

[54] **FASTENER STACK AND FASTENERS
HAVING BODIES OF FOAM**

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[52] **U.S. Cl.**..... **206/338, 206/820**

[51] **Int. Cl.**..... **B65d 69/00, B65d 85/62**

[58] **Field of Search**..... **206/56 DF, 56 AB, 46 H,
206/65 K; 24/23 W; 174/84 C; 224/42.1 C**

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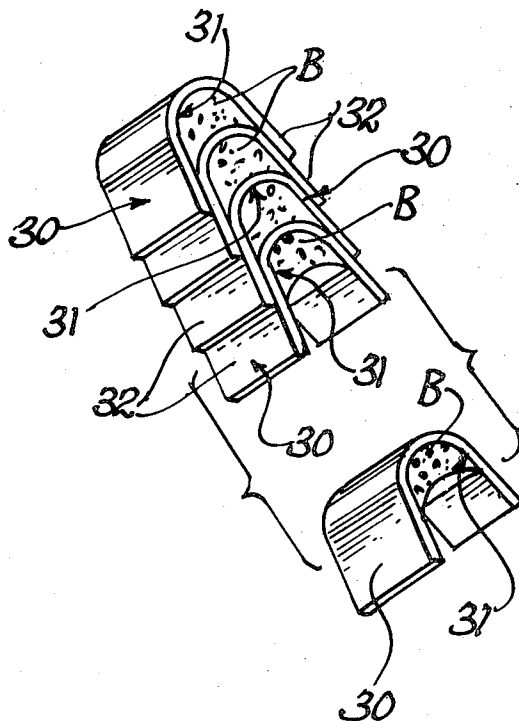
Primary Examiner—William T. Dixon, Jr.

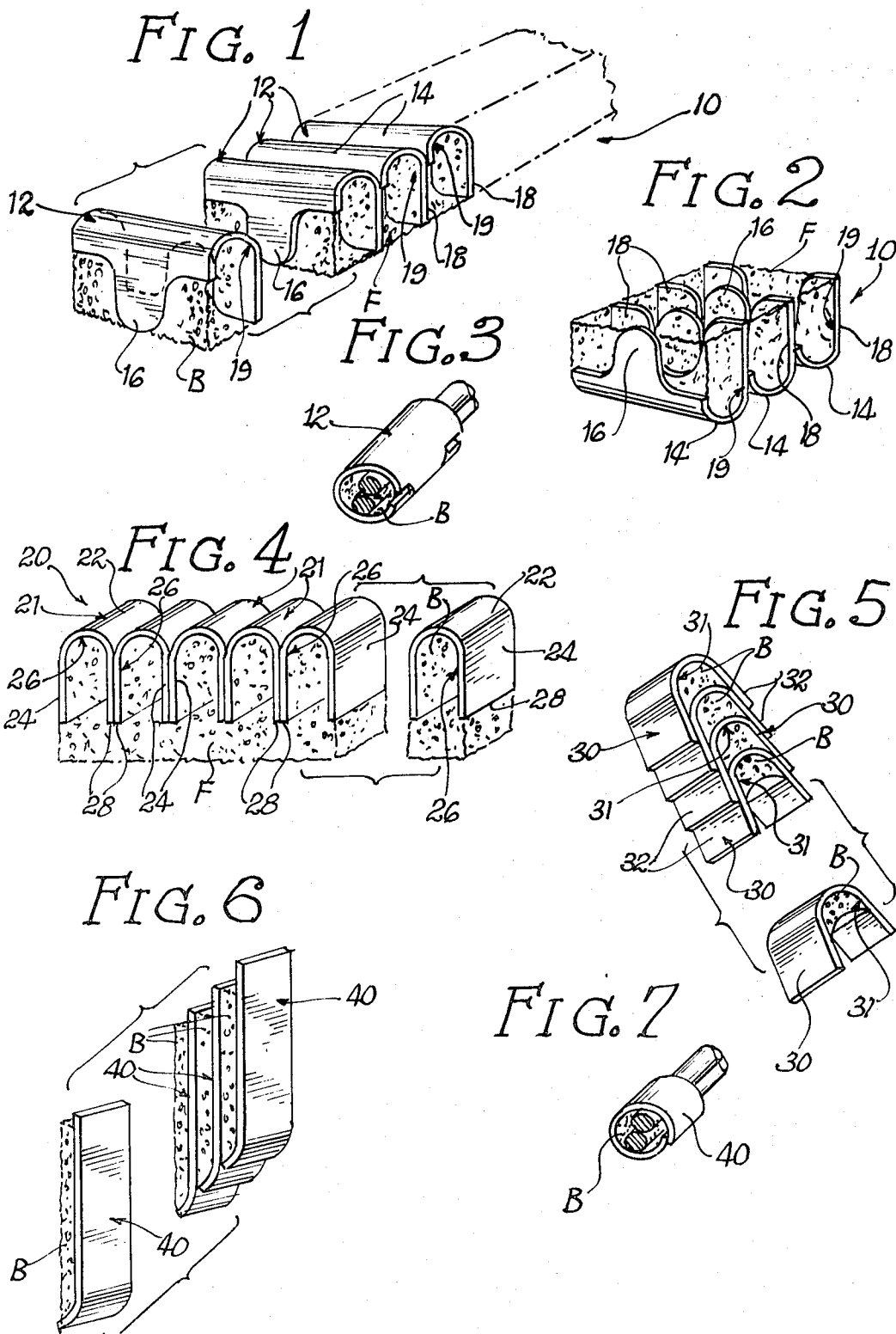
[57]

