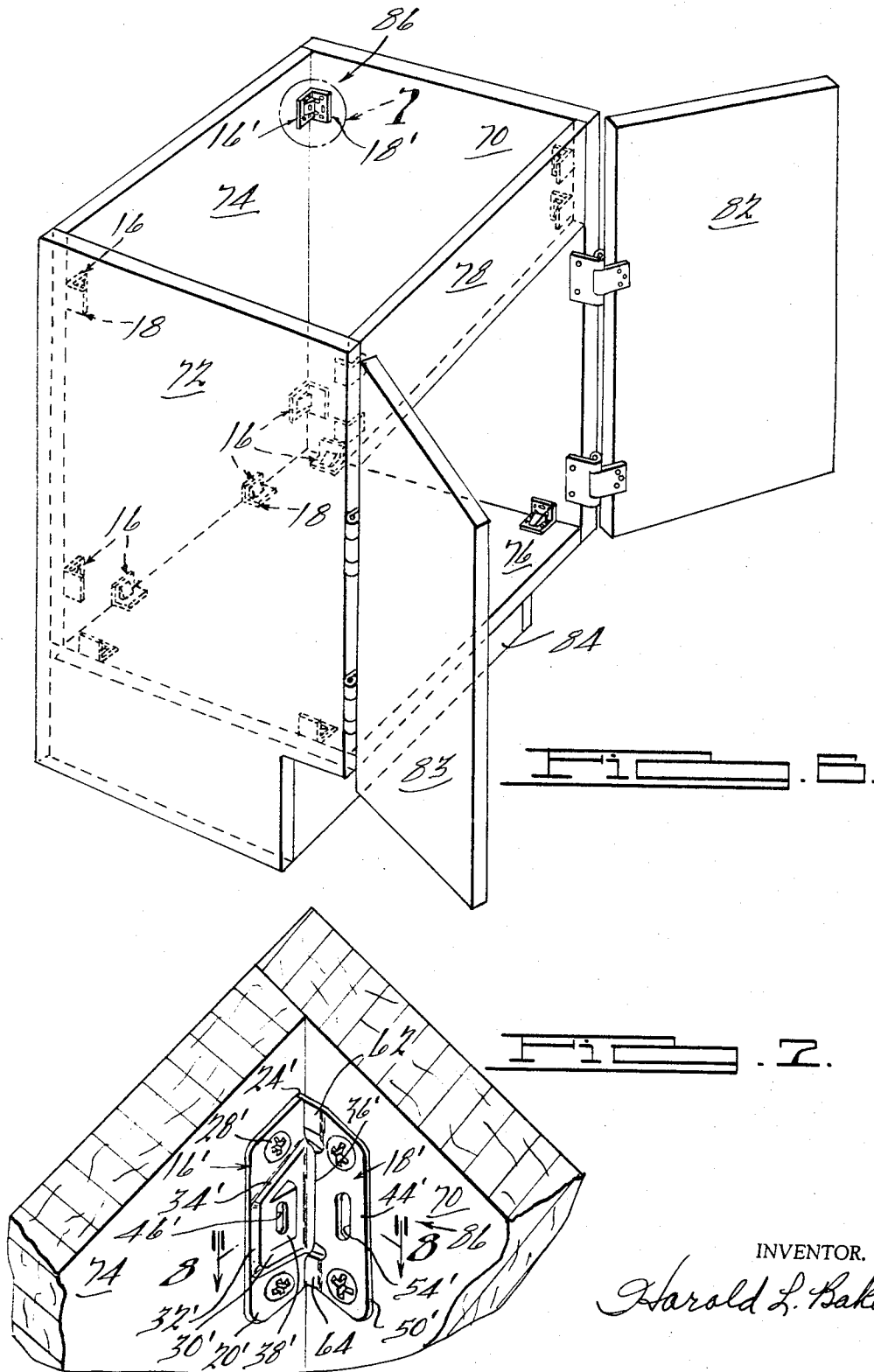
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3 Sheets-Sheet 2



