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L. W. SMITH

METHOD OF MAKING PAPER BOX FASTENERS

Filed Aug. 3, 1920

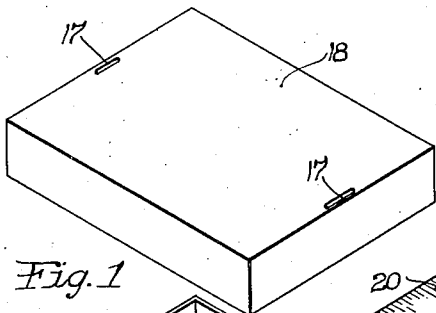


Fig. 1

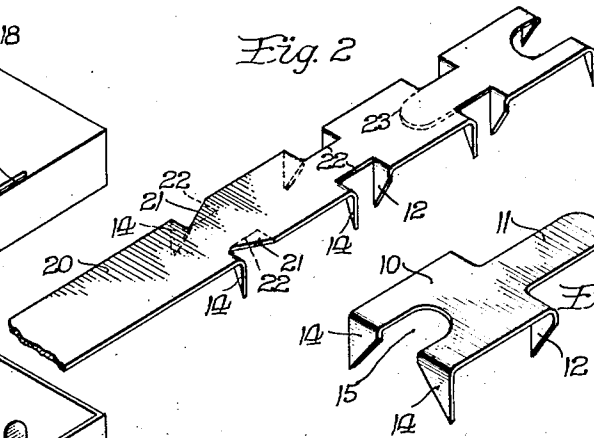
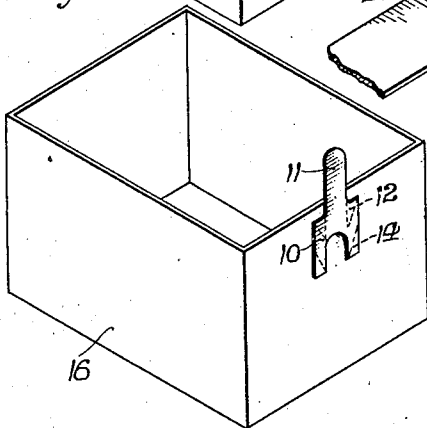


Fig. 2

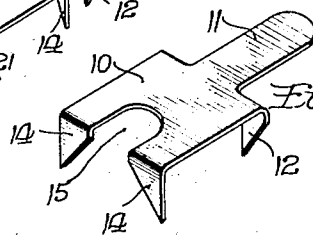


Fig. 3

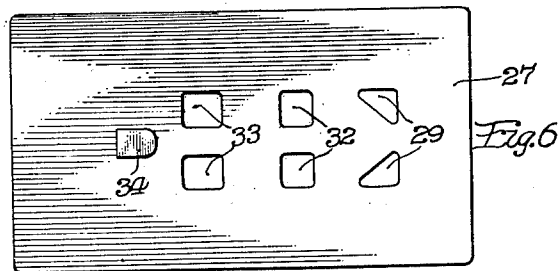


Fig. 5

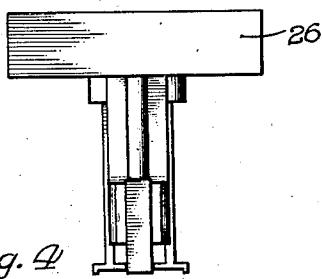


Fig. 6

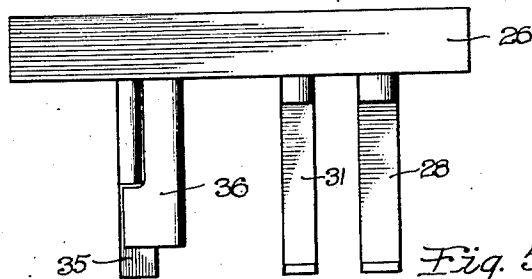
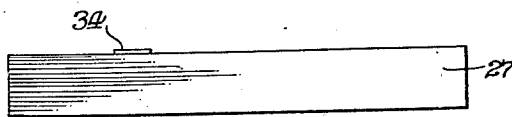
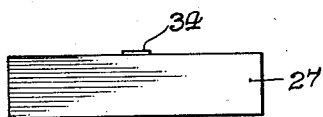


Fig. 7



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UNITED STATES PATENT OFFICE.

LOU W. SMITH, OF CHICAGO, ILLINOIS.

METHOD OF MAKING PAPER-BOX FASTENERS.

Application filed August 3, 1920. Serial No. 401,036.

To all whom it may concern:

Be it known that I, LOU W. SMITH, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Methods of Making Paper-Box Fasteners, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings forming a part of this specification.

