March 5, 1940. H. G. LOMBARD 2,192,359

FASTENER

Original Filed Dec. 8, 1936

Fig. 1.

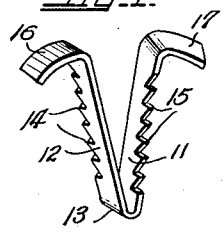


Fig. 2.

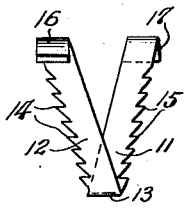


Fig. 3.

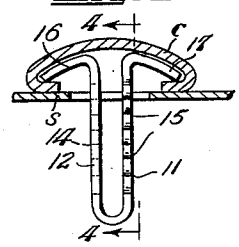


Fig. 4.

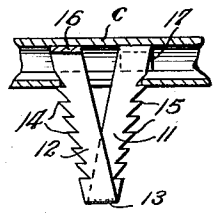


Fig. 5.

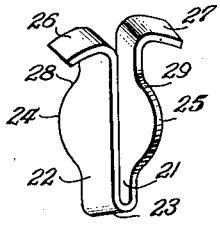


Fig. 6.

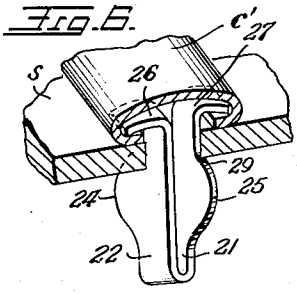


Fig. 7.

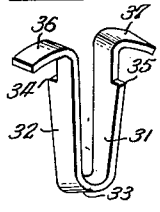


Fig. 8.

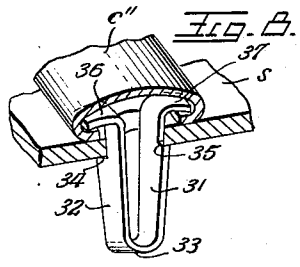


Fig. 9.

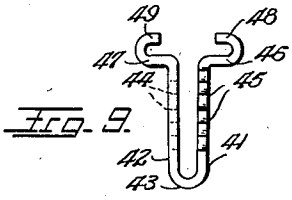


Fig. 10.

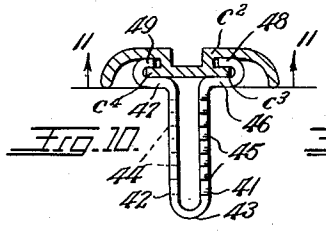


Fig. 11.

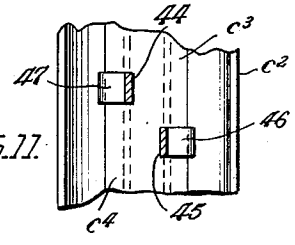


Fig. 12.

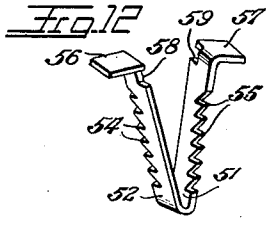


Fig. 13.

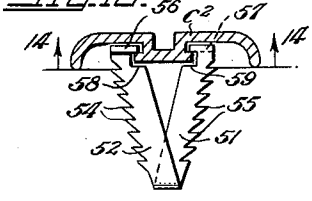


Fig. 14.

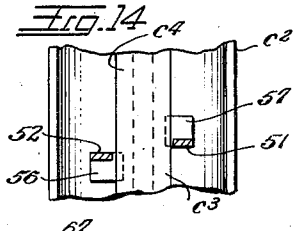


Fig. 15.

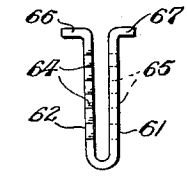


Fig. 16.

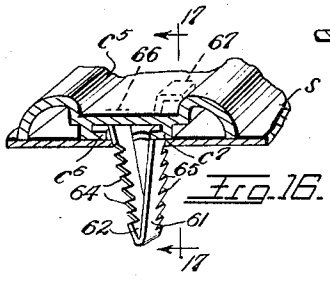
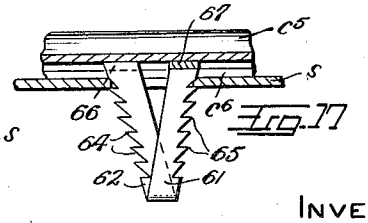


Fig. 17.



