Oct. 29, 1929. A. H. MAYNARD 1,733,506

STAPLE BLANK AND METHOD OF FORMING SAME

Filed March 5, 1927

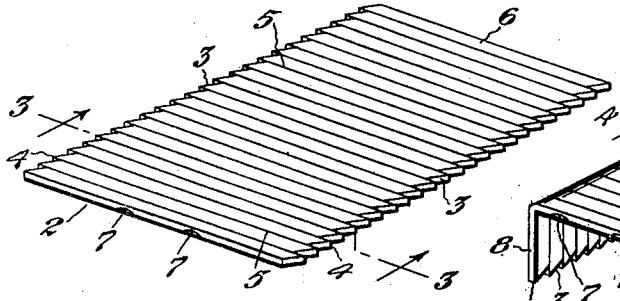


Fig. 1.

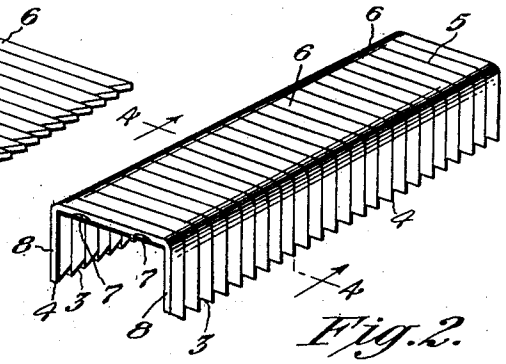


Fig. 2.

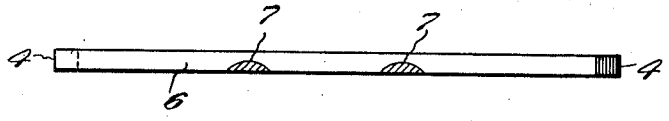


Fig. 3.

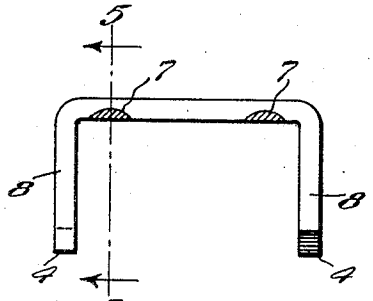


Fig. 4.

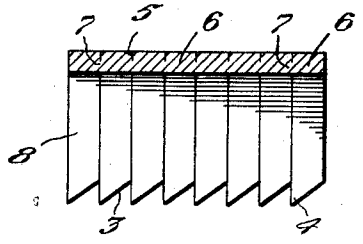


Fig. 5.

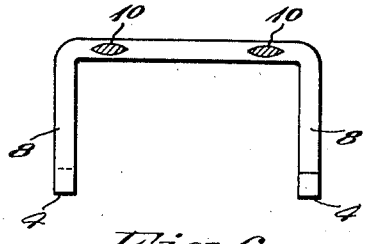


Fig. 6.

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UNITED STATES PATENT OFFICE

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STAPLE BLANK AND METHOD OF FORMING SAME

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This invention relates to a novel method of manufacturing staples for use in stapling or wire stitching machines and to the improved blank or strip of staples produced thereby.

One object of the invention is to provide a method of forming the staples from sheet stock to produce a strip comprising a plurality of contiguous staples or staple blanks joined together by frangible portions which permit them to be readily separated in the machine that applies them to the work.

Another object of the invention is to provide a staple strip in which the individual staples or staple blanks are completely divided from the strip along their contiguous edges except for the frangible connecting portions which are of less cross-sectional area than the stock of the staples so that the latter may be cleanly broken apart without leaving rough projections or jagged tangs on their sides.

Another object of the invention is to provide a method of manufacturing the staples that is simpler to perform and more economical in practice, and which produces more uniform and better finished staples.

Further objects of the improvement are set forth in the following specification which describes a preferred form of construction of the staple strip or blank and an improved method for its manufacture. The specification is illustrated by the accompanying drawings in which:

Fig. 1 is a perspective view of the staple blank in its flat form before bending;

Fig. 2 is a perspective view of the improved staple blank or strip shown as bent into finished form;

Fig. 3 is a greatly enlarged cross-sectional view of the flat blank taken on line 3—3 of Fig. 1;

Fig. 4 is a similarly enlarged cross-sectional view of the fully formed staple strip taken on line 4—4 of Fig. 2;

Fig. 5 is an enlarged longitudinal sectional view of the same taken on line 5—5 of Fig. 4; and

Fig. 6 is a view similar to Fig. 4 showing a modification in the form of the means for joining the staples together in the strip.

My present improved staple strip or blank is intended for use in stapling machines of the hand-operated type employed as office appliances for attaching sheets of paper; in tackers for attaching tags and labels; or in wire stitching machines used in the manufacture of boxes, for stitching books, pamphlets and the like and for various other purposes. It has been the usual practice in the present art to form the staples individually from lengths of wire, and in the case of hand stapling machines, to assemble a series of the staples on "sticks" or holders to provide a convenient method of furnishing the user with a supply of the staples in package form. In the larger wire stitching machines, which are usually power-operated, a continuous length of wire is fed to the machine and the staples are formed separately from sections cut from the wire during the stapling operation.

