No. 778,809. PATENTED DEC. 27, 1904.

J. S. STOKES.

STAY STRIP FOR BOXES.

APPLICATION FILED JUNE 7, 1902.

Fig. 1.

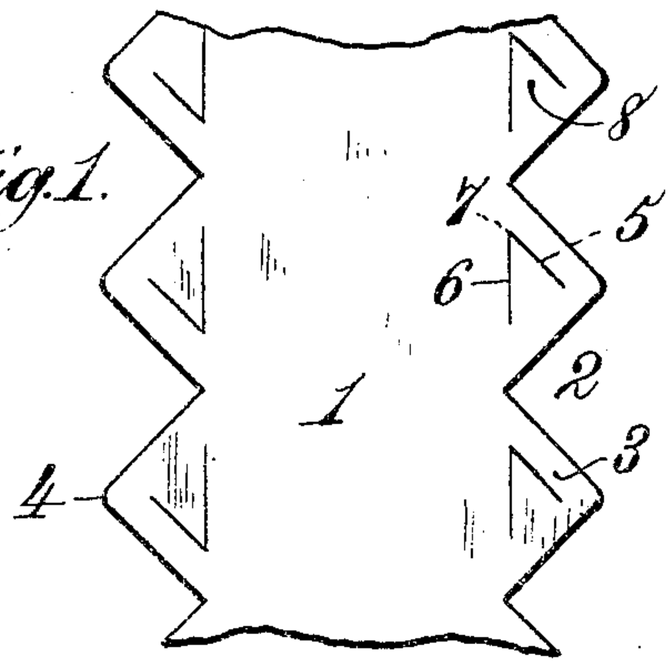


Fig. 6.

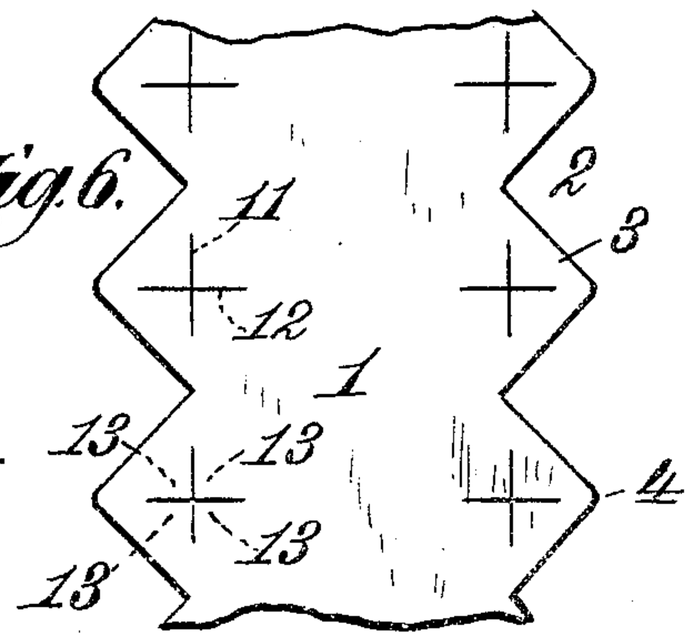


Fig. 2.

