June 2, 1970 J. V. FISHER 3,515,363

SPRING CLIP

Filed March 6, 1968

Fig. 1.

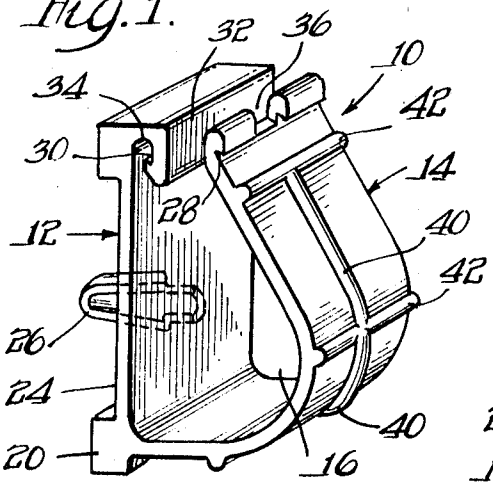



Fig. 2.

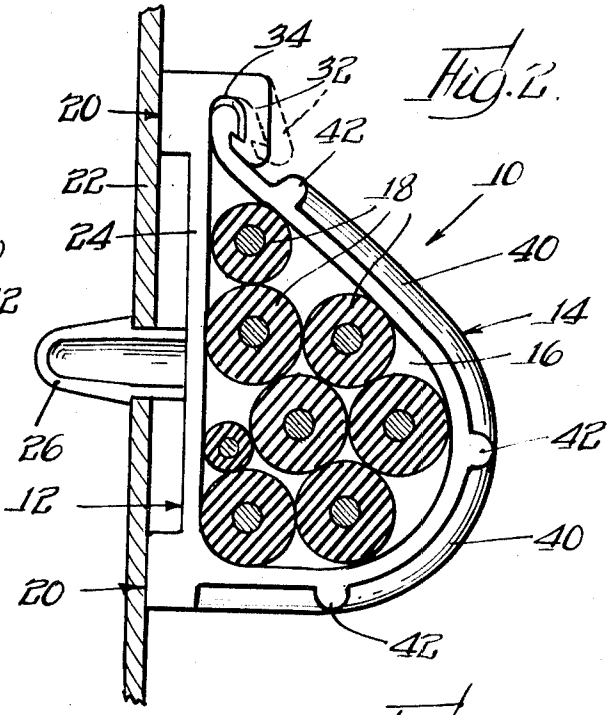



Fig. 3.

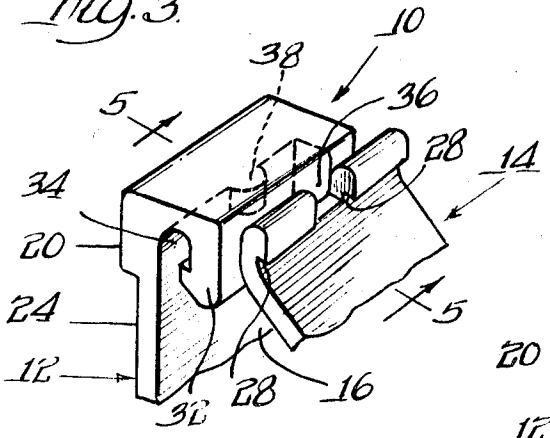



Fig. 5.

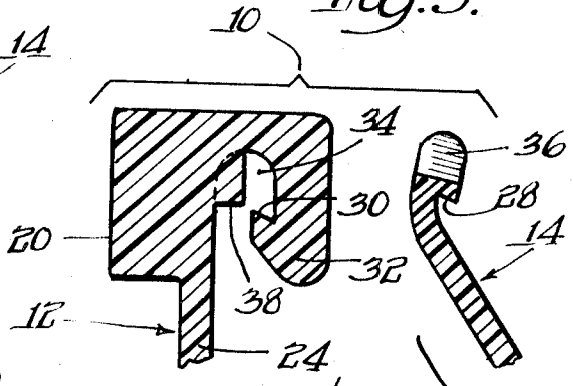



Fig. 4.

