Nov. 24, 1953 G. A. TINNERMAN 2,659,951

SHEET METAL SNAP FASTENER

Original Filed March 17, 1948

Fig. 1

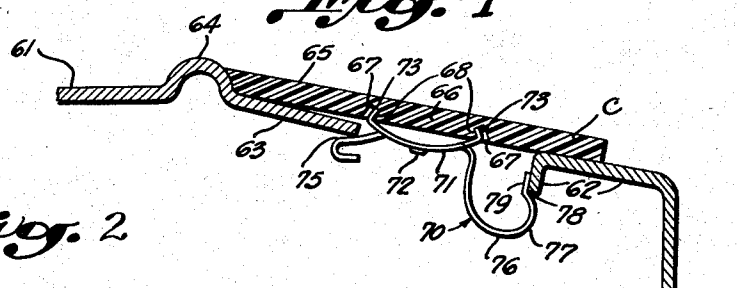


Fig. 2

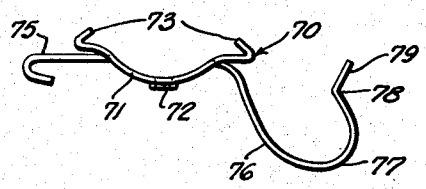


Fig. 3

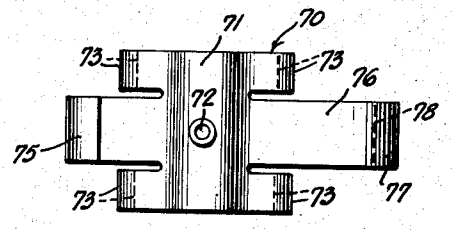


Fig. 4

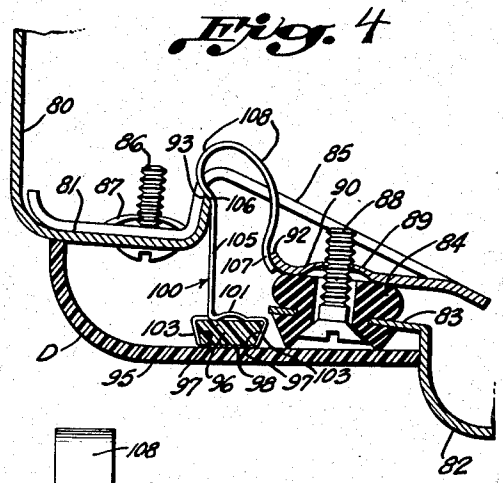


Fig. 6

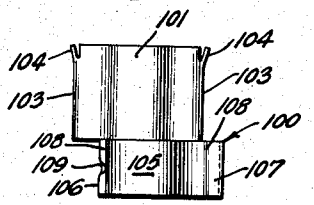


Fig. 7

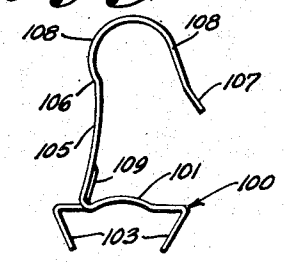
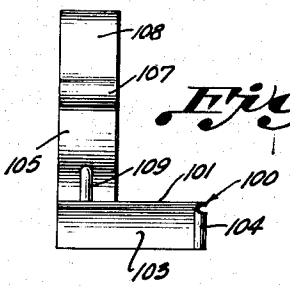


Fig. 5



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SHEET METAL SNAP FASTENER

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Original application March 17, 1948, Serial No. 15,477, now Patent No. 2,578,381, dated December 11, 1951. Divided and this application October 30, 1951, Serial No. 253,893

2 Claims. (Cl. 24—73)

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This invention relates in general to cabinet constructions and the like and deals more particularly, with improvements in the mounting and attachment of various types of finishing objects in the form of elongate cover plates or trim strips commonly known as breaker strips, sealing strips, etc., in any such installation. This application is a division of application Serial Number 15,477 filed March 17, 1948 and issued December 11, 1951 as U. S. Patent Number 2,578,381.