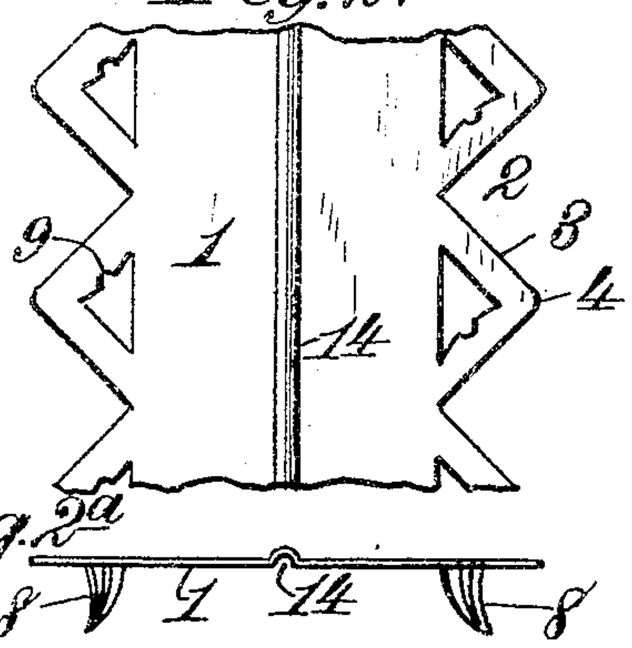


Fig. 2a

Fig. 7

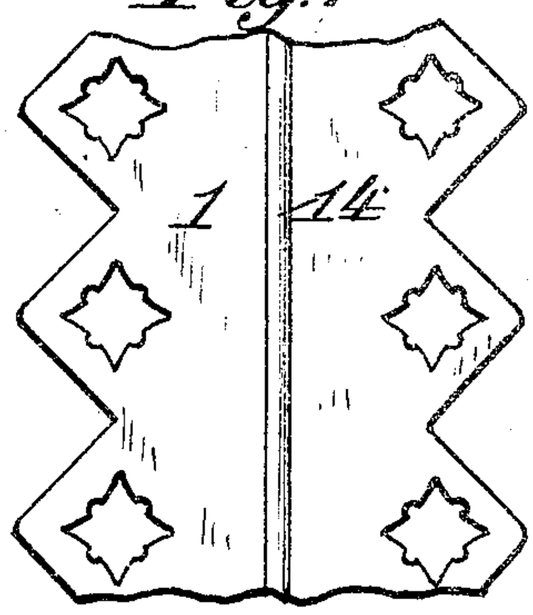


Fig. 3.

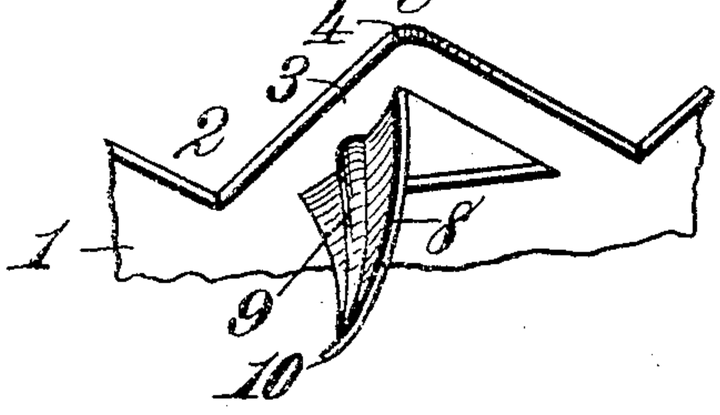


Fig. 8.

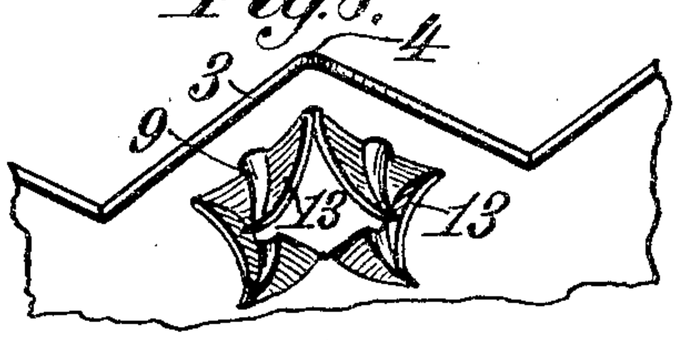


Fig. 4.

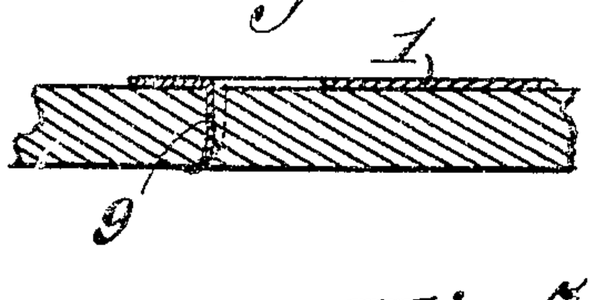


Fig. 9.