It has heretofore been proposed to provide a blank or strip of connected staples for use in hand-operated machines and one form of such a strip has the staples spaced apart at their longitudinal edges and joined at the center of their heads by means of a tab or tongue of the sheet-stock from which the staples are constructed. In other cases the separately formed staples have been joined together in the strip by means of a thin sheet of paper cemented or gummed thereto; while in still other instances it has been proposed to attach the staples in a strip with a cementitious binder such as solder, shellac, collodium or the like.

None of the above mentioned methods of forming or assembling the staples in strips had been found entirely satisfactory, however, owing to various reasons. In the commonest form of strip having the staples spaced apart and joined by a central tab or tongue made integral from the stock, the staples cannot be compacted closely as there is considerable waste space between them. A more serious objection to this form of staple strip, however, is that when the staples are cut apart in the stapling machine the ends of the tabs or connecting tongues are left as projecting tangs with their edges rough and

uneven. These rough and jagged projections on the sides of the staples are liable to catch in the paper or in other objects and to injure the fingers or cause other damage. Moreover, the rough projecting portions of the staples are unsightly and the stapled work does not therefore have a neat appearance.

Where the staples have been joined in a stick by means of a cementitious binder such as shellac, collodium or the like they are affected by climatic conditions and do not always hold together. Where solder or tinning is used as a bond it is difficult to distribute it uniformly over the staples and well nigh impossible to effect a neat and efficient joint or connection between the staples in the strip. The excess solder or tin is apt to clog the machine and prevent its proper operation.

My present improvement contemplates the bonding together or joinder of the staples in contiguous relation in the strip without the use of collodium, shellac, solder or other cementitious binders and provides a connection or tie between the individual staples which, though integral therewith, is easily fractured to separate the staples and, when broken, presents no rough and unsightly projections on the edges of the staples.

In general, my improved method of manufacturing the staples in the blank or strip consists in the employment of a flat length of relatively thin sheet-metal which is sheared or stamped out to the proper width in accordance with the size and shape of the staples to be formed and which, if desired, may have its lateral edges serrated or notched to provide sharp driving-points for the legs of the staples. Such a strip or flat blank, designated 2, is illustrated in Fig. 1 of the present drawings and it is to be understood that the blanks may be of any suitable width in accordance with the size and shape of the staples to be formed and of a length proportionate to the number of staples desired in the complete strip. In some cases the blank may be of sufficient width to constitute a plurality of staple strips to be later cut into single strips, but for convenience of illustration I have herein shown the blank 2 in the form of a single strip. As the blank 2 is stamped or sheared from the flat sheet-stock its edges may be formed with serrations 3 similar to saw-teeth which provide pointed ends for the legs of the staples. It will be understood that the angular points 4 are dimensioned in accordance with the width of the staples to be produced, and usually the points on one side of the strip are inclined in the reverse direction to those on the opposite side so that the two legs of each staple will be pointed at opposite angles, this being a common practice to provide for a better driving action when the staples are pierced or projected through the work.

After the strip 2 has been blanked out in the form shown in Fig. 1, the next step in the process of forming the individual staples consists in shearing or fracturing the stock across the width of the blank in a series of parallel slits 5 which define the edges of the several staples 6. This shearing or slitting of the metal is performed in suitable dies or rollers and may be accomplished without passing a tool or cutter through the stock. One practical method for performing this operation is to provide roller dies which force or bend the narrow strip of stock 6 constituting each staple across the main plane of the sheet or blank to fracture the metal along the lines of demarcation between the adjacent staples. To accomplish this the alternate staples in the strip may be forced into offset or staggered relation; or the narrow strip portions 6 of the stock between the lines 5 may be offset one from another in angular relation like the slats in a blind or shutter. The blank may be treated in this manner on one or both sides to slit the stock across the whole width of the strip with the dies acting to shear the metal with a clean break. Afterward, the blank 2 may be pressed or rolled out flat again to bring all of the staples 6 into the same plane as shown in Fig. 1.

During the above described operation of deforming and slitting the blank 2 a portion of the stock is left intact extending between each two adjacent staples to connect all of the series of staples in the strip, and one novel feature of my present improvement consists in the provision of a connecting bond or tie 7 between the staples which is of less cross-sectional dimension than the stock of the blank. I may provide the metal bond or tie 7 at one or a plurality of points on the sides of the narrow staple blank 6 and, as illustrated in Fig. 3, I prefer to use bonds at two points on the edges of the cross-bar or head of the staple. When the stock of the flat strip or blank 2 is sheared or slitted on the lines 5, instead of breaking it clear through the metal throughout the whole width of the strip, I leave a relatively thin cross-sectional area at 7 which forms the bond. These areas of stock constitute thin fins connecting each two adjacent staples or staple blanks 6 throughout the whole strip 2. The cross-sectional area of the fins 7 is partly lenticular or oval in shape, this peculiar form resulting from the slitting of the stock on the lines 5 clear across the blank 2 with the cut or slit increasing in depth at either side of the central portion of the connecting areas or fins 7.