My invention relates to an improved method of making paper box fasteners and the like.

The primary object of my invention is to provide an improved method of manufacturing a simple and inexpensive form of box fastener which will have maximum security of engagement with the wall of the paper box; this being accomplished by devising the body portion thereof to have a comparatively large area of clenched engagement with the wall of the box by the provision of a plurality of clenched prongs on the body portion at points so distributed as to sustain the lateral and outward strains to which the fastener is subjected, without danger of tearing from the box.

This improved method is designed to punch out these fasteners with maximum rapidity and with perfect economy of material, this latter result being attained by punching the fasteners out of the stock material in such a manner as to utilize every bit of stock and avoid the creation of any waste scrap.

In the accompanying drawings in which a preferred embodiment of my invention is particularly illustrated:

Figure 1 is a perspective view of a paper box illustrating the application of one of my improved fasteners;

Fig. 2 is a perspective view of the stock material illustrating in progressive sequence the various punching operations performed thereon;

Fig. 3 is an enlarged perspective view of the completed fastener;

Fig. 4 is a simplified end view of the punching dies for performing the punching operations;

Fig. 5 is a side view of the same; and

Fig. 6 is a plan view of the die plate.

Referring to the perspective illustration in Fig. 3, my improved box fastener com-

prises a body portion 10 and an extending tongue 11. The tongue 11 is made considerably narrower than the body portion 10, forming an upper edge on the body portion from which are bent down two prongs or spurs 12—12. These prongs are of triangular formation, being struck down from the metal along the lateral edges of the tongue 11 in such a manner as to form vertical inner edges on the prongs and inclined outer edges which converge inwardly and form points on the prongs. The lower end of the fastener is similarly formed with two triangular prongs 14—14. The outer edges of these prongs 14 extend vertically, or at a right angle to the body of the fastener, while the inner edges extend diagonally thereto to form the points. It will be noticed that the lower edge of the body portion 10 is formed with an upwardly extending recess 15. As I shall hereinafter describe in connection with the punching operation, this recess results from punching the tongue end of the preceding fastener out of the body portion of the next adjacent fastener. This practice does not impair the strength of the body portion 10 or prongs 14 to any extent, and has the advantage of saving a considerable quantity of metal.

Fig. 1 illustrates a typical application of my improved type of fastener to a paper box. The fasteners are secured to the end walls of the box 16 by forcing the prongs 12 and 14 through the wall of the box from the outside and clenching over the inner projecting ends on the inside of the box. The provision of the four prongs 12—12 and 14—14 at the four corners of the fastener insures a distributed area of engagement of the fastener with the wall of the box and assures a firmer mounting of the fastener on the box. The four-point fastening prevents lateral as well as inward and outward bending strains from loosening the fastener and thus securely holds the fastener against such strains as will generally tend to loosen a two-prong fastener. The fasteners are preferably situated adjacent the upper edge of the wall of the box, so that the tongues 11 thereof will be in position to pass through slotted openings 17 in the ends of the box 18. With the box cover 18 in position, the projecting ends of the tongues 11 are bent

down upon the cover, either along the top or down across the ends, in an obvious manner.

In Fig. 2 I have illustrated the successive punching operations involved in the manufacture of these fasteners; and it will be noted from this figure that the stock material is in the form of strip metal of exactly the same width as that of the finished fastener. The first operation to be performed on the stock strip 20 is the punching of two diagonal incisions 21 on opposite sides of the strip, and simultaneously therewith, or subsequently, bending the triangular portions of metal formed by the acute angles of the incisions downwardly on each side of the strip and thereby forming the triangular prongs 14—14. After the cutting of these two incisions 21—21 and the bending downward of the prongs 14, which operations are preferably performed as a simultaneous operation, the stock strip 20 is fed forwardly (which is to the right as illustrated in Fig. 2) to place the diagonal incisions 21 under the punching tools which perform the next operation. This latter operation is to make two incisions 22—22 which extend substantially longitudinally from the innermost ends of the diagonal incisions 21—21, as indicated by the dotted lines at the first step and by the full lines at the second step. These longitudinal incisions 22 are preferably extended back to a point approximately even with the outer ends of the diagonal incisions 21; it will of course be obvious that these longitudinal incisions may be inclined inwardly or outwardly from a true longitudinal line for the purpose of making wider or narrower prongs, if desired. The cutting punch is preferably so designed that simultaneously with the cutting of these longitudinal incisions 22, the triangular portions of metal between the diagonal and longitudinal incisions will be bent downwardly to form the triangular prongs 12. After the performance of this operation the stock strip 20 is again advanced to place the portion of strip previously operated upon under the die which punches out the tongue 11. As indicated by the dotted line 23, the outer end of the tongue 11 is preferably punched out of the end of the next succeeding fastener. This is the preferred practice inasmuch as it provides a relatively long tongue 11 for affording greater security of fastening when engaging over the box cover. It will be noted, however, that a relatively large portion of the tongue 11 is defined between the longitudinal incisions 22, and as an alternative construction, I may separate the fasteners by cutting across this neck of metal at either end of the longitudinal incisions so as to utilize this extending neck of metal as the tongue. The present prac-