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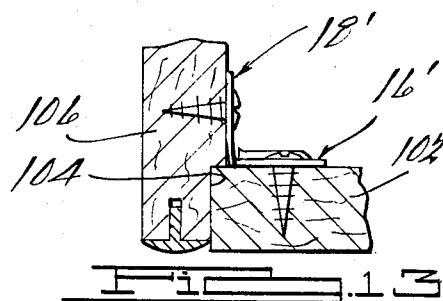
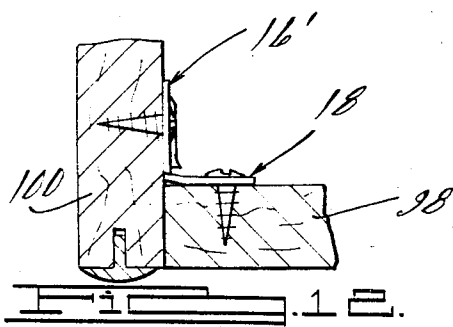
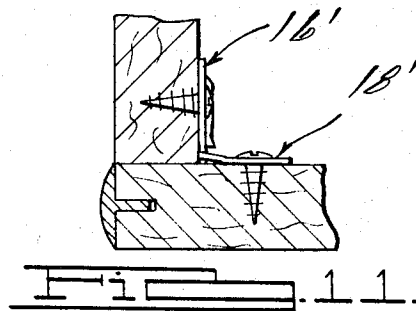
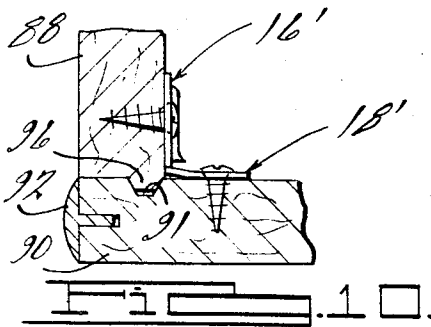
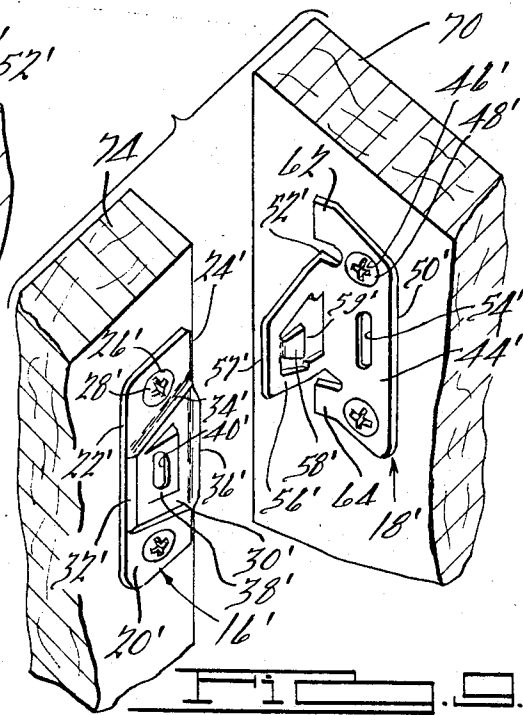
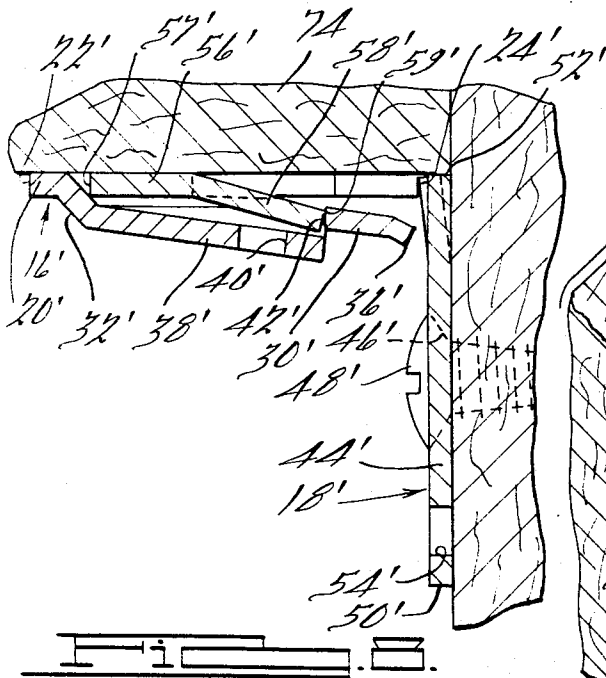
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3 Sheets-Sheet 3



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**BRACKETS FOR ASSEMBLING  
KNOCKDOWN CABINETS**

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Continuation-in-part of application Ser. No. 522,732, Jan. 24, 1966. This application Nov. 24, 1967, Ser. No. 691,095

20 Claims. (Cl. 108—152)

**ABSTRACT OF THE DISCLOSURE**

A bracket assembly for facilitating the rapid assembly of panels, shelves and the like in which one bracket portion snaps into locking engagement with another, with, preferably, the two portions being self biased apart to a locked position.

*Background and summary of the invention*

The present invention relates to prefabricated ready-to-use knockdown cabinets with wall panels, shelves and the like which are provided on predetermined assembling surfaces with quickly connectible brackets and has reference, more particularly, to novel assembling brackets.

This application is a continuation-in-part of my co-pending application Ser. No. 522,732, filed Jan. 24, 1966, and now abandoned.

More specifically, the arrangement herein disclosed has to do with knockdown cabinet assemblies utilizing a pair of specially constructed brackets one of which is provided with a plate-like base, said base being mounted flatwise on a coating panel or wall surface by rivets, screws, nails, staples or other fastening means. The companion bracket is likewise characterized by a plate-like base and it, too, is superimposed upon a surface of a shelf or other cabinet component and is secured in place by fasteners of the aforementioned type. The general concept lies in arranging the plates of the respective brackets at right angles to each other, and then linking and connecting the same together by quick separable connecting means.

The present invention has to do with certain new and useful improvements in such cabinets and particularly with improvements in a pair of coordinating brackets wherein each bracket is structurally distinct and wherein the interconnecting components are functionally designed and structurally adapted to more satisfactorily serve the purposes desired, that is, quickly assembling the cabinet walls and shelves to facilitate expedient packaging, shipping in knocked-down form and subsequent assembly by the purchaser. Experience has shown that cabinet components equipped with brackets perfected in accordance with the present concept mounted thereon facilitate ready and reliable assembling of the components into cabinetry that is amply strong and permits, if desired, the use of panels and shelves of heavier and more durable stock and results in an attractive-easy-to-assemble cabinet.

In carrying out the principles of the invention the coacting expedients which render the brackets illustrated herein especially suitable and efficient for use on and in connection with knockdown cabinets make it possible and practical to simply force the component parts (a wall and shelf, for example) into proximity, line up the brackets, and then snap the latching and interlocking means, and consequently the brackets and the component parts, together. The construction of the brackets is such that with the brackets mounted to the cabinet components the only tools ordinarily useful are a mallet and a screwdriver; the mallet to facilitate the assembling step, and the screwdriver to release the latch or detent, whereby to facilitate disassembling the cabinet parts.

As will be hereinafter more clearly set forth in the description of the illustrated embodiment one bracket is of the female type and is customarily screwed or otherwise mounted on a shelf or the like. The other bracket is of a male type and it is attachable to a wall surface or the like against which an end or edge portion of the shelf is butted for bracketing.

