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2,486,557

FASTENING CONSTRUCTION

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2 Sheets-Sheet 1

Fig. 1.

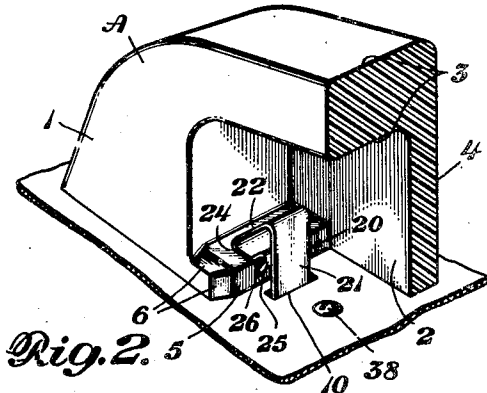
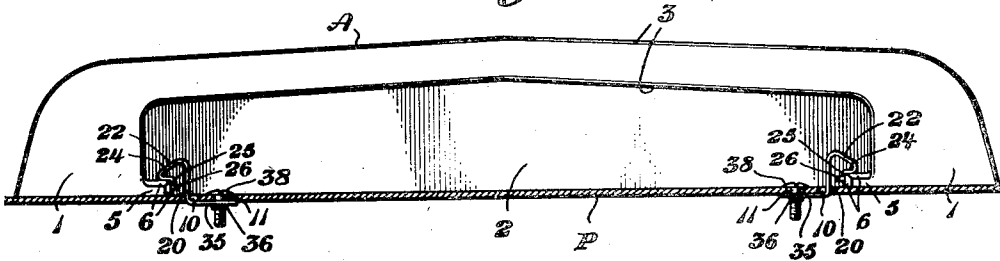


Fig. 3.

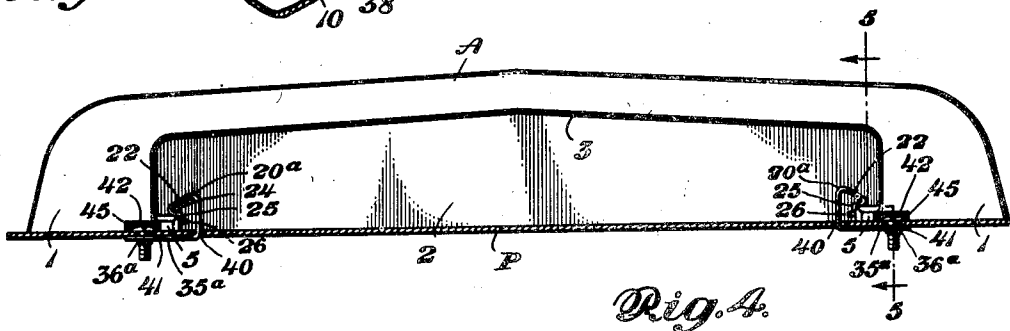
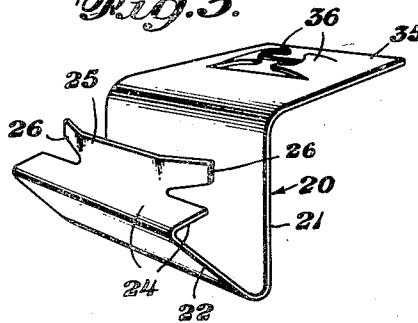


Fig. 4.

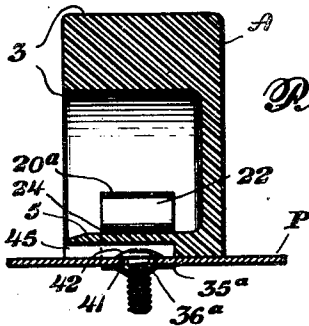


Fig. 5.

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FASTENING CONSTRUCTION

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12 Claims. (Cl. 16—114)

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This invention relates in general to an improved mounting arrangement for handles, drawer pulls, knobs and like articles of manufacture by which such objects may be easily and quickly mounted on an apertured supporting structure by a simple operation taking place entirely from the outer or readily accessible side of the supporting structure.