INVENTOR

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UNITED STATES PATENT OFFICE

2,192,359

FASTENER

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Original application December 8, 1936, Serial No. 114,825, now Patent No. 2,077,120, dated April 13, 1937. Divided and this application April 2, 1937, Serial No. 134,661

1 Claim. (Cl. 85—5)

This invention deals with the art of securing finishing objects such as moldings, trim strips, and the like, to supporting surfaces.

This application is a division of a prior copending application entitled Fastening means, Serial No. 114,825, filed December 8, 1936, since issued as Patent #2,077,120, April 13, 1937.

More particularly, this invention relates to a method and means for securing finishing objects, and the like, in the combination of individual fastening elements cooperating with a finishing object and designed for engagement in an apertured supporting surface for mounting the finishing object thereon.

Heretofore, individual fastening devices have been employed somewhat satisfactorily in securing finishing objects to supporting surfaces in applications and installations not subject to any great degree of movement or vibration. However, where any degree of strain, jarring or vibration takes place, fasteners now available to the trade have been unsatisfactory in that they tend to loosen from their fastening position and often become completely removed due to the fact that the sections or elements comprising the shanks thereof are not possessed of sufficient inherent holding power in applied fastening position. It has also been found that the connections of the fastening devices to a finishing object are often loose and inefficient, especially when advanced to fastening position in apertures provided in a supporting surface, whereupon the fastening devices often become disconnected from the finishing object, resulting in a faulty, loose mounting of the finishing object on the supporting surface.

This invention therefore contemplates the provision of various forms of fastening means and securing devices designed for use in mounting a finishing object such as a molding, trim strip, or the like, and in which the leg sections or shank elements of the devices are relatively yieldable and so disposed with respect to each other as to permit quick, easy insertion thereof into apertures in a supporting surface, yet, when in applied position have such a degree of stiffness, rigidity and tension stored therein through contact and compression against the sidewalls of the aperture that possibility of accidental loosening of the mounting of a finishing object is eliminated.

A further object of the invention aims to provide a mounting for a finishing object by the use of individual fastening devices the shank elements of which are provided with integral, projecting or lug means such as pronounced shoulders or teeth designed to positively engage in apertures in a supporting surface to rigidly and positively retain the devices and the finishing object mounted thereby in desired position.

Another object of the invention is to provide a rigid mounting for a finishing object in combination with individual securing devices having head sections suitably deformed for rigid connection to the finishing object and in which the shank sections may have relative movement to tensioned relation on being advanced to fastening position without causing a loosening of the connection or disengagement of the head sections from the finishing object in the mounting thereof onto a supporting surface.

Further objects and advantages of the invention will be apparent to those skilled in the art as a description thereof proceeds with reference to the accompanying drawing and in which like reference characters designate like parts throughout the same and in which:

Fig. 1 shows a form of the fastening device in which the head sections are deformed to seat in a finishing object such as a molding, trim strip, or the like.

Fig. 2 shows in side elevation the device represented in Fig. 1.

Fig. 3 is an end elevation of the fastener of Fig. 2 showing the position of the head sections when seated in a channel shape and secured to a supporting surface.

Fig. 4 is a section view taken along line 4—4 of Fig. 3.

Fig. 5 shows in perspective another form of the fastening device, the free ends of which are deformed into head sections for connection to a finishing object.

Fig. 6 shows the device of Fig. 5 in an installation for mounting a molding or trim strip to a supporting surface.

Fig. 7 shows another form of fastening device in which the head sections are deformed for cooperation with a finishing object.

Fig. 8 shows the device of Fig. 7 as applied in an installation for mounting a molding to a supporting surface.

Fig. 9 shows in end elevation a fastening device in which the free ends are deformed into head sections designed to engage ribs provided on a relatively wide finishing object.

Fig. 10 shows the fastener of Fig. 9 in connection with the ribs on the underface of a form of molding or trim strip.

Fig. 11 is a bottom plan view taken along line 11—11 of Fig. 10.

Fig. 12 shows in side elevation another form of fastening device in which the head sections are designed for connection to outwardly extending ribs provided on the underface of a finishing object.

Fig. 13 shows the device of Fig. 12 in engagement with outwardly extending ribs on the underface of a relatively wide molding or trim panel.

Fig. 14 is a bottom plan view taken along line 14—14 of Fig. 13.

Fig. 15 is an end elevation of a form of fastening device in which the free ends of the legs are designed to engage inwardly extending ribs or elongated projections provided on a finishing object.

Fig. 16 shows in perspective the fastener of Fig. 15 with the head sections designed for connection with inwardly extending ribs of a relatively wide channel-shape, trim panel, or the like, shown in section.