The illustrative female bracket is unique in that it embodies, in addition to the plate-like base, a median portion having a sheath which is pressed out, embossed or otherwise formed and which defines and provides a female coupling member. This sheath is open along one marginal edge and provides an entrance leading to the socket or receiver portion of the sheath. The illustrative complementary or companion male bracket is also characterized by a plate-like base which is similar in construction to the first-named base. The male bracket is adapted to be superimposed upon and secured flatwise to a predetermined area of the face of the wall or panel whereby the latter and shelf are then at 90° and are capable of being connected together by the snap action coupling means.

The plate-like base of the illustrated male bracket is provided on a median portion thereof, that is a lengthwise edge, with a right angled tongue. This tongue is identified as the main tongue and it projects from the edge of the base and is adapted to be telescopically fitted into the female coupling. In addition, this main tongue embodies, in the illustrated arrangement, an auxiliary struck-out tongue. The auxiliary tongue is relatively flexible and resilient in bending during assembly and relatively rigid in compression (or columnarily loaded as in use) and constitutes and provides a yieldable but strong and efficient snap-type retaining latch. By providing the sheath with a keeper or the like and lining up and coupling the main tongue and sheath, the latch comes into play and cooperatively engages the keeper. It will be noted in the illustration that the latch is exposed by way of an opening which is readily accessible. Hence, by using a screwdriver or the like one can release the latch whenever necessary or desired.

In addition to the above it will be later observed that in the first illustrated embodiment, the median (representatively) bottom portion of the plate or base of the male-type bracket is equipped with a struck-out tongue which is herein described as a resilient tang or resilient means. This tang is pressure responsive and it cooperates with a rib or edge along the mouth portion of the sheath-type female coupling member in a manner to utilize the inherent tension of the tang to assist in permitting a slight shift of the brackets toward each other when assembling and when disconnecting the same but normally maintaining the brackets in relative association minus undue play or the likelihood of rattling and exerting a force tending to move the two bracket elements apart.

In the second, presently preferred embodiment, correlative but improved results are achieved with a pair of resilient tangs, one to each side of the main tongue, engaging, at spaced locations, an edge of the female coupling member.

These together with other objects and advantages which will become subsequently apparent reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming a part hereof, wherein like numerals refer to like parts throughout, and in which:

FIGURE 1 is a view in perspective showing the two brackets, the male type bracket at the left and the female type bracket at the right with the two brackets ready to be lined up and connected together;

FIGURE 2 is a view also in perspective and which shows the brackets in the same order and relationship

but with the brackets attached one to a cabinet panel or wall at the left and the other one atop a cooperating shelf to the right or vice versa, the brackets being here latched together;

FIGURE 3 is a top plan view on a smaller scale of the assemblage shown in FIG. 2;

FIGURE 4 is an edge view of the brackets observing the same in a direction from right to left in either FIGS. 2 or 5, as the case may be;

FIGURE 5 is a cross-section taken on the plane of the section line 5—5 of FIG. 4;

FIGURE 6 is a perspective view of a knockdown cabinet embodying certain of the principles of the present invention;

FIGURE 7 is an enlarged view of the area labeled 7 in FIG. 6;

FIGURE 8 is a sectional view taken substantially along the line 8—8 in FIG. 7;

FIGURE 9 is a view of the structure of FIG. 7 shown in a disassembled condition;

FIGURE 10 is a fragmentary sectional view of one mode of interassociating a pair of cabinet structural members utilizing the principles of the present invention;

FIGURE 11 is a fragmentary sectional view of another mode of interassociating a pair of cabinet structural members utilizing the principles of the present invention;

FIGURE 12 is a fragmentary sectional view of another mode of interassociating a pair of cabinet structural members utilizing the principles of the present invention; and

FIGURE 13 is a fragmentary sectional view of another mode of interassociating a pair of cabinet structural members utilizing the principles of the present invention.

With reference first to FIG. 2 it will be seen that the structural members or component parts which are to be assembled and connected together to provide a knockdown structure may take the form of typical panels, walls, shelves and so on. For convenience it can be assumed that the wall 6 is a vertical cabinet wall having a planar or flat surface 8 against which an abutting marginal edge 10 of a right angularly disposed shelf or equivalent part 12 is positioned for assembling purposes. The flat top surface 14 is disposed at right angles to the surface 8.

While the brackets could be identified and differentiated as first and second brackets it is believed that because of the specific manner in which they are individually constructed, it is best to identify them as (1) a female-type bracket 16 (at the right in the views of the drawing) and (2) a male-type bracket 18 (at the left). Both brackets are similar, that is, basically similar in construction and purpose.

The bracket (or clip) 16 is made, for example, of case hardened cold-rolled steel. The companion male bracket 18 is made, for example, of spring steel and the two brackets have coacting component parts which make it possible to line up the same and snap them together and, if desired, to subsequently separate them, for knockdown, storing, and shipping purposes.

The female-type bracket comprises a substantially rectangular plate-like base 20 which is adapted to be superimposed flatwise on and securely mounted atop a predetermined surface of the shelf (FIG. 2). This plate can be and preferably is rectangular and has one longitudinal edge at 22 and the other longitudinal edge at 24. The transverse end portions are provided with holes 26 to accommodate the fastening screws or equivalent headed fasteners or securing means 28 (FIG. 2). The median transverse portion of this plate is provided with an indented or pressed out component here designated as a sheath 30. In the illustrated arrangement, the sheath is closed, that is, one end portion 32 of the sheath substantially registers with, or may, substantially register with, the edge 22. The other, lateral, marginal edge portions 34 are illustrated to be integral and the remaining marginal edge portion is open and flush with the edge portion 24 and is or may be provided with a reinforcing rib or guide or camming surface 36. This provides the mouth of the

receptacle portion of the sheath and the sheath in turn constitutes and provides the desired female coupling member. It will be further noted that the median part, in the illustrated embodiment, of the sheath itself is provided with an embossed or pressed out riser 38 which constitutes a shield. This shield has a sight opening therein as at 40 which serves a purpose to be later described. The left hand end portion of this portion 38 is lanced open to establish an outwardly facing edge portion which constitutes a stop shoulder as at 42 serving in the manner illustrated in FIG. 5, to establish in cooperation with an element of the male bracket a positive stop to separating movement of the two brackets. It will be observed that to accommodate the noted slight shifting of the brackets toward one another there will be a slight clearance between the edges 24 and 36 of the female bracket 16 and the portions of base 44 proximate thereto, as well as between the members 6 and 12, when the brackets are fully assembled, with the end of latch 58 abutting edge 42.

