Aug. 3, 1965 R. J. MOORE 3,198,057

CORRUGATED FASTENER STICK

Filed Dec. 12, 1961

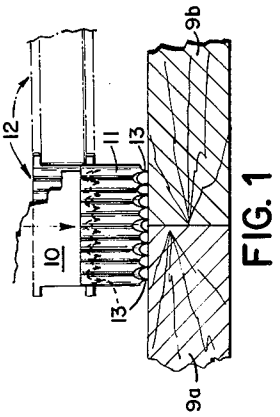


FIG. 1

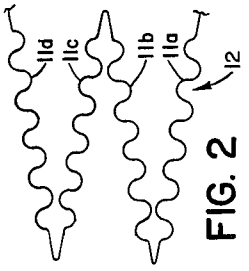


FIG. 2

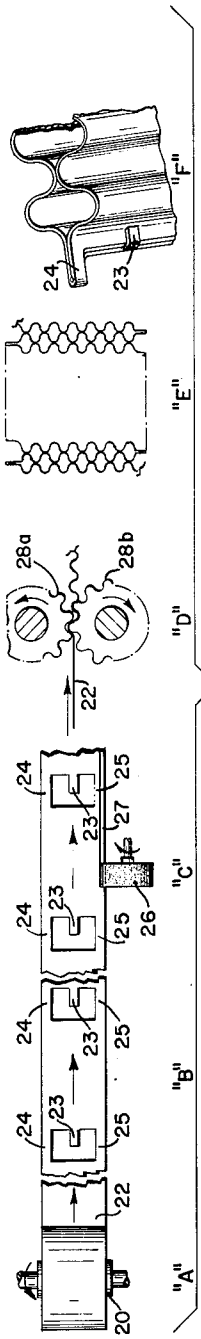


FIG. 3

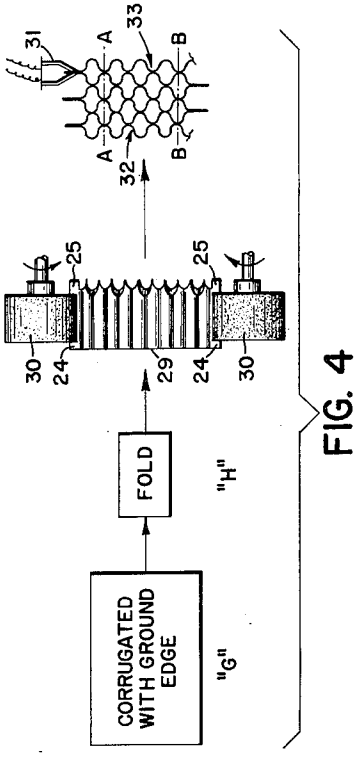


FIG. 4

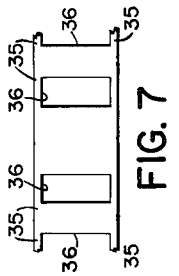


FIG. 7

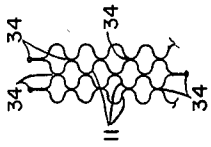


FIG. 6

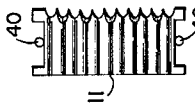


FIG. 5

INVENTOR
ROLAND J. MOORE
BY Leonard H. King
ATTORNEY

United States Patent Office 3,198,057 Patented Aug. 3, 1965

3,198,057

CORRUGATED FASTENER STICK

Roland J. Moore, Richmond Hill, N.Y., assignor of one-half to Leonard H. King, Valley Stream, N.Y.

Filed Dec. 12, 1961, Ser. No. 158,723
5 Claims. (Cl. 85—17)

This invention relates to a continuous corrugated fastener strip composed of a plurality of adjacently disposed corrugated fastener elements which are disposable into the magazine of a device for driving such elements into a workpiece.

Corrugated fasteners themselves are, of course, old and until recently were driven into a workpiece by setting an individual fastener against the workpiece and then mechanically driving it home by means of a hammer or similar tool.

With the advent of present day high labor costs, automatic machinery for driving such fasteners has come into use.