ABSTRACT

Fasteners such as clips and seals are each provided with a body of foam in its open zone. The foam is carried into a clinched joint to form a tight durable joint. The foam may be used to unitize a stack of like fasteners, thereby to provide an easily handled, somewhat bendable and pliable fastener stack.

5 Claims, 7 Drawing Figures





FASTENER STACK AND FASTENERS HAVING BODIES OF FOAM

This invention relates to an improved fastener, and especially to an improved clip or seal useful for securing elongate wire elements, strapping, plastic ligatures or the like to each other, usually intermediate their lengths. The fastener is provided with a body of foam material which, when the fastener is clinched to form a joint, will be positioned in the joint. The invention also relates to a stack of such fasteners, each fastener being adapted to be separated from the stack and to carry its body of foam material with the fastener as it is separated so that when it is clinched to form a joint the foam material will be positioned in the joint.

A variety of fasteners for securing elongate wires, strapping and other ligatures are known to the art. Some are adapted to be nested, thereby to form relatively compact stacks. Such a stack is illustrated in Kuster U.S. Pat. No. 3,032,184. Other fasteners are adapted to be stacked in a side-by-side array. Such an array is illustrated in Blumensaadt U.S. Pat. No. 2,574,811. Fasteners of those types are adapted to be closed and clinched about two or more elongate members, and a variety of machines have been designed for separating and feeding such fasteners from a magazine fed stack to a clinching mechanism in which such fasteners are clinched about such elongate members to be held. Some such fasteners are referred to as seals, a term most commonly used when speaking of strapping fasteners, and some such fasteners are referred to as clips, a term most commonly used when speaking of wire fasteners. The term fastener as used in this application is intended to embrace both types of fasteners. Although some fasteners may be individually inserted into the magazine of a fastening tool, wherever possible, a multiplicity of such fasteners is integrated into a stack thereby to facilitate their handling from the time they are made into a stack until the time they are driven from an appropriate fastening tool.

Most methods of integrating a plurality of fasteners have nothing to do with the joint to be produced by the fastener. Integrating methods currently in use utilize snap connections, adhesive, strips of materials, such as adhesive tapes or papers. All of these serve only to secure the fasteners to each other and are deliberately designed to interfere as little as possible with the joint to be produced when the fastener is clinched to form the joint.

When glues are used, unless they are of very high peel strength, a fastener stack tends to become quite rigid and difficult to handle. Such stacks are, of necessity, relatively short. Furthermore, when glue is used, a good intimate relationship between the fasteners is necessary and care must be taken that a fragile bridge will not be formed between adjacent fasteners which would promote breakage. When extraneous materials, such as tapes and the like, are used to unitize a stack of fasteners, extraneous material remains when fasteners are driven from the stack, this sometimes tending adversely to affect the operation of the fastening tool. And, too frequently joints formed with most prior art clips tend towards looseness in use, thereby producing squeaky assemblies and the like.

A recently suggested fastener unitizing method utilizes plastic filaments edge connected to a stack of fasteners. When the fasteners so unitized are severed from

a stack, portions of the filaments are carried by the edges of the fasteners, ultimately to be crimped into a joint. Although joints so produced are improved upon prior art joints, they do require the formation of edge notches which in some fasteners cannot be used because of an insufficient amount of fastener material to permit notching.