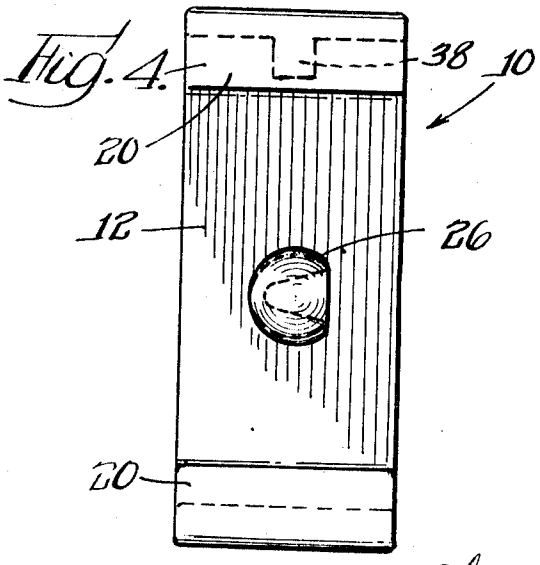
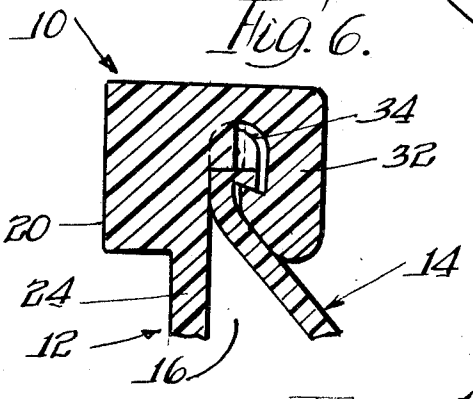



Fig. 6.




Inventor
Julian V. Fisher

By: Olson, Trexler, Wolters & Bushnell atty.

United States Patent Office 3,515,363 Patented June 2, 1970



3,515,363

# SPRING CLIP

Julian V. Fisher, Carpenterville, Ill., assignor to Illinois Tool Works Inc., Chicago, Ill., a corporation of Delaware

Filed May 6, 1968, Ser. No. 726,992
Int. Cl. F16l 3/12
U.S. Cl. 248—71 12 Claims

## ABSTRACT OF THE DISCLOSURE

The present invention relates generally to means in the form of spring clips attachable to surfaces of supporting workpieces such as the surface of a supporting panel, said clips being arranged to accommodate and support one or more elongated elements such as electrical conductors and the like. This application discloses one embodiment of the invention in the form of a one-piece spring clip of electrically insulating material such as a suitable plastic, said clip including a base member having means for attachment to a supporting work surface, and also including a flexible arm member extending from the general vicinity of one margin of the base member or plate, a portion of said arm superimposing the base plate and spaced therefrom to provide an opening for accommodating electrical conductors and the like. The free extremity of the arm terminates in the vicinity of a margin of the base plate oppositely disposed from the first mentioned margin and is provided with shoulder means adapted for interlocking association with complementary shoulder means formed integral with the base member.

It is an important object of the present invention to provide spring clips having improved, novel and highly efficient means for interlocking the free extremity of a yieldable arm with complementary means in the general vicinity of one margin of a base member or plate adapted for attachment to a work surface.

More specifically, the present invention contemplates a simple, yet efficiently operable clip wherein shoulder means associated with the free extremity of the spring arm may be interlocked with the base plate or member by insertion of the free extremity of the arm within novel channel means on the base member.

It is a further object of the present invention to provide an improved clip of the type set forth above, having a novel arrangement whereby the base plate member may be flexed laterally to assure firm engagement of the base member against the surface of a supporting part such as the surface of a panel.

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

FIG. 1 is a perspective view of a spring clip which is representative of one embodiment of the present invention;

FIG. 2 is an enlarged side elevational view of the clip shown in FIG. 1, after said clip has been attached to a workpiece or panel, and a plurality of elongated elements such as electrical conductors are secured in position with the free extremity of the clip arm interlocked with the adjacent upper marginal portion of the base member or plate;

FIG. 3 is a fragmentary perspective view of the upper portion of the clip, more clearly to illustrate the structural features of the shoulder means at the free extremity of the arm and the complementary shoulder means associated with the upper marginal portion of the base member or plate, said shoulder means being shown in disengaged relation;



FIG. 4 is a view of the clip as seen from the left of FIG. 1;

FIG. 5 is a fragmentary enlarged sectional view taken substantially along the line 5—5 of FIG. 3; and

FIG. 6 is a fragmentary enlarged sectional view similar to FIG. 5 showing the shoulder means of the clip arm interlocked with the complementary shoulder means associated with the upper margin of the base member or plate.

Referring now to the drawing, wherein like numerals have been employed to designate similar parts throughout the various figures, it will be seen that one embodiment of a spring clip contemplated by the present invention is designated generally by the numeral **10**. The clip **10** is preferably formed of suitable plastic, electrically insulating material having the required degree of inherent firm resiliency. The clip **10** includes a base member or plate **12** and an arm member **14** integral with the base **12** and extending laterally from the lower margin thereof as shown in the drawing and the extending upwardly so as to define a space **16** for accommodating one or more elongated elements such as electrical conductors **18**, FIG. 2. Opposed margins of the base member or plate **12** are preferably enlarged so as to provide surfaces **20** adapted to engage the complementary surface of a workpiece or panel **22**. A section **24** of the base plate **12** is of reduced cross-section so as to substantially enhance the lateral resiliency thereof as will hereafter be explained.