The male-type quick attachable and detachable bracket 18 comprises a substantially rectangular flat-faced plate-like base 44 having holes 46 for screw fastenings 48 when the base is mounted on the surface 8, as shown in FIG. 2. The upper longitudinal edge is denoted at 50 and the lower longitudinal edge at 52. A slot is provided at 54. The lower edge portion 52 of this bracket is provided with a right angular extension which is designated as a main tongue 56. This tongue is substantially wedge-shaped in plan, in the illustrated arrangement, and corresponds generally to the plan configuration of the aforementioned sheath and the leading edge 57 (FIG. 1) is adapted to be fitted through the mouth of the sheath so that the tongue can be lodged in place in the manner shown in FIGS. 2 to 5, inclusive, the taper of the tongue and sheath guiding the insertion. The main tongue of the illustrated male bracket is provided at its central or median portion with a resilient (in bending) struck-out tongue 58 which is referred to here as an auxiliary tongue and which constitutes and provides the aforementioned yieldable (in bending) snap-type retaining latch, cooperating with the edge 42. The central lower edge portion of the base 44 of the illustrated male bracket is provided with another struck-out tongue 60 which is shown as dovetail-shaped in configuration. This tongue for distinction is referred to as a tang and it is normally offset to provide the desired tension applying result illustrated in FIG. 2 and wherein it will be seen that the tang 60 engages the rib 36 to apply a continuing tension to the female bracket and a continuing spring force tending to separate the two brackets and virtually eliminates rattling between the two brackets. Stated otherwise, this tab-like tang 60 serves as a spring or resilient means acting between the brackets to continuously force the brackets apart to the limit or stop position defined and established by the abutment between edge 42 and the mating edge of tongue 58 and makes for a permanent locked joint.

These brackets or clips can be applied to any cabinet type structure with a corner (ranging from 0 to 180°) in any knockdown or disassembled form.

The female bracket or clip which is formed of steel or a suitable grade of moldable commercial plastics capable of accepting the male clip which is preferably made of processed spring steel or plastic material. The male bracket or clip locks automatically and can be released by depressing the flap-like latch 58 through aperture 40 in the female clip. These brackets can be applied either by rivets, screws, nails, staples or any satisfactory adhesive.

In practice, it will be seen that the leading end 57 of the latch-equipped male bracket can be lined up with the open mouth of the receptacle portion of the sheath, whereby to permit the thus oriented parts to be telescopically fitted together and to achieve the desired snap action and coupled result desired. The manner in which the brackets 16 and 18 are individually constructed should be clear from FIG. 1. The manner in which the two brackets are fastened in place for cooperative assembling

purposes is shown in FIGS. 2 to 5, inclusive. The construction, features and advantages will be clear from the specification and views of the drawing. Accordingly, a more extended description is deemed to be unnecessary.

An improved and presently preferred form of bracket assembly is illustrated primarily in FIGURES 7 through 9 of the drawings, and differs from the first embodiment primarily in that the central tang 60 (FIG. 1) in the first embodiment, which resiliently engages the central portion of the edge 24 of the female element to resiliently bias the male and female elements apart, has been replaced, in the second embodiment, with a pair of outboard spring or resilient fingers or tangs 62 and 64 which are spaced to each side of the main tongue 56' and which engage the edge 24' of the female element to each side of the riser portion 38' of the female element 16'.

Thus, the female bracket 16' (FIGS. 7-9) includes a substantially rectangular plate-like base 20' which is adapted to be securely mounted on one of two structural members, such as member 74, which is to be connected to another structural member, such as member 70. This plate can be and preferably is rectangular and has one longitudinal edge at 22' and another longitudinal edge at 24'. The transverse end portions are provided with holes, such as hole 26' to accommodate fastening screws or other headed fasteners or securing means such as screw 28'. The median transverse portion of this plate is provided with an indented or pressed-out component constituting a sheath 30'. In the illustrated arrangement, the sheath is again closed, that is one end portion 32' of the sheath substantially registers, or may substantially register, with the edge 22'. The other lateral, marginal edge portions 34' are illustrated to be integral with the plate, and the remaining marginal edge portion is open and flush with the edge portion 24' of the plate and is or may be provided with a deflected edge constituting a reinforcing rib or guide or camming surface 36'. This provides the mouth of the receptacle portion of the sheath and the sheath in turn constitutes and provides the desired female coupling member. It will be further noted that in the illustrated embodiment the median part of the sheath itself is provided with an embossed or pressed-out riser 38' which constitutes a shield. This shield has a sight opening therein as at 40' which serves a purpose to be later described. The end portion of the portion 38' is lanced open to establish an outwardly (leftwardly) facing edge portion which constitutes a stop shoulder as at 42' serving to establish, in cooperation with an element of the male bracket, a positive stop to separating movement of the two bracket parts.