In the fabrication of refrigerator door structures, refrigerator casings and similar types of cabinet structures, it is usually necessary or desirable that a trim strip, breaker strip or other finishing object be secured in desired position in the completed structure by an operation taking place entirely from the outer or readily accessible side of the assembly inasmuch as the rearward or reverse side thereof seldom is conveniently or readily accessible for the application of fastening means for this purpose. The present invention contemplates in general the mounting and attachment of various types of trim strips, breaker strips, and the like in cabinet constructions and similar structures by the provision of attaching or connecting means on the body of the breaker strip or other finishing object for accommodating spring fastening means adapted for snap fastening engagement with flange portions of the cabinet structure in a manner whereby the mounting may be easily and quickly effected entirely from outside of the installation in a minimum of time and effort.

The breaker strips, trim strips, and similar finishing objects are usually relatively simple designs which may be most economically provided in the form of elongate plate-like articles of relatively thin cross section and made of molded plastic materials in a simple molding operation or in the manner of simple sheet metal stampings, castings, or the like. The breaker strips or other finishing objects are advantageously provided in this manner in that there are no projecting parts thereon subject to breakage and the same otherwise may be compactly packaged to reduce the cost of shipping and handling to a minimum. When prepared for installation in an assembly, the breaker strips or other finishing objects are provided with connecting means for easy and quick attachment thereto of spring clip fastening devices designed for mounting the breaker strip in the assembly by substantial snap fastening action, as aforesaid, or otherwise

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adapted to provide the desired interlock between the finishing object and the supporting structure. Such connecting means may be provided in any suitable form or design in the manner of a connecting rib, flange, block or stud, or the like, either as an integral portion of the breaker strip or as a separate element secured to the underside thereof in any suitable way as by an adhesive, welding or other securing means for uniting the same to the breaker strip in a concealed joint in which such securing means is not visible on the outer or exposed surface of the breaker strip or other finishing object.

A primary object of the invention, therefore, is to provide various improved constructions for mounting a breaker strip, trim strip or other finishing object in a cabinet or casing structure or the like, such as described, comprising a finishing object having a relatively simple design in the form of a strip, plate or similar member which is prepared with integral connecting means or otherwise provided with separate connecting means for the attachment of spring clip fastening devices for securing the breaker strip in as assembly by an operation taking place entirely from outside the assembly.

A further object of the invention is to provide various installations of this character comprising improved forms of spring fasteners which are designed for use in accordance with the nature of the installation and the formation and design of the breaker strip and the supporting structure on which the breaker strip is mounted.

Another object of the invention is to provide various improved installations of the kind referred to which are admirably suited for the mounting of a breaker strip or other finishing object of relatively wide cross section by spring clip fasteners of relatively smaller size.

An additional object of the invention is to provide various installations such as described in which the spring fasteners are designed for easy and quick attachment to the breaker strip or other finishing object in the manner of simple clip devices and are otherwise adapted for snap fastening engagement with the adjacent flange structure of the cabinet, casing or other supporting part on which the breaker strip is mounted.

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 as the following description proceeds with reference to the accompanying drawings, for purposes of

illustration but not of limitation, in which like reference characters designate like parts throughout, and in which:

Fig. 1 is a sectional view representing a construction such as employed in the fabrication of the walls or door of a refrigerator, for example, which comprises spaced panels or liners and a breaker strip or sealing strip, or the like, mounted in position for closing and covering the space at the ends of said panels or liners;

Fig. 2 is an enlarged side or edge elevational view of the fastener shown employed in Fig. 1; and,

Fig. 3 is a bottom plan view of the fastener per se shown in Fig. 2.

Fig. 4 is a sectional view similar to Fig. 1 of a further installation in accordance with the invention;

Fig. 5 is a side or end view of the fastener shown in Fig. 4;

Fig. 6 is a top plan view of the fastener per se; and,

Fig. 7 is a side or edge elevational view of the fastener shown in Figs. 4–6, inclusive.