Formed integral with and extending laterally of the central portion of the plate section **24** is a stud type fastener member **26**. This fastener member **26** is preferably of the type which will permit telescopic association thereof with a complementary aperture of a workpiece or panel, as illustrated in FIG. 2. The shank of the fastener **26** is soformed as to facilitate collapsing thereof as it is inserted within the work aperture, and upon complete insertion it will spring back to its normal maximum diameter thereby preventing inadvertent or unauthorized removal of the fastener. Shoulders on the stud of the fastener **26** are so disposed with respect to the laterally yieldable plate section **24** and the surfaces **20** that they will not spring radially outwardly into locking engagement with the surface of the panel **22** oppositely disposed from the base of the clip, until after the surfaces **20** have been pressed firmly against the outer surface of the panel. Thus the lateral yieldability or resiliency of the plate section **24** cooperates in maintaining firm engagement of the surfaces **20** against the outer surface of the work or panel member **22** once the fastener stud has been completely inserted by providing take up means to compensate for tolerance variations in panel thickness. Other forms of attaching means can also be utilized as will be apparent, and may include, for example, adhesive means along the base plate **12** or its enlargement **20**.

The free extremity of the arm **14** is provided with shoulder means **28** located in the vicinity of complementary shoulder means **30** forming a part of a lip member **32**. The free extremity of the arm **14** initially may be sprung away from the lip **32** sufficiently to permit the association therewith of one or more elongated elements such as the electrical conductors **18** previously referred to. After assembly of the conductors within the space **16** bounded by the resilient arm **14**, the shoulder means of the arm may be telescopically associated with a complementary recess **34** formed by the space between the lip **32** and the adjacent marginal area of the base plate **12**. The lip **32** is sufficiently resilient so as to permit complete insertion of the free extremity of the arm **14** and ultimate interlocking of the shoulder means **28** thereof with the complementary shoulder means **30**. It will be recognized that the dis-

position of the complementary recess **34** can be angularly varied to include a vertical as well as a horizontal position relative to the base plate **12** where the requirements of installation or accommodation of conductors warrant such a design.

Attention is directed to a recess **36** provided at the free extremity of the arm **14**. This recess is adapted to receive and interlock with a complementary protuberance **38** on the plate member **12**, FIGS. 3 and 5. Interlocking of the protuberance **28** with the complementary recess **36** in the arm **14** secures said arm against any possible movement in a direction transverse to the direction of telescopic insertion of the free extremity of the arm with the recess **34**. Thus any forces acting longitudinally of the conductors **18** will not cause disengagement of the free extremity of the arm **14** from the above-mentioned recess **34**. By providing longitudinal strengthening ribs **40** and transverse strengthening ribs **42** along the outer surface of the arm **14**, said arm may be made relatively thin and yet possess the desired degree of yieldable firmness.

From the foregoing, it will be apparent that the present invention contemplates a spring clip construction of very practical and inexpensive form. The one-piece structure makes it possible to produce the clip by the practice of conventional molding methods, and thus the cost of manufacture is kept to a minimum. The improved structure for associating the free extremity of the resilient arm with the adjacent marginal structure of the base member or plate facilitates the ease with which the interlocking of such parts may be accomplished and assures against unauthorized separation of the parts once the interlock has been established. By employing the flexible lip arrangement, the ease with which the free extremity of the arm, including the shoulder means **28** associated therewith, may be interlocked with the shoulder means **30** of the lip **32** is greatly facilitated. This same resiliency also serves to maintain said interlocked relation after the shoulder means of the arm and lip member have been interlocked. Any tendency to cause relative movement between the arm and the plate in a direction transverse to the direction of insertion of the free extremity of the arm is effectively resisted by the use of the protuberance and recess arrangement described herein.

Thus the present invention contemplates the provision of a new and improved spring clip in which the resilient arm thereof is secured positively against separation in one direction due to the presence of the shoulder means, and in a transverse direction because of the presence of the protuberance and recess arrangement referred to above. By employing the thickened end margin of the plate and integral laterally yieldable relatively thin plate extending therebetween, a firm grip of the clamping surfaces of the plate member against a supporting work surface is assured.