More particularly, the invention is directed to the provision of an improved knob or handle mounting, and the like, comprising a simple, inexpensive form of sheet metal fastening device provided with cooperating attaching means and article holding means, the attaching means being adapted to maintain the fastening device in desired position on a supporting structure preparatory to the mounting of the article to be secured by connection thereof with the article holding means of the fastening device.

In the manufacture of various cabinet structures such as stoves or ranges, for example, it is usually quite advantageous to assemble the cabinet ready for use except for the handles and similar attachments so that the structure may be packed in the smallest size crate in order to conserve space in storage and shipping and otherwise to avoid breakage or mutilation of such attachments in the moving or handling of the cabinet structure. To this end, it is necessary or desirable for the knobs, handles and other auxiliary attachments to be mounted when the structure is completed or set up ready for use, and accordingly, it is highly practical to employ a fastening means which is concealed in the completed assembly and otherwise adapted to provide the desired mounting without requiring access to the interior of the cabinet structure or the like, in what is known generally as a blind fastening installation. In such an arrangement, the fastening device is provided with attaching means designed to be attached to the panel entirely from the forward side thereof with the article holding means in position to permit the knob, handle or other part also to be mounted entirely from the forward side of the panel in a simple operation requiring only a minimum of time and effort.

Heretofore, in a mounting construction for a molded plastic handle, for example, requiring two or more connecting studs, it has been a common practice to mold the handle with the heads of the bolts or stud fastenings concealed therein, whereupon the complementary nuts therefor were threaded onto the bolts from the reverse side of the support. However, in a blind location in which the reverse side of the support is

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not conveniently or readily accessible in a completed installation, the operation for mounting the handle must take place entirely from the forward side of the support due to the fact that the studs are not available for turning and, of course, the handle cannot be rotated to tighten the connecting studs inasmuch as the studs extend through spaced openings in the support.

A primary object of the invention, therefore, is to provide an improved mounting for a handle, knob, or other article of manufacture comprising a fastening device having combined attaching and article holding means, the attaching means being adapted to be applied from the outer side of a cabinet structure or the like, without requiring access to the interior thereof and with the article holding means of the fastener in position for mounting a handle, knob or similar article of manufacture to such outer side of the cabinet structure.

Another object of the invention is to provide such a mounting in which the fastener is applied from the outer side of the supporting panel to interconnected relation therewith and is secured in such relation by a bolt, screw or other stud fastening also applied from the outer side of the supporting panel.

A further object of the invention is to provide a mounting arrangement of this character in which the bolt, screw or other stud fastener is secured by a continuously effective spring tension locking means which is not subject to loosening or displacement under the most severe conditions of vibration, shock and the like.

Another object of the invention is to provide a mounting means of the kind described in which the fastening device embodies any one or more of the foregoing features and includes article holding means designed for easy and quick installation of the article to be mounted by a substantial snap fastening action therewith.

A further object of the invention is to provide such a mounting arrangement wherein the fastener and the article to be mounted are designed with complementary, slidably engageable surfaces which permit such article to be mounted by a substantial snap fastening action in a simple operation requiring only a minimum of time and effort.

Still another object of the invention is to provide a mounting arrangement of the character described in which the fastening means is concealed from view in a completed installation so as to present a neat and artistic appearance which is not marred by unsightly bolts, screws,

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or the holes in the panel for attaching and securing the fasteners.

A more specific object of the invention is to provide an improved mounting in which the fasteners have all the foregoing features and advantages and comprise simple one-piece sheet metal devices which are relatively inexpensive and lend themselves to economical quantity production in that they may be produced at comparatively low cost from ordinary sheet metal strip stock with little loss or waste of material.