The various attaching means of the invention are particularly suited for a wide range and variety of applications and uses for mounting or securing an object or part on a supporting structure by concealed fasteners. The attaching means of the invention, accordingly, comprise fasteners of general utility which are highly advantageous in that they involve only inexpensive, one-piece sheet metal attaching clips and otherwise eliminate the need for bolts, screws, nuts and similar fasteners which require time consuming assembling operations. A further advantage in the use of the improved attaching means resides in the fact that an assembly may be completely installed in applied mounted position on a supporting structure from the outer or readily accessible side without need for access to the inner or rearward side of the installation as is required in the use of the usual nut and bolt type of fasteners. For purposes of illustration, the various forms of the invention are disclosed in connection with installations for cabinet and casing structures such as employed in refrigerators and the like, but it is to be understood that the improved attaching means are not limited to the types of installations herein illustrated and described, but rather, are equally adaptable to various other similar and related types of assemblies.

Referring now, more particularly, to the drawings, Fig. 1 illustrates by way of example, a general construction of the walls surrounding the storage space of a refrigerator cabinet, including the usual hinged door forming one of such walls. Such a wall construction usually comprises spaced inner and outer wall panels or liners having the space therebetween filled with a suitable heat insulating material.

In the present example, the wall construction comprises an outer panel or liner 60 having an inturned flange 62 and an inner wall or structural member 61 having a relatively wide flange 63 formed with a corrugation 64 defining a seat for one side of the breaker strip C. Such a breaker strip C or other finishing object preferably is provided in a relatively simple design in the form of an elongate plate-like article made of molded plastic material, or composition or fibre board, or as a simple sheet metal stamping, casting, or the like. Such breaker strips or other finishing objects preferably are provided in this manner inasmuch as there are no projecting parts thereon subject to breakage and the same otherwise may be compactly packaged to reduce the cost of shipping and handling to a minimum. When prepared for installation in an assembly, the breaker strips or other finishing objects are provided with the required connecting means to which spring clip fastening devices may be attached for mounting the breaker strip in the installation by substantial snap fastening action, or by otherwise providing the desired interlock between the finishing object and the supporting structure. Such connecting means may be provided in any suitable form or design in the manner of a connecting rib, flange, block or stud, or the like, either as an integral portion on the underface of the breaker strip or as a separate element secured to the underside thereof in any suitable way as by adhesive, welding or other securing means to unite the same to the breaker strip in a concealed joint in which the securing means is not visible on the outer or exposed surface of the breaker strip or other finishing object.

In this relation, a further advantage is obtained by the present invention in that it is often necessary or desirable for a saving in material that the breaker strip, sealing strip or other finishing object be of comparatively thin cross section and usually of insufficient thickness to conceal a metallic insert or threaded screw fastening. In the instant construction, the use of threaded fastenings is avoided and by employing the improved attaching clips in combination with the connecting means provided on the underside of the breaker strip, as aforesaid, the breaker strip or other finishing object may be provided in any selected decorative configuration and of relatively thin cross section, and yet rigidly and securely mounted onto the supporting walls or other supporting structure and by completely concealed fastening means which do not mar or detract from the appearance of the breaker strip or other finishing object in mounted position.

The breaker strip C, in the present example, comprises an elongate relatively thin body 65 made of plastic or other suitable material, as aforesaid, and is provided with an integral connecting block or rib portion 66 which is defined by longitudinal slots or grooves 67 extending into said body of the breaker strip in inwardly inclined angular relation. The angular slots 67 form undercut abutments 68 for the attachment of the required clip fasteners 70, which provide a snap fastening mounting of the breaker strip on the end portions of the flanges 62, 63.

The attaching clip 70 is an inexpensive article of manufacture which may be readily provided from any suitable sheet metal or wire material preferably spring metal or cold rolled metal having spring characteristics. Such fasteners 70 are in the nature of spring clips which are formed from a suitable blank of sheet metal bent to define a central base portion 71 which is generally arched or bowed to increase the resiliency thereof and is provided with a suitable tool-receiving recess 72 for receiving a tool which is used to facilitate the application of the clips to attached position on the breaker strip. On opposite sides of the fastener base 71, integral spaced projections defining spaced attaching and holding tabs 73 are bent downwardly in inwardly inclined relation to each other at an angle approximating the inclination of the abutments 68 formed by the slots or grooves 67 in the body of the breaker strip, as aforesaid. The tabs 73, accordingly, define substantial cleats which provide a rigid, nonrotatable

attachment of the fastener base 71 to the connecting block or rib portion 66 of the breaker strip.