While for purposes of illustration certain structural features of a sprtng clip of the type contemplated by the present invention have been shown, it should be understood that other structural modifications and changes are contemplated without departing from the spirit and scope of the appended claims.

The invention is claimed as follows:

**1.** A one-piece spring clip formed of electrically insulating material for supporting elements such as electrical conductors and the like, including a base plate member, one side of which is adapted for engagement with a supporting work surface such as the surface of a panel, work attaching means associated with said side of the base member, a flexible arm member extending from the general vicinity of a first margin of said plate section and superimposing the opposite side of said base member in sufficient spaced relation to define an opening for accommodating elongated elements such as electrical conductors and the like, said arm having a free extremity provided with shoulder means and terminating in the general vicinity of a second margin of said base member oppositely disposed from said first margin, and arm interlocking means formed integral with the base member in the general vicinity of said second margin and including a laterally yieldable lip section superimposing and spaced from said second margin of said base member and also including shoulder means for interlocking with the shoulder means of said arm, said lip section being laterally yieldable to permit insertion of the shoulder means of said arm in a given direction within the space between said lip section and said second margin of the base member and to thereafter urge the shoulder means of said arm and arm interlocking means into interlocked relation.

**2.** A one-piece spring clip as set forth in claim **1**, wherein the shoulder means of the arm is positioned externally thereof.

**3.** A one-piece spring clip as set forth in claim **1**, wherein the shoulder means of the arm interlocking means is located on the inner surface of the lip.

**4.** A one-piece spring clip as set forth in claim **1**, wherein the shoulder means of the arm is positioned on the outer surface thereof and the shoulder means of the arm interlocking means is located on the inner side of the lip.

**5.** A one-piece spring clip as set forth in claim **1**, wherein the arm includes a relatively thin strip of stock equipped with reinforcing ribs.

**6.** A one-piece spring clip as set forth in claim **1** wherein the base member includes an intermediate, relatively thin, laterally flexible section bounded by opposite marginal sections providing work engaging surfaces.

**7.** A one-piece spring clip as set forth in claim **6**, wherein the work engaging surfaces of the opposite marginal sections project beyond the adjacent bounding plane of said flexible section.

**8.** A one-piece spring clip as set forth in claim **1** having interlocking means between the free extremity of the arm and said base to secure said parts against separation in a direction transverse to the aforementioned direction.

**9.** A one-piece spring clip as set forth in claim **8** wherein said interlocking means includes a protuberance and recess means for accommodating said protuberance.

**10.** A one-piece spring clip as set forth in claim **8** wherein said interlocking means includes a protuberance on the base member and recess means in the vicinity of the free extremity of the arm for accommodating said protuberance.

**11.** A one-piece spring clip as set forth in claim **9** wherein the protuberance is positioned in the general vicinity of a margin of said base member.

**12.** A one-piece spring clip formed of electrically insulating material for supporting elements such as electrical conductors and the like, including a base plate member, one side of which is adapted for engagement with a supporting work surface such as the surface of a panel, work attaching means associated with said one side of the base member, a flexible arm member extending from the general vicinity of a first margin of said base member and superimposing the opposite side of base member in sufficient spaced relation to define an opening for accommodating elongated elements such as electrical conductors and the like, said arm having a free extremity provided with shoulder means having a predetermined thickness and terminating in the general vicinity of a second margin of said base member oppositely disposed from said first margin, and arm interlocking means formed integral with the base member in the general vicinity of said second margin and including shoulder means having a similar predetermined thickness for intrlocking with the shoulder means of said arm, one of said shoulder means having a laterally yieldable lip section cooperating therewith to define a restricted throat therebetween, said throat having an initial dimension substantially less than said predetermined thickness of said shoulder means, said lip section

being laterally yieldable to permit intersection of one of the shoulder means in a given direction within the restricted throat area between said lip section and its cooperating shoulder means and to thereafter urge the shoulder means of said arm and arm interlocking means into resiliently urged interlocked relation.


**References Cited**

UNITED STATES PATENTS

| | | | |
|---|---|---|---|
| 2,352,856 | 7/1944 | Morehouse | 248—74 |
| 2,354,485 | 7/1944 | Slaughter | 248—74 X |
| 2,657,894 | 11/1953 | Sklenar | 248—239 |
| 3,154,281 | 10/1964 | Frank | 248—201 |
| 3,126,184 | 3/1964 | Kropp | 248—73 |
| 3,163,712 | 12/1964 | Cochran | 248—71 X |
| 3,423,055 | 1/1969 | Fisher | 248—73 |





CHANCELLOR E. HARRIS, Primary Examiner

U.S. Cl. X.R.

24—73; 248—74