In accordance with the present invention, a fastener defining an open zone to confront members to be held to each other is provided with a body of foam material disposed within at least a portion of the open zone. When such a fastener is secured to members to be held together, the foam is compressed between the members and the fastener. Preferred fasteners are adapted and configured to receive elongate members, such as wires, and to be closed and clinched to embrace and hold the elongate members, the foam material being positioned within the closed fastener thereby to form a tight durable joint with the members embraced. Desirably the foam is relatively flexible and resilient. Preferably it also serves to connect adjacent like fasteners of a stack to each other, whether nested or not. In a presently preferred embodiment the foam is continuous throughout the length of a stack of like fasteners, thereby to unitize the stack as well as serving, upon severance of the individual fasteners and closure about the elongate members, cooperatively to form a tight durable joint.

Further objects, features and advantages of this invention will become apparent from the following description and drawings of which:

FIG. 1 is an exploded perspective view of a fastener stack formed in accordance with the present invention;

FIG. 2 is a bottom perspective view of the fastener stack of FIG. 1;

FIG. 3 is a perspective view of a fastener of FIG. 1 crimped about wires to form a joint;

FIGS. 4, 5 and 6 are exploded perspective views of further fastener stacks formed in accordance with this invention; and

FIG. 7 is a view similar to FIG. 3, showing a fastener of FIG. 6 crimped about wires to form a joint.

Referring first to the embodiment of FIGS. 1 to 3, a fastener stack 10 comprises a plurality of clips or fasteners 12. Each fastener 12 may be formed in a conventional manner from sheet metal and comprises rounded central body portion 14 and downwardly extending spaced leg members. In this case, the leg members comprise a single front leg 16 and a pair of offset spaced back legs 18. Legs 16 and 18 are spaced and with body portion 14 define a concave open zone 19 to receive wires to be clinched. Such a fastener is especially adapted for securing the wires of springs for bedding and for seats to each other.

As seen in FIGS. 1 and 2, fasteners 12 are adapted to be positioned in an adjacent or juxtaposed relationship with respect to one another, preferably with the front leg 16 of one fastener adjacent the back legs 18 of the next adjacent fastener. The plurality of fasteners 12 are then secured to each other to form a unitized fastener stack.

In accordance with the embodiment of FIGS. 1-3, a flexible resilient foam material F is provided for securing the fasteners to each other and to provide individual foam bodies B to be carried into a joint to be formed. The preferred foam material F is a flexible polyurethane having a density of between about 3 1/2

and about 4 pounds per cubic feet, although foam having a substantially greater density should be useful as well. Such foam also has good adhesion characteristics. Foam F is continuous from fastener to fastener in stack 10, through the spaces between the adjacent legs of adjacent clips, thereby unitizing the fasteners into a fastener stack. Where the foam is not also adhesive, a suitable bonding agent may be provided for integrating the fasteners into a fastener stack and for causing the foam body B to be fast with each fastener 12 when it is separated from stack 10.

A stack of fasteners 10 is adapted to be separated for feeding of the individual fasteners 12 which may then be clinched to form a joint. A tool of the general character illustrated and described in Blumensadt U.S. Pat. No. 2,574,811 may be used to feed and clinch fasteners 12. Such a tool utilizes an anvil arrangement in which the legs of a fastener are gradually curled and clinched about two or more elongate members, such as wires to be used in mattresses or seating, the legs gradually closing to embrace, surround and hold the wires. As the fasteners are brought to their completely closed or fully clinched position, the foam body B is compressed against the wires within the fasteners, thereby to provide a strong, filled joint (see FIG. 3).

FIG. 4 illustrates a further fastener stack 20 comprising a plurality of generally U-shaped fasteners 21 secured in an elongate array. Fasteners 21 each comprises a central web 22 and a pair of front and back legs 24, and defines a concave open zone 26 to receive elongate members to be clinched together. In the embodiment of FIG. 4, front and back legs 24 are solid across the entire width of the fastener and are adapted to confront and abut legs of adjacent fasteners 21. Foam F is introduced into the stack of juxtaposed fasteners 21 to fill the open zones, the foam projecting outwardly beyond the periphery of the fasteners, i.e., in this case beyond the lowermost edges 28 of legs 24. Because the projecting foam is continuous throughout the length of the stack, it serves to integrate the stack of fasteners. It will be clear that the foam might also extend beyond the sides of the fasteners, thereby to provide a continuous body of foam for unitizing the fastener stack.