Fig. 2 illustrates the blank 2 after its sides have been bent down to form the legs 8 of the staples, thus providing a series of completely formed staples. In some instances, however, the strip may be used in its flat form and the individual staple blanks 6 bent into final shape in the machine that applies them to the work. Fig. 4 is an enlarged cross-sec-

tional view of the completely formed staple strip 2 taken on line 4—4 of Fig. 2 and showing the points at which the staples are bonded together. It will be observed by reference to this view that the connecting sections or fins 7 between the staples 6 are of relatively thin cross-section and therefore easily frangible so that the staples may be readily broken apart or separated in the machine that applies them to the work. Fig. 5 illustrates a longitudinal section of the staple strip taken on line 5—5 of Fig. 4 passing through the bonding sections or fins 7 which tie the staples together. It will be noted by reference to this latter view that the staples are divided at the top along the whole length of their heads or upper cross-bars so that each staple is initially disunited and severed from the adjacent staples in the strip throughout its whole length except for the narrow bonding portions 7 of the stock.

Fig. 6 shows a similar view of the staple strip except that the individual staples are bonded at points 10 intermediate their top and bottom edges, that is, centrally of the stock in their heads or cross-bars. In this form the connecting areas or fins 7 are of lentiucular or diamond shape in cross-section and the cross-bars or heads of the staples are severed along their edges both at top and bottom.

It will be understood that the completed staple strip 2 shown in Fig. 2 of the drawings may be used by feeding it into the machine or placing it in a magazine to be fed therefrom to the staple driver or other implement which inserts the staples into the work. As the driver descends upon the head or cross-bar of the foremost staple in the strip it will break it away from the main strip by fracturing the binding sections or fins 7. It is to be particularly noted, however, that since the sides of the staples are in contiguous or abutting relation in the strip, when the binding sections are fractured no projections or rough edges will be left on the edges of the staples. Consequently, the staples when separated from the strip and driven into the work are of substantially the same form and appearance as if constructed from a length of flat wire, it being impossible to discern the points at which they were joined together except by inspection under a magnifying glass.

It has been explained that the staple blank or strip 2 may be used in the staple or stitching machine in the form shown in Fig. 1 without bending it to form the legs of the staple. In this form the flat strips may be packed more compactly for shipment and handling and likewise they may be used in more compact arrangement in the magazine of the stapling machine. That is to say, several strips may be laid one upon another so that a large supply of staple blanks may be contained in a small space. When the flat blanks or strips 2 are used in the machine the staple driver or plunger is designed to act on each individual staple blank 6 as it is severed from the strip to bend down its legs before driving the staple into the work. In other words, the stapling machine will act on the individual staple blanks in the same manner as if they were lengths of wire fed to the staple driver for forming over an anvil in the usual manner.

It will be observed from the foregoing that my invention embodies a particularly simple and efficient method of forming staples of the type described from sheet stock to provide for the greatest economy in the cost of their manufacture. Furthermore, the invention provides as another feature a staple strip or blank wherein the staples are arranged in contiguous abutting relation to economize space, while being adapted for more convenient handling and packing and forming a more attractive article of sale as a supply package for either hand or power-operated machines.

The improved method of joining or bonding the staples together in the strip provides for easier separation of the individual staples during the process of applying them to the work. Moreover, this improved means for bonding or joining the staples provides for the separation or breaking apart of the staples without leaving rough edges or jagged projections on their sides so that the staples have a much better finished appearance in the work.

While I have herein illustrated a preferred method of carrying out the process and a preferred form of the staple strip or blank produced thereby, it is to be understood that the steps in the process of manufacture may be varied and the form and construction of the article itself may be changed without departing from the spirit or scope of the invention.

Therefore, without limiting myself in this respect, I claim:

1. A staple strip for use in stapling and wire stitching machines comprising a series of staples or staple blanks disposed in substantially contiguous parallel relation and connected together by integral sections of the metal of less cross-sectional dimension than the normal thickness of the stock from which the blanks are formed.

2. A new article of manufacture comprising a series of individual staples or staple blanks arranged in substantially contiguous abutting relation and united in a strip by means of relatively narrow fins of the metal of the strip of less thickness than the stock in the staples.

3. As a new article of manufacture, a staple strip comprising a plurality of staples or staple blanks arranged in contiguous parallel relation and united in a strip by means of integral sections of the stock cut

partly through on the lines of demarcation between the individual staples.

4. As a new article of commerce, a staple strip comprising a series of staples or staple blanks formed from a length of sheet-metal with the individual staples severed from the strip along their contiguous edges except for relatively narrow sections of the metal of less thickness than the normal cross-section of the stock.

5. An improved method of manufacturing staples in a strip or blank consisting in providing a strip of sheet-metal, treating the strip in dies to force the stock constituting adjacent staple blanks into different planes whereby to slit the metal to sever the individual staple blanks from the strip, and preserving relatively narrow sections of the stock without fracture to connect the individual staple blanks with their edges in contiguous relation.

In testimony whereof I affix my signature.

ARTHUR H. MAYNARD.