The male elements 18' of the attachable and detachable bracket comprises a substantially rectangular flat-faced plate-like face 44' having holes such as hole 46' to accept securing means, such as screw 48, when the base is mounted on the surface of the structural element, such as element 70, with which the male bracket is associated. The opposing longitudinal edges of the plate portion 44' are denoted 50' and 52'. A positioning slot 54' may also be provided. The lower edge portion 52' of this bracket is provided with a right angular extension which is designated as a main tongue 56'. This tongue is substantially wedge-shaped in plan, in the illustrated arrangement, and corresponds generally to the plan configuration of the aforementioned sheath 30', and the leading edge 57' (FIG. 9) is adapted to be fitted through the mouth of the sheath so that the tongue can be lodged in place in the manner illustrated in FIGS. 7 and 8, the taper of the tongue and sheath guiding the insertion. The main tongue of the illustrated male bracket is provided at its central or median portion with a stuck-out tongue 58' which is resilient in bending but relatively rigid when columnarly loaded, which is referred to here as an auxiliary tongue and which constitutes and provides the aforementioned yieldable (in bending, during insertion) snap-type retaining latch, having an inwardly (rightwardly) facing edge

59' cooperating with the edge 42' on the female member.

In this embodiment, the male plate portion 44' is provided with a pair of depending resilient spring fingers or tangs 62 and 64 disposed to opposite sides of the tongue 56' and extending into substantial coplanarity with the undersurface of that tongue portion. Each is deflected, during manufacture, forwardly (in the direction of the projecting tongue) of the plane of the body of the plate 44' by a small amount (somewhat more than the thickness of the metal in the illustrated arrangement). Similarly to the relationships established in the first-illustrated embodiment, when the main tongue 56' of the male element 18' is slipped into the sheath 30' of the female bracket element 16', tangs 62 and 64 engage outboard portions of the edge 24' of the female element 16' prior to the point in the travel of the male tongue 56' at which the inwardly facing edge 59' is aligned with the edge 42' of the sheath 30'. As a result, additional movement of the main tongue 56' of the male member into the female member is required to establish locking relationship. This additional increment of movement can be accomplished by hand or with the use of a mallet. As the tongue 56' is forced further into the sheath 30', the tangs 62 and 64 are resiliently deflected towards planarity with the body of the plate 44' by virtue of their engagement with the edge 24' of the female element 16'. This deflection is desirably within the elastic limit of the material so that the tangs 62 and 64 exert a continuing significant force against the female element 16' opposing such further insertion. When the tongue 56' has been moved into the sheath 30' sufficiently to bring the edge 59' of the male element to and slightly beyond the edge 42' of the female element, and auxiliary tongue 58' which is cammed downwardly toward planarity with the remainder of the main tongue 56' by the undersurface of sheath 30' during the insertion, will snap back towards its free position to a position illustrated in FIG. 8 in which the inwardly facing edge 59' is in engagement with the outwardly facing edge 42', to lock the two bracket elements together. When this occurs, the tangs 62 and 64 are deflected, are under resilient tension, and will exert a continuing force tending to move the female bracket element 16' away from the male bracket element 18' and hence tending to force edges 42' and 59' into tight abutting engagement. Thus there is again in this embodiment a continuing spring force tending to separate the two bracket elements, resulting, in this case, from the deflection of the cantilever spring elements or tangs 62 and 64 which tends to separate the two bracket elements and which forces the bracket elements apart to the limit or stop position defined and established by the abutment between the edges 42' and 59'. This locks the joint, and hence the structural elements of the cabinet, positively together against inadvertent and unintentional separation and creates a uniquely solid assembled knock-down cabinet. The second embodiment is preferred primarily in that the outboard relationship of the tangs 62 and 64 established an improved rigidity of interconnection which is particularly significant when but two pairs of brackets are used to secure a structural element in place which may be subjected to twisting or tilting forces, such as a door stile.

While the component elements of the bracket assembly illustrated in FIGURES 7 through 9 are rigidly locked together by virtue of the continuing substantial spring force therebetween, the fact that the spring force is exerted in a direction intended to separate the elements facilitates disassembly of the knockdown cabinet if it is desired to do so. Upon the insertion of a suitable tool such as a screwdriver in the aperture 40' and the exertion of enough force to deflect the tongue 58' sufficiently to separate edges 42' and 59', the previously restrained substantial spring forces are released and the tangs 62 and 64 (or the tang 60 in the first embodiment) causes the two elements of the bracket assembly to essentially jump apart a sufficient distance to release the major frictional forces

therebetween, so as to permit the constituent elements of the cabinet to be readily separated from one another.

While the assembled knockdown cabinet illustrated in FIG. 6 of the drawings representatively discloses the bracket assembly illustrated in FIGS. 7 to 9 of the drawings, the principles are applicable to any brackets, such as the bracket constituting the first embodiment, incorporating the principles of the invention. The knock-down cabinet illustrated in FIG. 6, which may represent a kitchen base cabinet or a vanity, includes a pair of parallel side walls or panels 70 and 72, a rear wall or panel 74, a bottom shelf 76, a sink panel 78 at the front interconnecting the end panels 70 and 72, a pair of doors 82 and 83 hinged to the end panels 70 and 72, respectively, and a kick panel 84 underlying the bottom shelf 76 and extending between the end panels 70 and 72. A representative mode of associating the bracket elements with those structural elements to constitute the completed cabinet is illustrated. The back panel 72 is connected to each of the side panel 70, the side panel 72 and the bottom shelf 76 by a pair of bracket assemblies such as bracket assembly 86. In one mode, the female element of the bracket assembly is, in each case, mounted on the back panel 74. The bottom shelf 76 is coupled to each of the end panel 70 and the end panel 72 by a pair of brackets with, illustratively, the female bracket elements being mounted on the bottom shelf. The sink panel 78 is associated with each of the end panel 70 and the end panel 72 by means of a pair of bracket assemblies with the male bracket element illustratively being mounted on the sink panel. The kick panel should desirably be coupled, beneath the cabinet, both to the bottom shelf 76 and to the two end panels 70 and 72. In a preferred mode of assembly, the coupling between kick panel 84 and each end panel is by means of a single bracket assembly and a pair of such bracket assemblies are used to interconnect kick panel 84 and bottom shelf 76, with all of the bracket portions on the kick panel 84 being male elements. A major consideration in the selection of the orientation of the bracket assemblies is ultimate ease of assembly.