Conventional hydraulic or pneumatically-operated fastener driving equipment comprise a magazine in which are disposed a number of fasteners formed in a stick by adhesive bonding with one another. A typical machine in which the fastener sticks of this invention may be employed is shown, for example, in U.S. 2,837,743. An opening is provided in the forward end of the magazine to accommodate the foremost member of the stick of fasteners. A driver blade is designed to impinge upon said foremost member of the strip, to sever it from the remainder of the stick, and to drive it into the workpiece. The conventional adhesively secured stick has a number of disadvantages which the present invention overcomes; for example, the adhesively secured stick is fragile. This results in breakage and considerable waste. The manufacturer and dealer are often harassed by returns of broken sticks, the damage occurring through misuse, dropping of the package, or normal shock occurring in the course of shipping. Because of the fragility of the adhesive stick, under the rules of the Interstate Commerce Commission rate classification system, the adhesively secured stick falls into a relatively high freight rate bracket. On the other hand, as will be discussed more fully hereinafter, the stick of this invention is not fragile, resulting in savings, ease of handling, absence of breakage in use, and the right to be classified in a shipping classification wherein freight charges are substantially reduced. An additional advantage of the more rugged features inherent in the stick of this invention is that simpler and less expensive packing means may be employed resulting in savings in packaging costs, shipping and storage space required.

Another advantage of the present invention is that the stick has indefinite shelf life, whereas, on the other hand, the prior art stick is known to have a limited shelf life because the adhesive tends to become brittle with age. The corrugated strip of this invention lends itself to the production of much longer sticks than is feasible with the adhesively collated type. For example, whereas a typical stick of the prior type is about 4" in length, a stick of this invention could be made 45" or even longer, to fit a magazine of suitable length.

Still a further advantage of the present invention, which will be more fully discussed hereinafter, is that more economical manufacturing procedures may be employed as the operation may be carried out on one machine as part of a continuous process, whereas the adhesively secured stick requires considerably more handling.

A further advantage of the present device is that it does not employ adhesive material which is cut off and can collect to ultimately jam the driving tool.

Thus, it is an object of this invention to provide a non-fragile corrugated fastener stick for loading in a magazine fed driving tool.

Still another object of this invention is to provide a longer corrugated fastener stick than previously feasible.

Still a further object of this invention is to provide a stick of corrugated fasteners having indefinite shelf life.

Still another object of this invention is to provide a more conveniently handle stick of corrugated fasteners.

Another object of this invention is to provide a stick of corrugated fasteners not employing an adhesive.

A particular object of the invention is to employ a one-piece continuous strip folded into a stick suitable for insertion in the magazine of a driving gun.

These and still further objects and advantages of the present invention will, in part, be pointed out with particularity and will, in part, become obvious as the following descritpion proceeds taken in conjunction with the accompanying drawings.

In the drawings:

FIG. 1 is a perspective view of a corrugated fastener being driven into a pair of wooden workpieces.

FIG. 2 is a top plan view of a fastener stick in expanded form.

FIG. 3 is a flow chart showing the manufacture of the fastener stick.

FIG. 4 is a flow chart showing a method for manufacturing an alternative embodiment.

FIG. 5 is an end view of an alternative embodiment of the invention.

FIG. 6 is a top plan view of a fastener stick showing another method of securing the stick against expansion.

FIG. 7 is a plan view of a section of a blank during the process of manufacture.

Referring now to FIG. 1, there is shown a fastener **11** about to be driven into workpieces *9a*, *9b*. It will be noted that the individual fastener **11** has been severed from the balance of a stick **12** of such fasteners by the driver blade **10** of the fastener driving machine. Each of the corrugated fastener elements **11** in the stick **12** is formed with a plurality of lateralmost points **13**.

Whereas in the prior art, a plurality of individual corrugated fastener members are collated together by means of adhesive into a stick, in carrying out the present invention the corrugated fasteners are formed in the continuous member folded upon itself accordion-like, as shown (in expanded form) in FIG. 2, and comprising a plurality of corrugated fasteners **11***a*, **11***b*, **11***c*, etc. Since there is a natural tendency for the folded member to expand, as shown in FIG. 2, it is necessary to provide means to keep the stick firmly clamped together in a compact assembly. Several methods of accomplishing this will be discussed hereinafter.

The foremost fastener may contact its succeeding fastener in either the conventional nested relationship employed in adhesively secured sticks, or in the lateralmost point to lateralmost point relationship. If a nested arrangement is employed, it is preferred that the bending be carried out in such a way that the adjacent corrugated fasteners are separated slightly to permit the driver blade of the fastener driving machine to sever an individual fastener from the strip without interfering with the succeeding fastener.

The operation adapts itself to continuous production procedures.