Fig. 17 is a section view taken along line 17—17 of Fig. 16.

In the constructions herein disclosed the fastening means of the combination comprise shank elements which in normal, untensioned relation are laterally offset with respect to each other or have the outer longitudinal edges thereof disposed in converging relation toward the leading end such that, as the device is advanced in an aperture of less width or diameter than the overall width of the shank, a gradual, relative, lateral movement of the shank elements is effected to set up a tension therein. The head sections are formed from the free ends of the laterally movable shank elements and are suitably deformed for connection with a finishing object to be secured such as a molding, trim strip, or the like, the usual form of connection being with a rib, flange or shoulder provided on such object. Thus it may be seen that as a fastening device in an assembly is advanced into a work aperture and the shank elements subjected to relative, lateral movement to tensioned relation in fastening position, the connection of the head sections of the fastening devices to the finishing object is not in any way altered and at the same time the shank elements are most effectively engaged in desired fastening position to rigidly mount the finishing object.

In assemblies of the prior art structures, the shank elements of a fastener are usually disposed directly opposite each other and are compressed directly toward each other on being applied in an aperture. This naturally causes a movement of the head sections in a direction to disengage from the finishing object such that in many instances a finishing object is loose in its mounting and often entirely disconnected from the fastening devices.

In the combination shown, the shanks of the securing devices may be constructed from a strip or blank of metal by bending the same back upon itself in a fold disposed at an angle such that the shank elements are laterally yieldable with respect to each other. On bending a strip to thus dispose the folds at an angle, the leg elements of the respective shanks must naturally lie offset with respect to each other in normal, untensioned relation. And since the degree of the legs is determined by the angle of the fold the disposition of the legs relative to each other in normal position may assume a laterally offset or other form of offset relation; this offset relation of the legs may be so designed as to be the most effective in an aperture of predetermined size in any desired location. Thus, on being applied to an aperture of smaller width or diameter than the distance between the outer longitudinal edges of the legs in their normal, untensioned, laterally offset relation, the legs are caused to move laterally from their normal, offset relation to a position approaching alignment or approximate alignment. Such movement of the legs from their normal, untensioned, laterally offset reation is designed to set up an extraordinary tension in the legs, which tension is exerted against the adjacent walls of the aperture. In many instances the tension thus exerted is sufficient to maintain a device rigidly in fastening position in the work due to the unusual frictional engagement thus obtained against the side walls of the aperture. Where such frictional engagement alone is sufficient to maintain the shank in its applied position, the fastening device may be utilized as a means for removably mounting a finishing object. On removing the shank from an aperture the shank legs naturally tend to assume their initial, normal, untensioned, offset relation such that the fastener may be reinserted in the manner of a push or snap-stud and the finishing object mounted in the installation from which it was removed.

In many other instances, however, it is necessary or desirable that the installation of a finishing object be permanent whereupon it is essential that the fastening devices be not readily removed or easily withdrawn from applied fastening position. In such instances, it is decidedly advantageous to employ on the legs of the shank some form of locking means to act in addition to the frictional engagement of the legs against the aperture side walls. Such locking means may be provided by recesses, shoulders, lugs, or series of teeth disposed on the legs, preferably along the longitudinal edges thereof such as to contact and engage the aperture side walls and adjacent underface of a support to lock in position under tension of the laterally yieldable shank elements.

Thus in mounting a finishing object such as a molding or trim strip, the shank elements of a fastening device are subjected to relative, lateral movement to tensioned relation in fastening position in the aperture of a support. This relative, lateral movement of the shank elements naturally effects a relative movement of the head sections provided thereon and in engagement with a finishing object but does not in any way alter or loosen the connection of the fastening device to such finishing object.

In the drawing various uses and methods of application of the shank structures in combination with finishing objects such as moldings, trim strips and the like are disclosed. In every form it is to be noted that the fastening of a securing device is accomplished through the action of the relatively yieldable leg members and tooth elements thereon contacting and engaging the side walls of the aperture and adjacent area of the support. However, it is to be understood that it is fully intended as within the scope of this invention that the free ends of the legs of any of the shank structures shown or described may be bent, distorted or suitably deformed to provide any of the head structures for connection to a finishing object as herein disclosed and for the purposes set forth. Likewise, it is intended as within the scope of this

invention that any of the head structures shown for connecting a fastening device to a finishing object may also be used and adapted for use as desired or expedient, on any form of shank structure herein disclosed, described, or similar thereto.