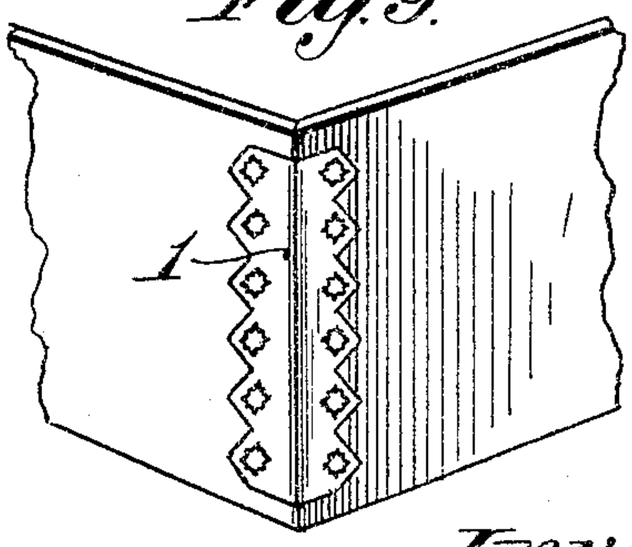
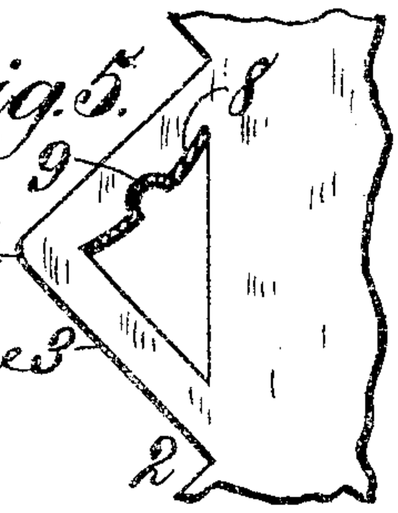


Fig. 5.



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No. 778,809. Patented December 27, 1904.

UNITED STATES PATENT OFFICE.

JOHN S. STOKES, OF MOORESTOWN, NEW JERSEY.

STAY-STRIP FOR BOXES.

SPECIFICATION forming part of Letters Patent No. 778,809, dated December 27, 1904.

Application filed June 7, 1902. Serial No. 110,679.

To all whom it may concern:

Be it known that I, JOHN S. STOKES, a citizen of the United States, residing at Moorestown, in the county of Burlington and State of New Jersey, have invented new and useful Improvements in Stay-Strips for Boxes, of which the following is a specification.

This invention relates to metallic stays for the corners of paper boxes, and has for its object to provide a continuous stay-strip of the character referred to which while being made from very thin and light material will be capable of resisting a great tearing strain and will operate to hold the corners of the box in their true shape; to so shape the edges of such a strip that the sides of the box adjacent to its corners will not be liable to break; to impart to the edges of the strip such a configuration that the strips may be cut from a sheet of metal without waste; to so construct the penetrating prongs that they will possess the greatest possible strength and holding power; to so form the penetrating prongs relatively to the indented edges of the strip that said prongs will be situated as far as possible from the center of the strip without unduly weakening the edges of the latter; to so form the ends of the penetrating prongs that when the latter are embedded in the sides of the box said prongs will be bent outward or away from the openings formed in the strip by said prongs and from the corner of the box, thereby imparting additional strength to the fastening; to arrange the penetrating prongs at such angles relatively to the longitudinal axis of the strip that the slits made by the prongs in penetrating the sides of the box will not be in alinement, and hence will not score the paper-stock in straight lines, along which it might be easily bent or broken, and, finally, to improve and simplify the construction and render more efficient the operation of such class of stays generally.

To these ends my invention consists in the features and in the construction, combination, and arrangement of parts hereinafter described, and particularly pointed out in the claims following the description, reference being had to the accompanying drawings, forming a part of this specification, wherein—

Figure 1 is a plan view showing one form of my improved stay after it has been cut from a sheet of metal and slitted to form single triangular prongs, but before the prongs have been struck or bent up from the stay. Fig. 2 is a similar view of the stay after the prongs have been bent or struck up therefrom. Fig. 2ª is an end view of the stay shown in Fig. 2. Fig. 3 is a perspective view of a portion of the stay viewed from the under side, showing one of the completed prongs after being bent or struck up. Fig. 4 is a sectional view of a portion of one side of a box, showing in section one of the prongs after it has been embedded therein. Fig. 5 is a bottom plan view of a portion of the stay, showing one of the prongs in cross-section. Figs. 6, 7, and 8 are views similar to Figs. 1, 2, and 3, but illustrating a modified form of stay; and Fig. 9 is a perspective view of one corner of a box, showing one of my improved stays applied thereto.