tice of continuing the tongue up into the body of the next succeeding fastener is however preferred. The tongue may of course be reversed by punching it out of the preceding instead of the succeeding fastener, in which event the tongue would extend forwardly of each finished fastener discharged from the machine. The punching out of the tongue 11 separates the fasteners, after which the completed fasteners are clenched to the end walls of the paper box, either as a subsequent operation performed by the same die head or as an independent operation.

In Figs. 4, 5 and 6, I have illustrated in a simplified showing the die mechanisms for performing these punching operations. A vertically reciprocating die head 26 carries on its under side the several male dies which are adapted to cooperate with a female die or die plate 27. The stock strip 20 is fed intermittently from right to left between the dies and the die plate during the reciprocation of the dies, suitable guide mechanism (not shown) being provided for guiding the strip in operative association with the dies. A first pair of dies 28 performs the simultaneous operation of cutting the diagonal incisions 21—21 and bending the triangular prongs 14 downwardly out of the intervening portions of metal. These dies 28 cooperate with triangular die openings in the die plate 27, into which the prongs 14 are bent. Subsequent to this operation the strip is raised and advanced forwardly to position the notched portion of the strip directly under a second pair of dies 31. This latter pair of dies cooperate with a pair of substantially square die openings 32 in the die plate 27, along the margins of which the dies 31 shear the longitudinal incisions 22 and fold down the triangular prongs 12—12. The next operation is performed by raising the strip and advancing it forwardly to position the two pairs of prongs 12 and 14 in register with a second pair of rectangular openings 33 in the die plate 27. This locates the outer or lower end of the fastener directly over a small male die 34 in the die plate 27, which male die 34 is conformed to punch out the pointed tip of the tongue 11 from the outer end of the outermost fastener unit. Co-operating with the die 34 is a spring pressed plunger 35, which is shaped similarly to the die 34 and which is embraced by a female die member 36 which is adapted to move down over the margins of the male die 34 and perform the operation of punching out the end of the tongue 11. In the performance of this latter punching operation, it will be noticed that the adjacent pairs of prongs 12 and 14 are thrust downwardly into the pair of openings 33 and are thus prevented from being turned over or in-

jured. The fasteners may be secured directly to the body of the box at this point or may be discharged into a hopper for packing.

5 It will be noticed from the foregoing that the gang arrangement of the dies performs the three punching operations at different points on the stock strip upon each reciprocation of the die head, and as a result the
10 punching out of the completed fasteners follows as a continuous operation. It will also be noted that as a result of the present formation of fastener and the improved method of making the same there is an entire
15 elimination of waste scrap metal.

I claim:

1. The method of constructing box fasteners out of a continuous strip of metal which comprises making lateral incisions in
20 the edge of the strip and punching prongs for said fasteners by folding backwardly the metal adjacent said lateral incisions, and punching tongues on said fasteners from substantially the entire metal between said
25 lateral incisions.

2. The method of constructing box fasteners out of a continuous strip of metal which comprises cutting lateral incisions along each edge of the strip and punching
30 prongs for said fasteners by bending downwardly the metal adjacent said lateral incisions, and forming tongues on said fast-

eners by punching the same out of the adjacent fasteners and from substantially the entire metal between said lateral incisions. 35

3. The method of constructing box fasteners out of a continuous strip of metal which comprises making a diagonal incision along each edge of the strip, bending the metal backwardly on a line passing through
40 the end of said incision to form a spur or prong, cutting a substantially longitudinal incision extending from the diagonal incision, bending the intervening metal backwardly to form a second prong, and punching
45 a tongue for each fastener out of the intervening metal between the incisions on opposite sides of the strip.

4. The method of constructing box fasteners out of a continuous strip of metal which comprises cutting a diagonal incision
50 along each edge of the strip, bending the metal backwardly on a line passing through the end of said diagonal incisions to form spurs or prongs, cutting substantially longitudinal
55 incisions extending from the ends of said diagonal incisions, and bending the intervening metal between said incisions backwardly to form secondary spurs or
60 prongs.

In witness whereof I hereunto subscribe my name this 31st day of July, 1920.

LOU W. SMITH.