FIG. 5 illustrates another fastener assembly of this invention. In the embodiment of FIG. 5, each of the plurality of fasteners 30 is similar to fasteners 20, except that the legs 32 diverge to allow the fasteners to nest. Each fastener 30 defines a concave open zone 31 adapted to receive elongate members such as wires intermediate the ends of the wires and mounts a body of foam material B fast with the fastener, disposed within the open zone 31 and positioned to confront the elongate members to be held together. When the legs 32 of a fastener are closed about elongate wire members, the body of foam material B will be compressed against the wires to provide a tight joint.

The fasteners 30 are secured to each other for ready separation in a fastener tool. They are secured as by a suitable adhesive interposed between confronting portions of legs 32 or, for example, as by a properly configured dimple and recess assembly such as those illustrated in Kuster U.S. Pat. No. 3,032,184. The foam material used for the body may also be between legs 32 to serve to secure the stack of fasteners 30 to each other.

Another embodiment of this invention is illustrated in FIG. 6. FIG. 6 illustrates fastener members 40 of a J shape. The fasteners are staggered as illustrated in FIG. 6 and are releasably bonded to each other by the bodies of foam material B. The foam material is fast with each fastener 40 within its concave open zone so that when it is rolled and clinched about elongate members to form a joint (FIG. 7), the foam is retained and is compressed against the elongate members within the closed fastener 40.

A preferred foam material is the polyurethane foam identified above. Such a foam material is flexible and resilient so that when it is compressed it tends to retain its memory, thereby to avoid its complete crushing. As such it is relatively uniformly dispersed and tightly compressed in joints, such as those in FIGS. 3 and 7. Further, variations in the wire sizes may be compensated for by the foam, making a given fastener adaptable to a wider range of applications than were prior art clips and fasteners. Joints in accordance with this invention also resist the twisting and movement of the wires in the joint, and, even if there is some relative movement, the joint tends to retain its noiseless characteristics. Stacks with such flexible foams are rigid enough to be handled easily but are pliable and bendable to an extent, thereby minimizing breakage due to handling. Of course, other foams may be used as well and other fasteners, collated and stacked as desired, may also be used.

While this invention is susceptible of embodiment in many different forms, there has been shown and described in detail preferred embodiments of the invention, with the understanding that the present disclosure is to be considered as an exemplification of the principles of the invention and is not intended to limit the invention to the embodiment illustrated. The scope of the invention will be pointed out in the appended claims.

What is claimed is:

1. A fastener stack comprising a plurality of similarly shaped adjacent metal fasteners, each of which is adapted to hold elongate members to each other, each fastener defining an open internal zone adapted to receive elongate members intermediate their ends and adapted to be closed to embrace and hold said elongate members, each fastener providing a body of given volume of compressible foam material fast therewithin and disposed within at least a portion of said open zone, said body being positioned to confront said elongate members, each of said fasteners being readily severable from said stack and proportioned to carry said body of foam material therewith, whereby when a severed fastener is closed about said elongate members, foam material is displaced and compressed within said closed fastener to reduce very substantially the volume of said foam material and to place foam material in intimate retentive engagement with said elongate members.

2. A fastener stack in accordance with claim 1 wherein the open zone of each fastener is concave and said foam material is fast with the concave surface.

3. A fastener stack in accordance with claim 1 wherein said foam material is a resilient foam.

4. A fastener stack in accordance with claim 1 wherein said fasteners are U-shaped clip members adapted to be closed and crimped about said elongate members.

5. A fastener stack in accordance with claim 1 in which said bodies of foam material are continuous and integral, thereby to secure said fasteners to each other in said fastener stack.

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UNITED STATES PATENT OFFICE
CERTIFICATE OF CORRECTION

Patent No. 3,841,473 Dated October 15, 1974

Inventor(s) William L. Gabriel

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Please correct inventor's name from "Bagriel" to --Gabriel--.

IN THE SPECIFICATION:

Column 1, line 43 "Itegrating" should be -- Integrating --.

Column 1, line 66, "filaments edge" should be -- filament edges--.

Column 3, line 9, "fastneers" should be -- fasteners --.

Column 3, line 47 "theplurality" should be -- the plurality --.

Column 4, line 26, "trhandling" should be -- to handling --.

Signed and sealed this 7th day of January 1975.

(SEAL)
Attest:

McCOY M. GIBSON JR.
Attesting Officer

C. MARSHALL DANN
Commissioner of Patents