In forming my improved stays I make in a thin sheet of any suitable metal a plurality of parallel incisions or cuts at uniform distances apart, said incisions or cuts being each zigzag in shape, or, in other words, each of said incisions is alternately deflected at a right angle toward the right and left at uniform intervals, whereby is produced a number of separate strips of thin sheet metal each having a solid or imperforate central portion 1 and serrated or angularly-indented edges 2, each of said serrated edges comprising a multiplicity of laterally-projecting triangular teeth or extensions 3, similar in shape to the teeth of a saw. By imparting to the indented edges of the strips the configuration described it will be evident that the strips can be cut from a sheet of metal without waste of material. The apices of the triangular teeth 3 of the indented edges of the strip are preferably cut away or slightly rounded, as at 4, in order that said teeth may not have sharp points that would have a tendency to embed themselves in the paper-stock or catch in other articles

or materials in handling the boxes. The ends of the teeth 3 may be cut away or removed either during the operation of cutting the strips from the sheet of metal or subsequent to such operation, as may be preferred.

In forming the stay shown in Figs. 1 to 5 of the drawing after the stay has been cut from the metallic sheet in the manner described I form in each triangular tooth 3 two angular slits or incisions 5 and 6, the incision 5 being formed parallel with one of the straight inclined sides of the tooth, while the other incision, 6, is formed parallel with the longitudinal axis of the stay, both of said incisions converging toward each other and meeting at a point 7, that preferably lies in a line passing through the outer unindented edge portion of the stay. There is thus formed in each tooth a triangular tongue or prong 8, one side of which is parallel to one of the straight inclined sides of the tooth, while the other side of said prong is parallel to the longitudinal axis of the stay. As shown in Fig. 1, the prongs on one of the stay are all adjacent to the upwardly-facing sides of the projections, while those on the other side of the stay are all adjacent to the downwardly-facing sides of the projections; but obviously all the prongs on both sides of the stay might equally well be adjacent to similar sides of all the projections without in any manner sacrificing the advantages of the oblique arrangement thereof. By means of a suitable die each of the prongs 8 is then struck up at approximately a right angle to the stay, the die being of such shape that the prong is given a concavo-convex shape in cross-section, as most clearly shown in Figs. 3 and 5 of the drawings, the convex sides of the prongs being disposed toward the center of the stay. The die is also so shaped that when the prongs are struck up at an angle to the body of the stay a concavo-convex rib or corrugation 9 will be formed centrally and longitudinally in or on each prong, said rib preferably decreasing in dimensions or tapering from the base of each prong toward the point thereof and terminating just above said point, as most clearly shown in Fig. 3. By curving the prongs in cross-section and corrugating or ribbing them in the manner shown and described great strength and penetrating power is imparted to said prongs, whereby prongs struck up from stays formed from sheets of very thin metal are capable of being forced through very thick and tough paper-board without liability of bending or being crushed in the operation. The penetrating point 10 of each prong is bent or curved away from its convex side—that is to say, away from the opening in the stay formed by said prong—so that when the prongs are forced through the paper-stock their ends will be deflected or turned outward away from the said openings in the stay and from the corner of the box, thereby imparting greater strength and security to the fastening. I have described the incisions as being first made to form the prongs, the prongs next struck up at angles to the stay, the ribs then being formed, and, finally, the points of the prongs bent or curved back; but in practice these several operations will substantially be performed simultaneously by the die; but as the latter forms no part of the present invention the same is not herein shown and described.

The advantages attendant upon a stay formed in the manner above described are as follows: By angularly indenting the stays, as described, I am enabled to cut a plurality of indented stays from a sheet of metal without waste, thus effecting an economy in the cost of manufacture of the stays. By striking up the prongs from triangular openings, as described, a single prong is formed in each tooth 3, which on account of its length and strength as compared to a plurality of prongs struck up from the same tooth causes the prong to take a much firmer hold of the material, particularly in heavy paper-board. The triangular openings formed in the teeth conform closely in shape to the indented edges of the strip or the shape of the teeth, permitting the openings to be formed as near the edges of the teeth as possible and at the same time not making the material too scant or narrow between the openings and the edges of the teeth, so that it will not tear out or bend the edges of the stay out of shape when the latter is fed by a stay-affixing machine to the box. By forming the openings entirely in the teeth they are disposed as far as possible from the center of the stay, whereby when the stay is applied to the corner of a box the greatest possible quantity of the paper-board is embraced between the prongs and the box-corners, whence there is less liability of the prongs pulling out by the material giving way between the prongs and the box-corner, as is frequently the case when weak paper-board is used. The indented edges of the stay operate to resist tearing of the paper-board along the edges of the stay. If the edges of the stay were unindented, they would act as "straight-edges" in a manner similar to the beveled edge of a ruler, and the paper-board would tear or break quite readily along such edges. The indented edges described renders such tearing or breaking of the paper-board difficult. Also by striking up the prongs from the teeth in the manner shown and described the incisions formed in the paper-board are parallel to each other and at an angle to the longitudinal axis of the stay, whereby I avoid making a series of slits or incisions in alinement with each other, which arrangement would act as a straight scored line on which the paper-board could be easily