It will be appreciated that there is a choice as to which of two structural members shall bear the male bracket element and which shall bear the female and there is the choice of the interrelationship of two structural elements. Thus, it will be observed that in the arrangement of FIG. 5, structural element 12 is in end butting relationship with structural element 6, with the male bracket element being mounted on structural element 6 and the female bracket element being mounted on structural element 12. The resilient force exerted by the spring portion 69 tends continuously to force the male and female bracket elements apart to the limit position defined by the engagement between the edge 42 and the mating edge of auxiliary tongue 58, that is, the spring force will tend to move the female bracket element 16 to the right in the view of FIG. 5 away from the vertical plate portion of the male bracket element 18. The two structural members 6 and 12 will tend to be forced apart in the sense of translation of structural member 12 in a plane perpendicular to the plane of the structural member 6 in a direction away from optimum positional relationship. While in this case the minute movement of one structural member apart from the other is in a sense to tend to create a minute crack between those structural elements, the movement is so small as to not prove detrimental. If desired, a tongue can be formed on the left hand end of the structural member 12 to engage a mating groove formed in the base of structural member 6 to further improve the rigidity of the assembly.

Other interrelationships of the bracket elements and of the structural elements are representatively illustrated in FIGURES 10 through 13. While those figures illustrate the bracket assembly constituting the second embodiment of the invention, they are equally applicable to the first embodiment. In the arrangement of FIG. 10, structural

element 88 end abuts structural element 90, with the left hand face of structural element 88 being essentially coplanar with the left hand edge of structural element 90, although a decorative cap 92, to conceal the end grain of the wood or plywood, has been illustrated. A groove 94 is formed in the surface of structural element 90 to accommodate a tongue 96 formed on a structural element 88. The male bracket element 18' is secured to the structural element 90 and the female bracket element 16' is secured to the structural element 88. The resilient fingers on the male element 18 will tend to force the male and female bracket elements apart (in the sense of upward movement of bracket element 16 in the view of FIG. 10) to the defined limit position and the two structural members will be forced apart in the sense of translation of structural member 88 in a plane perpendicular to the plane of structural member 90 and in a sense or direction away from optimum position.

The arrangement of FIG. 11 is similar except that it illustrates that the tongue and groove relationship is not imperative.

In the arrangement of FIG. 12, structural element 98 is in end butting relationship with structural element 100, with the lower (FIG. 10) surface of the element 98 being essentially coplanar with the lower end of the element 100. In this case, the female bracket element 16' is secured to the structural element 100 and the male bracket element 18' is secured to the structural element 98. In this case the resilient force acting between the two bracket elements will tend to cause the two structural members 98 and 100 to be forced apart in the sense of translation of structural member 100 in a plane perpendicular to the plane of structural element 98. That is, the force will tend to move structural element 98 upwardly in the view of FIG. 12, in a direction away from the optimum relationship.

In the arrangement illustrated in FIG. 13, the end structural element 102 is seated in a rabbet 104 formed along the edge of structural element 106, with the lower face (FIG. 13) of structural element 102 either being effectively coplanar with the end of structural element 106 or, as illustrated, displaced slightly therefrom. In this case the male bracket element 16' is mounted on the structural element 106 and the female bracket element 18' is mounted on the structural element 102 so that the two structural members will tend to be forced apart in the sense of translation of structural element 102 in a plane perpendicular to the plane of structural element 106. As in all other cases, the movement is minute and continues only to the limit position defined by the engagement between the auxiliary tongue on the male element and the mating face of the sheath of the female element. It will be observed that the relative positions of the two bracket elements 16' and 18' in the arrangement of FIG. 11 can be reversed, in which event the two structural elements will be urged apart in the same sense as they are in the arrangements of FIG. 13.

To guide the user of the invention, certain of the dimensional relationships (all presented in inches) of a representative constructed form of the bracket assembly of FIGS. 7-9 are presented. The male element is made of 0.040 cold rolled annealed spring steel, SAE 1050. The main plate 44' is 0.77 by 1.50 overall. The main tongue 56' is 0.88 wide at its base and tapers at about 20° down to 0.53. It is about 0.70 long measured from the rear face of plate 44'. It is bent from plate 44' at a 0.03 radius. The auxiliary tongue 58' is about 0.30 wide at end 59' and tapers at about 20°, each side, over its length of about 0.26. It is deflected upwardly, in its free position, so that the upper edge of its surface 59' is about 0.06 from the upper surface of the main tongue 56'. From the face 59' to the adjacent face of plate 44' is about 0.22.

Each spring finger, such as finger 62, is about 0.22 long and about 0.23 wide, with the lower ends thereof

being approximately coplanar with the under surface of the main tongue 56'. Each is bent forwardly so that in its free position the forwardmost edge is about 0.06 from the nearest face of the plate 44'.

The female element is made of 0.040 SAE 1010 cold rolled steel and is about 0.75 by 1.50 in overall size. The sheath 30' is conformed to readily accommodate the main tongue 56'. The upper surface thereof is deflected from the main surface of the plate sufficiently to define, with the surface of the structural element with which it is associated, a cavity of appropriate height to effectively trap the thickness of the tongue 56'. In the constructed unit, the distance between the lower surface of the sheath and the lower surface of the plate was about 0.045 to accommodate the 0.040 main tongue acceptably tightly.

The edge 42' is about 0.190 from the forwardmost edge 24' of the female bracket and the riser 38' is raised sufficiently to accommodate the auxiliary tongue 58' as it snaps in place. In the constructed unit, the total depth between the lower or under surface of the plate 20' and the lower or under surface of the deepest part of the riser 38' was about 0.1.