Further objects and advantages and other new and useful features in the construction, arrangement and general combination of parts of the invention will be readily apparent to those skilled in the art as the following description proceeds with reference to the accompanying drawings in which like reference characters designate like parts throughout the same, and in which:

Figure 1 is plan view of the underside of a handle construction, or the like, showing one embodiment of the improved mounting of the invention;

Figure 2 is a fragmentary perspective view of one end of the handle mounting represented in Figure 1 showing the article holding means of the fasteners and the function thereof in retaining the handle in mounted position;

Figure 3 is a perspective view of the fastening device employed in Figures 1 and 2;

Figure 4 is a view similar to Figure 1 showing an alternate embodiment of the invention in which the attaching means of the fasteners are fully concealed in a completed installation;

Figure 5 is a sectional view along line 5-5 of Figure 4 looking in the direction of the arrows;

Figure 6 is a plan view of the underside of a handle construction, or the like, showing a further embodiment of the improved mounting of the invention;

Figure 7 is a fragmentary perspective view of one end of the handle illustrated in Figure 6 showing the formation thereof for accommodating the fasteners in a completed installation;

Figure 8 is a fragmentary plan view similar to Figure 6 showing an alternate construction of this type of handle and a further form of the fastening device, the attaching means of which are fully concealed in a completed installation;

Figure 9 is a plan view of the underside of a handle construction, or the like, in which the fasteners are entirely concealed in a completed installation; and

Figure 10 is a fragmentary perspective view of the handle of Figure 9 showing the manner in which it is molded with recesses for receiving and concealing the fasteners in a completed installation.

The invention in general, contemplates an improved mounting arrangement for use in blind fastening installations wherein the inner side of a panel or other support is not conveniently or readily accessible and it is necessary that the entire fastening operation take place from the exposed or outer surface of the panel. To this end, the present invention discloses various constructions in which the fastener comprises article holding means and means for attaching the fastener to the inner side of the support from the outer side thereof with the article holding means located at the outer side of the support in position for mounting the handle, knob or other article of manufacture by a simple clip fastening action.

Referring now, more particularly, to the draw-

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ings, Figures 1 and 2 show a mounting arrangement for a handle A or similar article of manufacture. The handle may be of any selected shape or design and in the present illustration, for example, it comprises a pair of spaced hubs 1, separated by an elongated cavity 2 which defines the gripping portion 3 merging with a continuous outer wall 4, Figure 2, forming the outer contour of the handle. The outer wall 4 preferably is imperforate and suitably fashioned to provide an installation which has a neat and artistic design and in which none of the fastening means is visible to mar the appearance thereof.

The handle or other article of manufacture may be provided from wood, glass, molded plastic or other suitable material and when made of plastic, it is a simple matter in the molding operation to provide an inwardly projecting connecting flange 5 at each side of the cavity 2. At the free end of a flange 5 the side and top edges thereof are bevelled as at 6 to define a tapered leading edge on the flange to facilitate the connection thereof, as presently to be described.

The supporting structure, designated generally P, may be of any suitable metal, wood or fibre board construction but usually is in the form of a metallic plate or panel-like member such as employed in ranges, refrigerators, and similar cabinet structures. In each location in which a fastening device is to be attached to the panel P for mounting the handle, there is provided a perforated area comprising an assembling opening 10 suitably spaced from a stud passage 11 and of such size as to accommodate the fastener to be applied thereto. The assembling opening 10 preferably is in the form of a simple slot in outline and accordingly, may be formed in the panel P with little added cost in the same punching operation by which the necessary stud passage 11 would be provided in any event. Preferably, the assembling opening 10 and the stud passage 11 are made of a size slightly larger than required in order to provide for any adjustment of the fastener in attached position that may be necessary or desirable.

The spring fastening device designated generally 20, Figure 3, may be constructed of any selected size and configuration in accordance with the shape and proportion of the parts to be secured, and preferably is provided from a relatively small, inexpensive, substantially rectangular section of sheet metal which may be severed from ordinary sheet metal strip stock with little loss or waste of material. Any suitable sheet metal may be employed but preferably that of spring metal nature such as spring steel or cold rolled steel having spring characteristics.

By suitable slitting, punching and bending operations, the sheet metal section thus provided is formed into a combined spring clip and spring nut type of fastening device comprising a clip portion at one end and an attaching portion at the other. The clip portion includes a body 21 and a return bent spring arm 22 which is provided with a generally horizontal shoulder 24 having an abutment 25. In being formed on such a return bent spring arm 22, said shoulder 24 is yieldable in a direction either generally normal or parallel to its plane and is thereby sufficiently resilient to permit an easy and quick fastening engagement thereof with the complementary connecting flange 5 on the handle or other object to be mounted. The abutment 25 is formed on the adjacent extremity of the clip and extends sub-

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stantially at right angles to the shoulder 24. Preferably the bend joining the shoulder and abutment is partially severed or slotted at each side of the clip to present wings 26 which are bent slightly inwardly to define inclined guide surfaces adapted to facilitate the connection of the clip with the flanges 5 on the article to be mounted.