Integral extensions on said fastener base 71 between the tabs 73 provide arms 75, 76, which are bent generally upwardly from said fastener base in opposite relation to the tabs 73. The arm 75 is provided in the form of a short relatively rigid shoulder adapted for an interlocking, positive clasping relation with the inturned flange 63 of the inner structural member 61. The cooperating arm 76 is a spring arm designed for considerably greater resiliency and is provided in the form of a relatively large return bend having a rounded cam or guide surface 77 leading to a shoulder 78 for engaging the edge of the flange 62 on the outer wall panel or liner 60, together with an adjacent lip portion 79 for seating on the marginal portion of said flange 62 in the applied fastening position of the clip, substantially as shown in Fig. 1.

With the breaker strip C and the clip fasteners 70 thus provided, as many of such clips as are necessary are attached to the connecting block or rib 66 on the breaker strip along the path which the breaker strip extends in mounted position on the flanges 62, 63. The attachment of a clip fastener 70 to the connecting block 66 of the breaker strip in this form of the invention is easily and quickly effected by positioning the downwardly bent tabs or cleats 73 over the end of the connecting block 66 and sliding the fastener as necessary for said cleats to engage the inclined abutments 68 on the breaker strip, whereupon the clips are pushed longitudinally relatively to the breaker strip to the desired location thereon. The attachment of the clips in this manner is facilitated by the use of a pointed tool applied to the tool-receiving recess 72 in the fastener base to compress the fastener base from its generally arched or bowed formation, thus spreading the tabs 73 apart as necessary to permit quick and easy sliding of the clip to attached position on the breaker strip. When the tool is removed, the fastener base tends to assume its initial bowed or arched formation and thereby draws the tabs 73 inwardly toward each other into rigid and positive engagement with the abutments 68 so that the clip fastener is held in rigidly attached position on the breaker strip under spring tension.

With the required clip fasteners thus attached to the connecting block 66, the mounting of the breaker strip on the flanges 62, 63 is effected by moving the breaker strip laterally as necessary to engage the clasping arm 75 of each clip with the underside of the inturned flange 63 of the inner wall member, substantially as shown in Fig. 1. In this position, the rounded guide surface 77 on the resilient spring arm 76 is in position to cam against the end of the flange 62, and as pressure is exerted on the breaker strip, said spring arm 76 is compressed as necessary for the retaining shoulder 78 thereon to snap into engagement with the edge of said inturned flange 62. In this relation, said shoulder 78 is supported in engagement with the flange 62 by the lip 79 bearing on the adjacent marginal portion of said flange 62 and by the side body portions of the breaker strip C in the bearing engagement with the adjacent surfaces of said flanges 62, 63.

Figs. 4–7, inclusive, disclose another form of the invention in which the breaker strip D is provided with an alternate type of connecting block

or rib which serves similarly to that in the form of invention described with reference to Figs. 1–3, inclusive, and in which thhe clip fasteners are provided in an improved design comprising only a single spring arm adapted to provide the desired mounting of the breaker strip in the completed installation. The wall structure comprises a panel 80 having an inturned flange 81 and an associated panel 82 spaced therefrom and having a flange 83 provided with openings in which rubber grommets 84 are secured. The flanges 81, 83, are connected by an inner spacer member 85 which is secured to the panel flange 81 by bolts or screws 86 threaded into nut elements 87, while the flange 83 is secured to said spacer member 85 by screws 88 extending through the grommets 84 and threaded into nut elements 89 provided on outwardly bent integral wings 90 stamped from said spacer member 85. The inner end of said wing 90, accordingly, defines a flange edge 92 in spaced relation to the flange edge 93 on the inner end of the inturned flange 81 and these portions 92, 93, thus define the spaced flanges of the cooperating wall panels or liners in the wall structure.