The camming lip 36' was formed by deflecting about an 0.08 wide edge portion of the sheath 30', adjacent the mouth opening, upwardly at about a 30° angle. This causes the edge of the lip 36' to be spaced away from the plane of the edge 24' by about 0.010. This insures that the engagement between the two bracket elements, in a separating sense, is between the edge 24' and the flexible fingers 62 and 64.

It will be seen that when the main tongue 56' is inserted into the sheath 30', the outer surface of the auxiliary tongue 58' will engage the sloping undersurface of the lip or camming surface 36' and be gradually cammed downwardly towards and nearly into planarity with the remainder of the main tongue 56'. The resilient auxiliary tongue will then be exerting a significant force tending to restore it to its free position, so that as soon as the edge 59' of the auxiliary tongue 56' passes edge or stop shoulder 42' of the sheath 30', it will snap into locked position. In view of the latching engagement between surfaces 42' and 59' (and the corresponding edges in the first embodiment), edge 42' (or 42) constitutes a keeper for tongue 56' (or 56). However, well before such latching occurs, the edge 24' of the female bracket element 16' will have engaged spring fingers or cantilever springs 62 and 64 so that the final movement to latching position entails deflection of those spring fingers. Desirably the latching point—the limit stop position—occurs before the spring fingers 62 and 64 are deflected into planarity with the plate 44'. In the constructed unit, the dimensioning is such that with a unit constructed to nominal dimensions, the fingers 62 and 64 will be deflected about half way between their free positions and their fully planar positions at the point that surfaces 42' and 59' engage, so as to provide a range of tolerance. From the same standpoint, the bracket elements should be appropriately mounted on the structural elements, depending on the conformation and the interrelation of those structural elements, to provide a proper joint, again with a range of tolerance. In the arrangement illustrated in FIGS. 7-9 the lower surface of the main tongue 56' of the male element 18' is positioned so that the outer face of structural element 74 will be appropriately positioned in relation to the end of element 70. The female element is positioned to properly align, in cooperation with the positioned male element, the two structural elements in all senses. In the constructed arrangement, the edge 24' of the female element is desirably spaced from the end of structural element 74 by about the sum of the thickness of plate 44' and half of the deflectional movement of fingers 62 or 64, that is, about 0.07 inch.

While it will be apparent that the embodiments of the invention herein disclosed are well calculated to fulfill

the objects of the invention, it will be appreciated that the invention is susceptible to modification, variation and change without departing from the proper scope or fair meaning of the subjoined claims.

What is claimed is:

1. Bracket means for assembling and cooperatively joining prefabricated knockdown cabinet components such as, for example, an abutting end of a horizontal shelf to a companion face of a supporting wall, panel or the like comprising: a female bracket embodying a plate-like base adapted to be superimposed flatwise upon and secured to a predetermined surface of said shelf, a portion of said base having an integral offset sheath defining and providing a female coupling member, said sheath being open along one marginal edge and providing an entrance, a male bracket complementary to said female bracket and also embodying a plate-like base similar to said first-named base and adapted to be superimposed upon and secured flatwise to a predetermined area of the face of said wall in a manner to assume an angle of substantially 90° relative to said first-named plate-like base and having a portion of one lengthwise edge provided with a rigid main tongue disposed substantially at right angles to said base and projecting through said entrance telescopically into said female coupling member and defining and providing a male coupling member, said main tongue having an auxiliary tongue struck out therefrom, said auxiliary tongue being flexible as well as resilient and constituting and providing a yieldable snap-type retaining latch, said sheath having a keeper, and said latch being retentively but releasably engageable with said keeper, the entrance of said sheath being provided with a straight-across rib defining an offset lip, a portion of the base of said male bracket having a portion struck out and defining and providing a tang, said tang being resilient and flexed to assume an angularly offset position, said tang being constantly under inherently present spring tension and having a free end portion abutting one portion of said female bracket.

2. The bracket means according to claim 1 and wherein said sheath is substantially wedge-shaped in plan, said main tongue being likewise wedge-shaped in plan and proportional in size to fit into the pocketing and coupling portion of said sheath.

3. The bracket means according to claim 1 wherein a portion of said base of said male bracket further has a second portion struck out and defining and providing another tang, said other tang being resilient and flexed to assume an angularly offset position, said other tang being constantly under inherently present spring tension and having a free end portion abutting a portion of said female bracket spaced from said one portion of said female bracket.

4. Bracket means for assembling and cooperatively joining prefabricated knockdown cabinet components such as, for example, an abutting end of a horizontal shelf to a companion face of a supporting wall, panel or the like comprising: a female bracket embodying a plate-like base adapted to be superimposed flatwise upon and secured to a predetermined surface of said shelf, a portion of said base having an integral offset sheath defining and providing a female coupling member, said sheath being open along one marginal edge and providing an entrance, a male bracket complementary to said female bracket and also embodying a plate-like base similar to said first-named base and adapted to be superimposed upon and secured flatwise to a predetermined area of the face of said wall in a manner to assume an angle of substantially 90° relative to said first-named plate-like base and having a portion of one lengthwise edge provided with a rigid main tongue disposed substantially at right angles to said base and projecting through said entrance telescopically into said female coupling member and defining and providing a male coupling member, said main tongue having an auxiliary tongue struck out therefrom, said auxiliary



tongue being flexible as well as resilient and constituting and providing a yieldable snap-type retaining latch, said sheath having a keeper, and said latch being retentively but releasably engageable with said keeper, a portion of said sheath embodying a stop shoulder constituting and serving as said keeper, said latch having a freely flexible free terminal end releasably abutting said shoulder, a median portion of the wall of said sheath being indented and thus formed into a latch-accommodating-and-pocketing shield, said shield having an orifice exposing and permitting access to be had to said latch, whereby a screwdriver or the like can be aligned with and passed through said orifice, engaged with said latch and the latter forcibly depressed and disengaged from said stop shoulder.