The attaching portion of the clip comprises a base 35 which, in the form of the fastener shown in Figure 3, extends in generally opposed relation to the spring arm 22 and substantially normal to the fastener body 21. The fastener base 35 preferably includes stud securing means 36 which are designed to be applied through the assembling opening 11 to the inner side of the panel and secured by a bolt, screw or other stud applied from the outer side of the panel in what is known as a blind fastening installation. The stud securing means 36 otherwise are in the form of integral cooperating tongues, or the like, which are struck from the material of the base and so formed that the extremities thereof lie on a helix corresponding substantially to that of the thread of the bolt or screw for uniform threaded engagement therewith.

The thread engaging elements 36 are best provided from the sheet metal material of the base 35 by an aperture intermediate spaced parallel slits which form cooperating tongues, or the like, having spaced extremities defining the desired thread or thread opening corresponding substantially to the root diameter of the bolt or screw for threadedly engaging the thread thereof. Said tongues 36 otherwise are preferably formed to project out of the plane of the base 35 and are bent lengthwise in substantial ogee formation to provide for the maximum strength obtainable to withstand the tightening action of the bolt or screw as it is advanced to its applied fastening position.

Such thread engaging means may be pressed, stamped, extruded, or the equivalent thereof provided on the fastener in any suitable form or construction for threadedly engaging with the thread of the associated bolt or screw and, in this relation, the present invention fully contemplates the provision of such thread engaging means in various other similar and related forms, as in the manner of a keyhole type of thread opening, or a perforated protuberance which is pressed from the sheet metal and shaped to provide a helical thread or thread opening, or otherwise has the walls thereof tapped to provide a plurality of threads for threadedly engaging the bolt or screw. However, it has been found that such thread engaging means prepared in the form of cooperating, yieldable tongues 36, as shown, are the most efficient and the most practical in that they are possessed of unusual inherent strength and will not collapse or pull through when the bolt or screw is tightened, nor loosen under continuous strain and vibration in the installation. This takes place by reason of the fact that the sheet metal material from which such tongues are formed is of less thickness than the pitch or spacing between adjacent thread convolutions of the bolt or screw, wherefore the extremities of said tongues tend, more effectively, to move toward each other and dig into the grooves intermediate adjacent thread convolutions when tightened therewith and otherwise become embedded in the root of the bolt in locked, frictional fastening engagement therewith in applied fastening position. Thus, in the present example, the tongues 36 are shown as extending out of the

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plane of base 35 in substantial ogee formation and provided preferably with notched extremities forming substantial biting jaws designed to cut into the root of the bolt and the adjacent thread surfaces thereon in positive locking relation therewith in the most effective manner. There is thereby eliminated the necessity for a separate, auxiliary locking means such as a lock nut or lock washer and this, in mass production, makes possible a considerable saving not only in the cost of such locking devices, but also, in the expense and labor involved in the tedious, time consuming assembling operations and other added steps in manufacture which such auxiliary locking means require. It is to be understood, however, that the instant invention is not limited in any manner or form to the illustrated construction of the stud engaging means but rather, comprehends also, various other similar and related forms of such thread engaging elements, or equivalent fastening means.

With the various parts of an installation provided substantially in the manner aforesaid, each clip is assembled with the supporting panel from the outer side thereof by slipping the base 35 of the fastener through the associated assembling opening 10 so that said base and the thread engaging means 36 thereon are disposed at the opposite or inner side of the panel with said thread engaging means thereon overlying the stud passage 11. A bolt, screw or other stud 38 is then inserted through the stud passage 11, likewise from the outer side of the panel, into threaded engagement with the thread engaging means 36 to secure the fastener in attached position on the panel.