As shown in Figs. 1–4 inclusive, the free ends of the shank legs 11, 12 may be bent in opposite directions and suitably deformed to provide head sections 16, 17, conforming substantially to the contour of a channel-shape C, such as a molding, trim strip, or other finishing object. In use, the fastening devices may be assembled, by any suitable aligning means, in exact position in a channel shape whereupon the assembly as a unit may be applied to desired location on a pre-perforated supporting surface. The head sections 16, 17, of the fastening devices are so designed as to snugly seat within the channel-shape and have portions thereof contacting the inner face of the roof and base flanges whereby the shank leg members 11, 12 are readily driven home to locked fastening position in a support S, as shown in Fig. 3. This may be accomplished by a simple, expedient axial push or hammer blow on the outer face of said channel-shape, it being preferable to employ a rubber hammer to avoid possible injury to the finish of the object supported.

On being applied to desired position on the supporting structure, S, the shank elements 11, 12, extending in converging relation toward the entering end 13, Fig. 2, are subjected to a gradual, relative, lateral movement from their normal, laterally offset, untensioned relation to tensioned relation in fastening position as shown in Fig. 4. The relative, lateral movement of the shank legs does not in any way effect the efficiency of the connection of the head sections 16, 17 with the molding, this being accomplished by reason of the fact that the relative movement of the shank elements is almost entirely in a lateral direction and is not such as to compress the same toward each other to loosen the head sections 16, 17 from their normal, effective engagement with the channel-shape, as shown in Fig. 3. Such a movement of the leg elements of the shank away from their normal, untensioned, laterally offset relation sets up an extraordinary tension in the legs, which tension is exerted against the adjacent walls of the aperture. In order to obtain a more positive engagement of the shank elements in fastening position in the apertures of the support, lug, shoulder, or abutment means such as series of teeth 14, 15, may be provided on the outer longitudinal edges of the laterally offset leg members, such teeth being adapted to dig into the side walls and adjacent surrounding area of the aperture to rigidly retain the fastening devices in position whereby a highly efficient, rigid mounting for a finishing object is obtained.

Figs. 5 and 6 show a combination comprising an alternate construction in which cam surfaces are provided on the shank legs of the fastening devices such that they are adapted for use in various thicknesses of supports. As shown in Fig. 5, in this form of the device, shank elements 21, 22 are integral in the leading end, 23, of the device and are laterally offset with respect to each other in normal, untensioned relation. Along the longitudinal edges of the shank elements cam surfaces 24, 25 are provided presenting cam shoulders 28, 29 which are adapted to seat in apertured supports of any thickness, within limits. As shown in Fig. 6, head sections 26, 27 are deformed for snug engagement with the channel-shape C′ and are frictionally retained therein through contact with the underface of the roof and the base flanges of the channel-shape. In mounting a finishing object such as channel-shape C′, each of the fastening devices is applied to fastening position by inserting the leading end 23 in an aperture in the support. As the finishing object is advanced to its home position, the leading edges of the cam surfaces 24, 25 serve as guide means causing a relative, gradual, lateral contraction of the shank elements to tensioned relation in fastening position, but without in any way causing a loosening or disengagement of the head sections 26, 27 with the channel-shape. On being seated the cam shoulders 28, 29 are thus in position to engage the lower corner of the aperture at any suitable point depending on the thickness of the support.

Figs. 7 and 8 show a combination including a form of the device which is especially adapted for mounting finishing objects to supports of predetermined thickness. The fastening devices each comprise laterally offset shank elements 31, 32 integrally united in the leading end as at 33 and provided with sharp, pronounced shoulders 34, 35 designed to engage the underface of the support in the area surrounding the aperture as shown in Fig. 8. This form of the device, by reason of the pronounced shoulders 34, 35, provides such a rigid, positive mounting that the finishing object held thereby cannot be removed without destroying the fastening means.

Figs. 9–11 inclusive show a combination in which the free ends of the shank elements may be bent, distorted, or deformed to receive outwardly extending ribs C3, C4 or the like, provided on a relatively wide, grooved finishing object C2, such as a molding or trim strip. This trim strip C2 shown in Figs. 10 and 11 is economically manufactured and also has a wide, varied use because of its unique appearance on a supporting surface, and also, in that coloring, colored plastics, and the like, may be applied in the groove for unusual effects. The fastening devices for securing such type of finishing objects may comprise shank members consisting of laterally offset leg elements 41, 42 integral in the leading end as at 43, and the free ends of which are bent into complementary head sections 46, 47 provided with flanges 48, 49, adapted to engage and seat between them the outwardly extending ribs C3, C4 of the trim strip C2 as shown in Figs. 10 and 11. Along the longitudinal edges of the shank elements 41, 42, lug, shoulder, or abutment means such as series of teeth 44, 45 may be provided whereby the devices function to secure a finishing object much in the manner of the combination described in connection with Figs. 1–4 inclusive.