Referring now to FIG. 3, there is shown such a procedure. At station "A," there is provided a supply spool **20** of steel **22** of suitable width and thickness, typically about 0.020" thick and about ½" wide, the width being determined by the dimensions of the magazine of the particular gun for which the corrugated fastener is intended. As the material **22** is supplied from roll

20, it is fed to a punch press operation at station "B" where a conventional stamping die stamps out a portion leaving a tongue member 23 and a pair of tabs 24 and 25. The strip moves on the station "C" where an abrasive wheel 26 grinds a sharp edge 27. The strip then moves on to station "D" where corrugated rolls 28*a* and 28*b* corrugate the strip. For purposes of illustration, the drawings show the strip in an edge view at stations "D" and "E," i.e., rotated 90° from that shown at station "A"–"C." It is to be noted that the grinding operation may also be carried out after the corrugating operation and it is often, for some applications, preferred, as this provides a many-toothed structure. It is not germane to the invention as to the particular order in which the grinding and corrugating is carried out. The strip then advances to station "E" where folding dies fold the strip, as shown. At station "F" a suitable die bends over tongue 23 to secure the stick against opening to the expanded position.

Again, for purposes of illustration only, an enlarged fragment of two adjacent fasteners are shown pictorially. The folding and bending dies are not shown since they form no part of this invention and their construction would be routine for a tool and die shop.

Still another method of carrying out the invention is shown in FIG. 4, where the corrugated strip 29 with a preground edge (step "G") is folded (step "H") and passed through a pair of grind wheels 30 which grind a recess leaving tab portions 24 and 25. Corrugated and folded strip 29 is then tack welded, as by spot welder 31 (shown symbolically), to form a cohesive closely aligned stick 33. It is to be noted that the weld need be no stronger than that required to hold the fasteners together in a cohesive stick. In lieu of spot welding along the edges, the welding may be carried out on the top or bottom, for example, along lines A—A and B—B without departing from the spirit of the invention.

Since tabs 24 and 25 maintain the individual fasteners in the continuous strip, in lieu of welding, solder 34, for example, at the points shown in FIG. 6, can be used to prevent the stick from expanding. However, soldering by present day techniques is more expensive because of the need for prior removal of grease and oil accumulated during the forming procedures.

Another way of preventing the stick from expanding is to employ a pair of round, flat, or other shaped restraining wires 40 welded to the edges of the fasteners 11, as shown in FIG. 5. In use, the wires are fed out of the driving gun curling up adjacent to the gun for later disposition.

FIG. 7 shows a section of a steel strip 35 provided with simple rectangular cut-outs 36. The perforated strip is corrugated, ground, folded, and secured against expansion, as disclosed earlier.

Having disclosed the best embodiment of the invention presently contemplated, what is claimed is:

1. A corrugated fastener stick in the form of a continuous elongated member folded upon itself to provide a plurality of elongated elements having corrugations extending completely across their smaller dimension, said elements including top and bottom end surfaces and having opposed side edges, any two adjacent elements being integrally joined by relatively narrow U-shaped tab portions at one side edge and being free from connection at the other side edge, and tab portions being readily severable by an axial force applied to the top end surface of one of said adjacent elements, each of said elements having a series of relatively sharp penetrating points along the bottom end surface thereof, said member including frangible retaining means secured to the integrally joined side edges thereof, whereby said member is prevented from expanding.

2. The fastener stick of claim 1 wherein said frangible retaining means comprises an L-shaped tab clamping adjacent elements at said integrally joined side edges.

3. The fastener stick of claim 1 wherein said frangible retaining means comprises weld joints at said integrally joined side edges securing adjacent elements to each other.

4. A corrugated fastener stick in the form of a continuous elongated member folded upon itself to provide a plurality of elongated elements having corrugations extending completely across their smaller dimension, said elements including top and bottom surfaces and having opposed side edges, any two adjacent elements being integrally joined by relatively narrow U-shaped tab portions at one side edge, said fastener stick further comprising a pair of wires secured to opposite sides of said folded member to integrally join any two adjacent elements along both side edges thereof, said wires being readily severable by an axial force applied to the top end surface of one of said adjacent elements, each of said elements having a series of relatively sharp penetrating points along the bottom end surface thereof.

5. The fastener stick of claim 4 including weld joints securing said pair of wires to said adjacent elements.

References Cited by the Examiner

UNITED STATES PATENTS

427,632	5/90	Starr	10—34
1,026,050	5/12	Reber	1—56
1,106,938	8/14	Greenfield	85—17
1,129,968	3/15	Englert	85—11
1,465,783	8/23	Polzer	85—17
1,981,869	11/34	McFaul	10—34
2,433,914	1/48	Lang	85—17
2,574,219	11/51	Marsden	85—49
2,942,267	6/60	Cusumano	85—11
2,969,585	1/61	Smith	29—413
3,044,921	7/62	Wentworth et al.	
3,083,369	4/63	Peterson	1—56
3,086,624	4/63	Wyatt.	

EDWARD C. ALLEN, *Primary Examiner.*

M. HENSON WOOD, JR., CARL W. TOMLIN, *Examiners.*