In this relation, the shoulder 24 on the fastener extends generally parallel to the adjacent panel surface and is spaced therefrom a distance slightly less than the thickness of the complementary connecting flange 5 on the handle or other object to be mounted, so that said flange will be frictionally and grippingly clamped against the panel by said shoulder 24, as seen in Figures 1 and 4. Similarly, the abutment 25 is designed to extend slightly inwardly beyond the adjacent side edge of the connecting flange 5 to have a frictional and gripping engagement therewith.

With the fasteners thus attached to the panel, the handle is mounted by being brought flush against the panel with the free ends of the connecting flanges 5 extending toward the fasteners and with each flange in position for sliding under the shoulder 24 and against the abutment 25 of the associated fastener. The bevelled edges 6 at the leading ends of the flanges 5 and the inclined guide surfaces defined by the inwardly bent wings 26 on the fastener facilitate the initial application of the flanges 5, and as the handle is advanced to its mounted position, these elements effect a gradual yielding of the shoulders 24 and abutments 25 of the fasteners as necessary to permit said connecting flanges 5 to slide relative thereto until the handle is located in predetermined mounted position.

In the fully applied position of the handle, the article holding portion of a fastener engages a full size section of the flange 5 beyond the bevelled edges 6 to clamp the flange frictionally and grippingly against the panel. If desired, the handle can be so applied as to position the inner side of the wall 4 thereof in abutting relation with the adjacent edges of the fasteners, thereby rigidifying the mounting to this extent. The fasteners, in any event, are completely contained within the

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cavity 2 in the handle in such a way that the elements thereof and the assembling opening 10 and stud passage 11 in the panel are concealed by the gripping portion 3 and outer wall 4 of the handle. Thus, the mounting is one in which none of the fastening means is visible to mar the appearance of the finished installation, and, accordingly, an important advantage resides in the fact that with such an arrangement the handle or other object may be easily designed with an uninterrupted, streamlined contour which will ornament and enhance the beauty of the completed product.

Figures 4 and 5 disclose an alternate construction of the mounting shown in Figures 1-3 wherein the attaching portion 35a of the fastener 20a extends in the same general direction as the spring arm 22. The fastener otherwise is the same as that shown in Figure 3 and said attaching portion 35a is applied in a similar manner through an assembling opening 40 to position the stud engaging means 36a in alignment with the stud passage 41 provided in the panel outwardly of said assembling slot, whereupon the bolt 42 is applied through the stud passage 41 to secure the fastener in attached position. In the hubs 1 of the handle there are provided transverse recesses 45 for receiving the heads of the bolts 42. These recesses open to the underside of the hubs 1 so that in the application of the handle, the heads of the bolts 42 are received in such recesses and permit sliding of the handle to the mounted position thereof in which the flanges are in full engagement with the shoulders 24 and abutments 25 of the fasteners, substantially as described with reference to Figures 1-3 inclusive.

Figures 6 and 7 show a further embodiment of the invention in which the handle mounting comprises a fastener 20 which is identical to and is attached and otherwise applied in the same manner as that described with reference to Figures 1-3 inclusive. The handle B, or other object is of the same general construction as respects the hubs 51, cavity 52, gripping portion 53, outer wall 54, and flanges 55 which are engaged by the fasteners to retain the handle in its applied mounted position. In this embodiment, however, the handle includes throughout its length an integral base plate 56 which conceals the heads of the bolts or screws 38 and otherwise enhances the appearance of the completed assembly. The flanges 55 are defined by transverse openings 57 in the base plate 56 along with recesses 58 which open to the underside of the base plate 56 and are so designed that in the application of the handle, the heads of the bolts 38 are received in said recesses 58 and permit sliding of the handle to the mounted position thereof in which the fasteners frictionally and grippingly clamp the connecting flanges 55, substantially as in the embodiment of Figures 1-3 inclusive.

Figure 8 discloses a construction similar to Figures 6 and 7 but employing the fastener 20a described with reference to Figures 4 and 5 in which the fastener base 35a extends in the same general direction as the spring arm 22. Thus, in the completed mounting, the heads of the bolts 42 are received in the transverse recesses 59 formed in the hubs 51 of the handle B. The fastening arrangement in this form of the invention otherwise is identical to that disclosed in Figures 4 and 5 wherein the assembling opening 40 in the panel is formed inwardly of the stud passage 41 for receiving the bolts or screws 42 which secure the fasteners in attached position preparatory to the mounting of the handle on the panel substantially

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as described with reference to Figures 1-3 inclusive.