Figs. 12–14 inclusive disclose an alternate construction in which the free ends of the shank legs 54, 55, are bent into flanged head sections 56, 57. Adjacent said head sections are provided recesses 58, 59 adapted to receive the outwardly extending ribs C3, C4 of the trim strip, Fig. 13. In employing this form of fastening means for the trim strip, the flanged head sections 56, 57 are designed to seat between the upper face of the ribs C3, C4 and the lower adjacent underfaces of the roof of the trim strip, being locked in such position by the shoulders of the recesses 58, 59 snugly engaging the ribs and under tension of

the legs attempting to assume their normal, offset relation. Along the longitudinal edges of the shank elements, lug, shoulder or abutment means such as teeth 54, 55, may be provided for effecting a rigid, positive engagement of the fastening devices in applied position of the finishing object.

Figs. 15–17 inclusive show a combination in which a fastening device is provided with a head structure especially adapted for use with a molding or trim strip C5 having inturned ribs C6, C7, Fig. 16. Shank legs 61, 62 are provided with relatively short head sections 66, 67 designed to seat in assembled relation between the upper face of the ribs C6, C7, and the adjacent undersurfaces of the roof of the trim strip. The shank legs are disposed in laterally offset relation and may be provided with lug, shoulder or abutment means such as series of teeth 64, 65 to provide a rigid engagement of the fastening devices in the apertured support. On applying an assembly of a finishing object and fastening devices to an apertured supporting surface, the shank elements of each fastening device are subjected to a gradual, relative, lateral movement from their normal, untensioned, laterally offset relation to tensioned relation in fastening position as shown in Fig. 16. Since the head sections 66 and 67 are snugly mounted in between ribs C6, C7, the lateral movement of the legs is such as not to disturb the connection of the head sections with the finishing object whereby a most effective mounting is obtained which is not subject to loosening from vibration, jarring, strain and the like.

From the foregoing it may be readily appreciated that the structures disclosed are advantageous in that they provide a most efficient, rigid mounting for a finishing object on a support and facilitate the assembling of parts in mass production since the fastening devices are readily seated in applied position by a simple axial thrust on the outer face of a finishing object, and without the use of separate tools, time consuming assembling operations, or the necessity of conventional nut and bolt fastening devices.

It will be readily seen that the fastening devices are simple, inexpensive and capable of effectively clamping a relatively long finishing object to a supporting structure and under tension to eliminate any possibility of looseness or rattling incident to strain, jarring or vibration of the supporting structure.

It will also be understood that the fastening devices are designed to function in the manner of snap-studs and when in fastening are possessed of such a degree of stiffness and rigidity that a finishing object mounted thereby may not be removed without destroying, mutilating or otherwise injuring the finishing object or fastening devices or both.

While the invention has been described in detail with specific examples such examples are illustrative only, since other modifications within the spirit and scope of the invention will be apparent to those skilled in the art. Hence the invention is to be understood as limited only as indicated in the appended claim in which the intent is to set forth all the novelty over the prior art.

What is claimed is:

A fastener for securing to an apertured support a substantially channel-shaped finishing object having spaced attaching ribs or the like on the underface thereof, said fastener comprising a strip of sheet metal having a bend intermediate its ends providing a shank comprising a pair of cooperating leg members integrally united to form a leading end for the fastener, head sections formed from the free end portions of said leg members, said head sections projecting out of the planes of said leg members and comprising substantially flat bearing surfaces bent to a shape corresponding substantially to the contour of the roof of the finishing object with the extremities thereof extending outwardly from each other, said head sections of the fastener being adapted to be attached to said finishing object with said bearing surfaces adapted to engage the roof of the finishing object and with the extremities thereof adapted for positive connection with the spaced attaching ribs of the finishing object, said leg members of the fastener being disposed laterally at an angle to each other such that the longitudinal edges thereof are offset from each other, said leg members undergoing relative, lateral yielding movement on being applied to fastening position in an aperture in the support, whereby said positive connection of the head sections of the fastener with the roof and attaching ribs of said finishing object remains undisturbed in the relative lateral movement of the leg members of the fastener to applied fastening position securing the finishing object to the support.

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