The breaker strip D comprises a relatively thin body 95 having a longitudinal connecting block or rib 96 which is angularly undercut to define the abutments 97 on the sides thereof and is secured to the breaker strip body 95 by cement or adhesive 98 or other suitable means such as welding, or the like. The attaching clip 100 comprises a sheet metal body bent to define a base 101 which preferably is formed with an arch or bow for added resiliency. Integral projections on opposite sides of said fastener base are bent downwardly to define spaced attaching and holding tabs 103 extending inwardly in inclined relation toward each other at an angle approximating the inclination of the abutments 97 on the connecting block or rib 96. The tabs 103, accordingly, define substantial cleats which provide a rigid nonrotatable attachment of the fastener base to the connecting block or rib 96. Preferably said tabs are formed at one end with outwardly flared extremities 104, Figs. 5 and 6, which facilitate the initial application of the tabs 103 over the end of the connecting block and the sliding of the fasteners to the desired attached location on the breaker strip. A portion of the fastener base 101 includes an extension which is bent upwardly from the fastener base to provide a return bent spring arm 105 extending in opposed relation to the tabs 103. The return bent spring arm 105 is suitably formed to provide a resilient shoulder 106 on the portion thereof depending from the fastener base and a cooperating shoulder 107 on the extremity thereof while the intermediate rounded portions of the spring arm define cam-like guide surfaces 108. Preferably the spring arm is provided with a corrugation 109 adjoining the fastener base which strengthens and rigidifies said spring arm in the completed clip structure.

The clip fastener 100 thus provided is attached to the connecting block or rib 96 on the breaker strip in substantially the manner described with reference to Figs. 1–3, inclusive, by sliding the holding tabs 103 over the end of the connecting block and advancing the clip to its attached location on the breaker strip. With the required clip fasteners 100 thus attached to the breaker strip, the mounting of the breaker strip on the flanges of the wall structure is effected easily and quickly by positioning the spring arm 105 in the

space between the flange edges **92, 93**. The guide surfaces **108** defined by the rounded cam-like formation of the spring arm bear upon said flange edges **92, 93**, and as pressure is exerted on the outer surface of the breaker strip D, said guide surfaces cause the spring arm to be compressed as necessary for the shoulder **106** to snap into engagement with the flange edge **93** while the shoulder **107** on the extremity of the spring arm seats in bearing engagement with the flange edge **92**. In this relation, the shoulders **106, 107**, are disposed in resilient engagement with the flange edges **92, 93**, under continuously effective spring tension set up in the spring arm as compressed in the applied mounted position of the breaker strip.

Although the various embodiments of the invention are described in connection with an insulated wall construction which is particularly useful in refrigerators and similar structures, it is to be understood that the invention is equally adaptable to various other similar applications and uses in building constructions and the like within the general scope and teachings of the instant disclosure.

The clip fastener in any form preferably is constructed of relatively thin sheet metal, the thickness of which is selected according to service requirements and the predetermined size of the parts secured. The fasteners are most effective when provided of spring metal suitably spring tempered and otherwise treated to give the desired toughness and hardness, particularly in the case of devices used in installations where extreme vibratory motion takes place. A cheap but effective fastener may also be provided from cold rolled metal, such as cold rolled steel, which is untempered but of a spring metal nature and capable of providing an effective and reliable fastening means.

While the invention has been described in detail with specific examples, such examples are intended as illustrations only, inasmuch as it will be apparent 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 is:

1. A fastener comprising a piece of sheet metal providing a base and spaced tabs at opposite ends of said base, and a spring arm extending from a side portion of said fastener base, said spaced tabs projecting outwardly from one surface of said fastener base in inwardly inclined inverted substantially V-shaped relation for engaging correspondingly inwardly inclined spaced abutments in inverted substantially V-shaped relation on an object, and said spring arm projecting outwardly from the opposite surface of said fastener base for securing said object to a supporting structure.

2. A fastener comprising a piece of sheet metal providing a base and spaced tabs at opposite ends of said base, and a spring arm extending from a side portion of said fastener base, said spaced tabs projecting outwardly from one surface of said fastener base in inwardly inclined inverted substantially V-shaped relation for engaging correspondingly inwardly inclined spaced abutments in inverted substantially V-shaped relation on an object, at least one of said spaced tabs having an outwardly flared extremity for facilitating application of said tabs to said spaced abutments, and said spring arm projecting outwardly from the opposite surface of said fastener base for securing said object to a supporting structure.

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