In the embodiment of Figures 9 and 10 the fasteners 20 as identical to those described in connection with Figures 1-3 inclusive, but have the bases 35 thereof attached in reversed position through the assembling openings 60 in the panel with the stud engaging means 36 thereon in alignment with the stud passages 61 provided outwardly of said assembling slots 60. The handle C or other object follows the same general design with respect to the hubs 71, the cavity 72, the gripping portion 73, the outer wall 74, Figure 10, and flanges 75 which are clamped by the fasteners to retain the handle in mounted position. The hubs 71 of the handle are relatively wide and so designed as entirely to cover and conceal the fasteners. To this end, transverse holes 76 are provided in the hubs of the handle which define the flanges 75 and otherwise present a space of such size as to enclose fully the spring arm portion 22 of each fastener. The holes 76 and the adjacent recesses 77 for receiving the heads of the bolts 68, open to the underside of the hubs 71 so that the handle may be applied to mounted position in the same general method described with reference to the embodiment shown in Figures 1-3 inclusive. In this respect, the heads of the bolts 68 are completely concealed within the recesses 77 while the spring arm portions 22 of the fasteners are also completely concealed in the transverse holes 76 with the shoulders 24 and abutments 25 of the fasteners in firm, frictional, clamping engagement with the flanges 75 to retain the handle in its applied mounted position.

Although in the foregoing description and the accompanying drawings, the disclosure is directed to preferred embodiments of the invention in various handle constructions, it is obvious that the invention is applicable wherever an operating member, push or pull device, gripping element, supporting means or the like, is to be mounted onto a supporting wall, particularly a sheet metal wall member. Accordingly, it will be understood that the disclosure is not to be limited to any strict interpretation of the word "handle" as used in the description or in the claims but should be considered generally as defining knobs, gripping devices, supporting devices, drawer pulls, and like articles of manufacture.

While the invention has been described in detail with specific examples such examples are intended as illustrations only, since it will be apparent to those skilled in the art that other modifications in the construction, arrangement and general combination of parts may be devised without departing from the spirit and scope of the invention. The present embodiments are therefore to be considered in all respects as illustrative and not restrictive, the scope of the invention being indicated by the appended claims rather than by the foregoing description, with all changes falling within the scope, meaning and range of equivalency of the claims intended to be embraced therein.

What is claimed and desired to be secured by United States Letters Patent is:

1. A fastening construction comprising a part provided with a connecting flange having a free end formed with a bevel, and a fastener for securing said part to a support comprising a sheet metal body having means for attaching the fastener to the support and a spring arm defining a shoulder and abutment extending normally in the path of application of said flange and an inclined

guide surface cooperating with the bevel on the connecting flange to facilitate application of the connecting flange to connected relation with the shoulder and abutment on the fastener, said shoulder being designed for surface engagement with said flange and adapted to clamp said flange against the support with said abutment engaging a surface of said flange adjacent said shoulder.

2. A fastening construction comprising a part provided with a connecting flange and a fastener for securing said part to a support provided with an assembling opening and a stud passage, said fastener comprising a sheet metal body having an attaching portion provided with stud engaging means applied through the assembling opening from one side of the support to the opposite side thereof with said stud engaging means aligned with said stud passage for receiving a stud securing the fastener in attached position, and a spring arm on said fastener defining a shoulder engaging the connecting flange on said part to retain the same in mounted position on the support.

3. A fastening construction comprising a part provided with a connecting flange and a fastener for securing said part to a support provided with an assembling opening and a stud passage, said fastener comprising a sheet metal body having an attaching portion provided with stud engaging means applied through the assembling opening from one side of the support to the opposite side thereof with said stud engaging means aligned with said stud passage for receiving a stud securing the fastener in attached position, and a spring arm on said fastener defining a shoulder and an abutment extending in the path of application of said flange and an inclined guide surface facilitating application of the connecting flange to connected relation with the shoulder and abutment on the fastener.