torn or broken. By bending back the ends of the prongs, as shown, they are caused to clench back away from the center of the stay and the corner of the box, thereby imparting additional strength and security to the fastening. Also by curving or arching the prongs in cross-section and providing them with ribs or corrugations in the manner shown great strength and rigidity is imparted to the prongs, which enables them to penetrate hard and tough paper-board, which otherwise might cause the prongs to be crushed or flatten out without penetrating and clenching the paper-board.

In Figs. 6, 7, and 8 of the drawings I have shown a stay embodying the same principles of construction and operation as the stay above described, excepting that instead of striking up a single prong from each tooth I strike up from each tooth four prongs, and for some classes of work I consider this as the preferred form of strip. In forming such a stay I employ dies which first operate to cut in each tooth two incisions 11 and 12, which intersect each other at their centers, as shown in Fig. 6, the incisions 11 being formed parallel with the longitudinal axis of the stay, while the incisions 12 are formed at right angles thereto. The incisions thus made form four triangular prongs 13 in each tooth 3. The prongs thus formed are then struck up by the die at right angles to the body of the stay, as shown in Fig. 8, each prong being given a concavo-convex or arched shape in cross-section and ribbed centrally, as at 9, in the same manner as the single prong 8, before described, and the points of the prongs are bent or curved back, as at 10. Excepting as to their number, the prongs 13 are precisely the same both as regards their construction and operation and the advantages attendant thereupon as the prongs 8.

The stay shown in Figs. 1 to 5 is better adapted for use on boxes formed from heavy and tough paper-board, while the stay shown in Figs. 6 to 9 is more particularly designed for staying boxes formed of thinner stock—such as cardboard, for example.

It will be manifest to those skilled in the art that instead of providing each of the teeth 3 of the stay shown in Figs. 1 to 5 with one prong only such teeth may each be provided with two or three prongs, and in like manner each of the teeth of the stay shown in Figs. 6 to 9 may be provided with but two prongs instead of four.

The stays constructed in the manner described are in practice fed to the box-corners, are bent at right angles along their longitudinal axes, and the prongs are inserted in the sides of the box and clenched by a machine of well-known construction, as will be readily understood by those skilled in the art.

In practice I prefer to provide the strip with a central longitudinal corrugation 14 in order to lend additional strength thereto and also to enable me to make the strip from the thinnest possible stock, which is a great desideratum.

It will be noted that the prongs hereinbefore described are triangular and have solid bases. Such prongs should not be confused with those prongs which at the point of junction with the strip are undercut on their opposite edges, thus giving to said prongs an approximately arrow-head shape and greatly weakening them at the points where they should be strongest—namely, where they are bent up from the strip.

Having described my invention, what I claim is—

1. A corner-stay for boxes comprising a thin metallic strip having serrated edges, penetrating prongs struck up from the metal of the strip and lying parallel to the adjacent edge portions thereof, each prong being curved outwardly toward the adjacent edge portion, substantially as described.

2. A corner-stay for boxes comprising a thin metallic strip having serrated edges, penetrating prongs struck up from the metal of the strip, each prong being concave in cross-section and inclined toward the adjacent edge portion, substantially as described.

3. A corner-stay for boxes consisting of a thin metallic strip having serrated edges comprising alternate triangular projections and indentations, penetrating prongs lying parallel to the sides of said projections, said prongs being concavo-convex in cross-section and curved outwardly away from the center line of the strip, substantially as described.

4. A corner-stay for boxes consisting of a thin metallic strip having serrated edges comprising alternate triangular projections and indentations, a penetrating prong concavo-convex in cross-section and having a strengthening-rib on its concave side, struck up from the metal of the strip, in each projection and located parallel to one side of said projection, each of said prongs being curved outwardly away from the center line of the strip, substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

JOHN S. STOKES.

Witnesses:
ALBERT S. PETTIT,
EDWIN R. ROGERS.