5. The bracket means according to claim 4, said sheath being substantially wedge-shaped in plan, said main tongue being conformingly wedge-shaped in plan and mated in size to fit into the pocketing and coupling portion of said sheath.

6. The combination of claim 4 in which said stop shoulder faces outwardly away from said plate-like base of said male member, and in which said free terminal end of said latch which is abutted by said shoulder faces inwardly toward said plate-like base of said male member.

7. In combination, a cabinet wall having a flat face, a male-type bracket comprising a substantially rectangular base plate having flat faces and provided along one longitudinal marginal edge with an integral right angularly bent main tongue, said main tongue being rigid and having a resilient auxiliary tongue struck out from a median portion, said auxiliary tongue being offset and inclined toward said plate and constituting and providing an end thrust pressure responsive snap-action latch, a portion of the body of said base plate adjacent said one longitudinal edge of said plate having a limited portion struck out, flexed outwardly, and defining and providing an anti-rattling tang, said tang being resilient and spaced from said tongue.

8. The structure according to claim 7 and, in combination, a second cabinet constructing wall having a flat top face, and a female-type bracket fixed on said top face and having a tongue accommodating sheath for telescoping reception and releasable retention of said tongue, said sheath having a screwdriver opening therein and said latch being alignable with said opening.

9. Bracket means for interconnecting in preselected generally right-angled interrelationship first and second rigid structural members constituting elements of a pre-fabricated cabinet or the like comprising a male bracket element having a first portion securable to one of said rigid members and having a projecting tongue portion, a female bracket element having a portion securable to the second rigid member and means defining a cavity accepting said projecting tongue, cooperating means on said male and female bracket elements defining a positive limit stop positively establishing a fixed limit to separating movement of said male and female bracket elements, and resilient means effective when said male and female bracket elements are engaged for continuously exerting a resilient force in a direction to separate said male and female bracket elements and continuously forcing said male and female bracket elements apart to said limit position.

10. The combination of claim 9 in which said means defining a cavity accepting said projecting tongue is effective after said projecting tongue has been longitudinally inserted therein to effectively preclude movement of said projecting tongue relative to said female bracket element in all directions other than the direction of said longitudinal insertion, in which said cooperating means effectively precludes a longitudinal movement of said projecting tongue relative to said female bracket element in a separating sense beyond said limit stop position, and in which said resilient means continuously exerts a force tending to move said projecting tongue longitudinally in a separating sense.

11. The combination of claim 10 in which said means for defining a cavity includes an offset portion of said female bracket element establishing a face and two side surfaces of said cavity and includes a proximate portion of said second rigid structural member establishing another face of said cavity.

12. The combination of claim 9 in which said cooperating means comprises a portion of one of said elements having a stop shoulder facing in one direction and a portion of the other one of said elements having a face abutable with said stop shoulder at said limit position and rigidly preventing separating movement of said elements beyond said limit position.

13. The combination of claim 9 in which said resilient means is a cantilever spring finger integral with one of said elements and struck out therefrom and abutting the surface of the other one of said elements.

14. The combination of claim 9 in which said male and female bracket elements and the first and second structural elements are movable towards a preselected position in relation to each other against said resilient force from said fixed limit position.

15. The combination of claim 11 in which said cooperating means comprises means on one of said elements establishing a fixed abutting face and latch means on the other one of said elements deflectable by said one element during insertion of said projecting tongue portion into said cavity and springable upon full insertion into rigid engagement with said fixed abutting face.

16. The combination of claim 9 in which said cooperating means comprises means on one of said elements establishing a fixed abutting face facing in one direction and latch means on the other one of said elements having a deflectable body portion inclined in the opposite direction and deflectable by said one element during insertion of said projecting tongue portion into said cavity and springable upon full insertion into rigid engagement with said fixed abutting face.

17. The combination of claim 16 in which said fixed abutting face is on said female bracket element, in which said latch means is a tab deflected upwardly from the face of said projecting tongue at a relatively small angle and points away from the direction of insertion of said projecting tongue into said cavity, said tab being deflectable by said female bracket element towards said projecting tongue during said insertion and springing away from said projecting tongue upon full insertion thereof to a position to bring the free end of said tab into mating relation with said fixed abutting face.

18. The combination of claim 17 in which said resilient means comprises a cantilever spring finger integral with one of said elements and struck out therefrom and abutting the other one of said elements and in which said male and female bracket elements and the first and second structural elements are movable towards each other against said resilient force from said fixed limit position.

19. The combination of claim 11 in which said cooperating means comprises means on one of said elements establishing a fixed abutting face facing in one direction and latch means on the other one of said elements having a deflectable body portion inclined in the opposite direction and deflectable by said one element during insertion of said projecting tongue portion into said cavity and springable upon full insertion into rigid engagement with said fixed abutting face, in which said fixed abutting face is on said female bracket element, in which said latch means is a tab deflected upwardly from the face of said projecting tongue at a relatively small angle and points away from the direction of insertion of said projecting tongue into said cavity, said tab being deflectable by said female bracket element towards said projecting tongue during said insertion and springing away from said projecting tongue upon full insertion thereof to a position to bring the free end of said tab into mating relation with said fixed abutting face, and in which said resilient means

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comprises a cantilever spring finger integral with one of said elements and struck out therefrom and abutting the other one of said elements and in which said male and female bracket elements and the first and second structural elements are movable towards each other against said resilient force from said fixed limit position. 5

20. The combination of claim 19 in which said spring finger is integral with said male bracket element and disposed laterally of said projecting tongue in one direction and abutting said female bracket element, in which said resilient means further includes a second cantilever spring finger integral with said male bracket element and struck out therefrom and abutting said female bracket element 10

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and disposed laterally of said projecting tongue in a direction opposite to said one direction.

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