4. A fastening construction comprising a part provided with a connecting flange having a free end formed with a bevel, and a fastener for securing said part to a support provided with an assembling opening and a stud passage, said fastener comprising a sheet metal body having an attaching portion provided with stud engaging means applied through the assembling opening from one side of the support to the opposite side thereof with said stud engaging means aligned with said stud passage for receiving a stud securing the fastener in attached position, and a spring arm on said fastener defining a shoulder and abutment extending in the path of application of said flange and an inclined guide surface cooperating with the bevel on the connecting flange to facilitate application of the connecting flange to connected relation with the shoulder and abutment on the fastener.

5. As an article of manufacture, a fastener comprising a sheet metal body having an attaching portion provided with stud engaging means and a return bent portion defining a spring arm, a shoulder on said spring arm extending generally inwardly toward the fastener body, and an abutment in angular relation to said shoulder, said abutment having a bent portion defining a guide surface.

6. As an article of manufacture, a fastener comprising a sheet metal body having an attaching portion provided with stud engaging means, and a return bent portion defining a spring arm extending in generally opposed relation to said attaching portion, a shoulder on the spring arm extending generally inwardly toward the fastener body, and an abutment in angular relation to said shoulder,

said abutment having a bent portion defining a guide surface.

7. As an article of manufacture, a fastener comprising a sheet metal body having an attaching portion provided with stud engaging means, and a return bent portion defining a spring arm extending in the same general direction as said attaching portion, a shoulder on the spring arm extending generally inwardly toward the fastener body, and an abutment in angular relation to said shoulder, said abutment having a bent portion defining a guide surface.

8. A handle mounting or the like comprising a handle having a cavity and spaced hubs provided with connecting flanges forming marginal portions of said cavity, and a fastener associated with each connecting flange securing the handle to a support comprising means attaching the fastener to the support and means projecting from the support adapted to yield and permit sliding of the connecting flanges on the handle into connected relation with the fasteners to mount the handle on the support with said projecting means of the fasteners concealed in the cavity therein.

9. A handle mounting or the like comprising a handle provided with a cavity and spaced hubs and a base plate having slots providing a pair of spaced connecting flanges, and a fastener associated with each connecting flange securing the handle to a support comprising a sheet metal body having means attaching the fastener to the support and a portion projecting from the support including a resilient shoulder engaging the connecting flange to mount the handle on the support with said projecting portion of the fastener concealed in the cavity therein.

10. A handle mounting or the like comprising a handle provided with a cavity and spaced hubs including fastener receiving recesses defining a pair of spaced connecting flanges, and a fastener associated with each connecting flange securing the handle to a support comprising a sheet metal body having means attaching the fastener to the support and a portion projecting from the support including a resilient shoulder engaging the connecting flange to mount the handle on the support with said projecting portions of the fasteners concealed in said recesses in the hubs of the handle.

11. A mounting comprising a part having a cavity and a connecting flange forming a marginal portion of said cavity, a support provided with an assembling opening and a stud passage, and a fastener for securing said part to the support comprising a sheet metal body having an attaching portion provided with stud engaging means applied through said assembling opening from one side of the support to the opposite side thereof with said stud engaging means aligned with said stud passage for receiving a stud securing the fastener in attached position, and a spring arm on said fastener defining a shoulder and an abutment extending in the path of application of said flange and an inclined guide surface facilitating application of the connecting flange to connected relation with said shoulder and abutment on the fastener, said spring arm and the shoulder and abutment thereon being concealed in said cavity in said part in connected relation with said flange.

12. A mounting comprising a part having a cavity and a connecting flange having a free end formed with a bevel and comprising a marginal portion of said cavity, a support provided

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with an assembling opening and a stud passage, and a fastener for securing said part to the support comprising a sheet metal body having an attaching portion provided with stud engaging means applied through said assembling opening from one side of the support to the opposite side thereof with said stud engaging means aligned with said stud passage for receiving a stud securing the fastener in attached position, and a spring arm on said fastener defining a shoulder and an abutment extending in the path of application of said flange and an inclined guide surface cooperating with the bevel on the connecting flange to facilitate application of the connecting flange to connected relation with the shoulder and abutment on the fastener, said spring arm and said shoulder, abutment and

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guide surface thereon being concealed in said cavity in said part in connected relation with said flange.

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