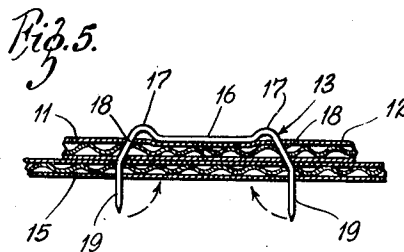
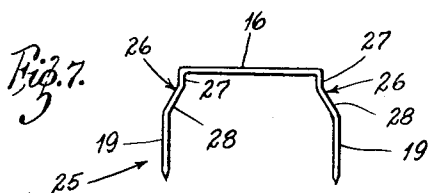
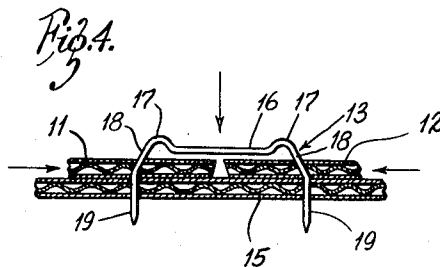
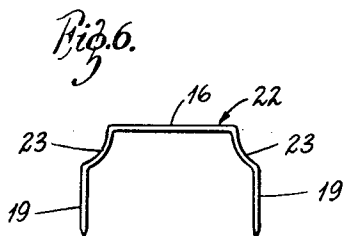
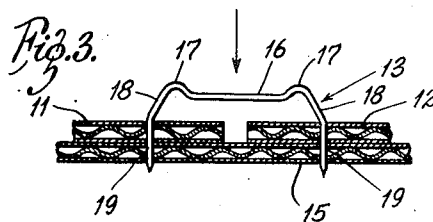
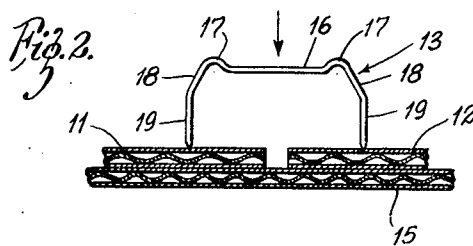
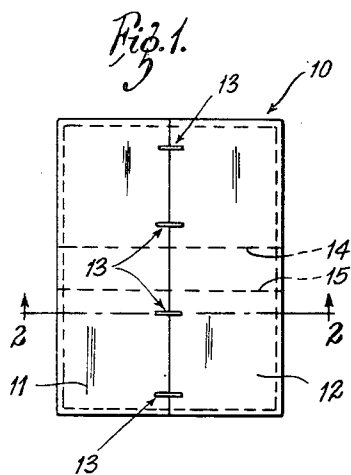


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CAMMED SHOULDER STAPLE

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2,778,266

CAMMED SHOULDER STAPLE

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This invention relates to improvements in staples and, in particular, is concerned with an improved staple which is designed to fasten together flaps in endwise sealed relationship to an underlying bottom flap on a carton. The staple of this invention has a particular configuration on its shoulder which aids in the drawing together of overlying pieces of material resting upon a bottom base wherein all of these materials are to be stapled together. A further feature of the invention resides in protuberances on the shoulder of the staple whereby the staple may be more easily extracted by a staple remover.

In the stapling field it is often desirable to staple together side flaps to underlying end flaps of the carton from the exterior of the carton. A machine for accomplishing this stapling operation is disclosed in Patent No. 2,469,054, assigned to International Staple and Machine Company. In such stapling operations it is desirable that the side flaps be brought together snugly, as close as possible, in order to provide full closure and sealing of the interior of the carton. It is further desirable that the ultimate user of the carton be able to remove the staples by an easy staple removing operation. There has been provided by means of this invention a specially designed staple which fulfills both of these problems in the stapling field.

The staple of this invention is provided with a shoulder which acts as a cam in the overlying side flaps to draw them together when the staple is driven through the overlying side flaps and the underlying bottom flap. After this drawing together has been formed, the staple is clinched at the bottom of the underlying end flap of the carton in a conventional manner by the stapling machine such as that disclosed in the Patent No. 2,469,054. If desirable, any overlying pieces of material can be joined closely together at their ends over a base material, and the invention is not limited to drawing together the flaps of a carton, as will be obvious.

The shoulder of the staple is provided with protuberances which are adapted to receive the prongs of a staple remover to provide for easy and simple gripping and withdrawal of the staple. Staple removers equipped with such prongs are quite conventional, and one type of staple remover is that shown in Patent No. 2,470,726, assigned to International Staple and Machine Company. These protuberances have an added desirable feature since the driving blade of the stapling machine may be provided with indentations at the end to receive the protuberances, which permits the centering of the driving blade or plunger.

Accordingly, it is an object of this invention to provide a new and improved staple having a specially designed shoulder which is adapted to draw together pieces of material through which the staple is fastened.

It is a further object of this invention to provide a novel and improved staple having a cammed or wedge-shaped shoulder wherein two overlying side flaps of a carton can be fastened to and drawn together at their adjacent ends over an underlying flap of the carton through which the staple is fastened.

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Still another object of this invention is to provide a novel and improved staple having a shoulder design which permits the fastening and sealing together of sheet-like materials, and wherein the shoulder of the staple is provided with means to receive a staple remover for easy withdrawal of the staple after it has been clinched and fastened to the sheet-like material.

Yet a further object of this invention is to provide a staple for drawing together overlying sheets of material so that their ends are sealed together over a single underlying piece of material and wherein a staple pierces a single hole in the pieces of material through which it passes for each of its two legs, and effects the sealing together of the overlying flaps by a wedging action of a cammed or wedge-shaped shoulder on the staple.

Still another object of this invention is to provide a novel staple having a shoulder design to effect the sealing together of two overlying pieces of material at their ends on a single underlying piece of material wherein the staple is adapted to be used in existing stapling machines in stick form. No major modification of the actuating parts of the stapling machine is required other than to insure that the magazine and housing conform with the physical configuration of the staple.

Other objects of this invention will appear in the detailed description which follows and will further be apparent to those skilled in the art.

Reference will now be had to the accompanying drawing illustrating a typical embodiment of the staple of this invention with modifications, and showing the employment of the staple to fasten the flaps of a carton. These drawings are for the purpose of example only and the invention is not limited thereto.

In the drawings:

Fig. 1 is a top plan view of a carton showing side flaps overlying end flaps which are stapled together by the staple of this invention;

Fig. 2 is a sectional view in elevation taken on the line 2—2 of Fig. 1, and showing the position of the staple at the beginning of the stapling operation just prior to the position where the staple pierces the top of the side flaps;

Fig. 3 is a view taken similarly to Fig. 2 showing a further position of the staple in the stapling operation;

Fig. 4 is a view taken similarly to Fig. 2 at a further stage in the stapling operation;

Fig. 5 is a view taken similarly to Fig. 2 showing the staple after it has completely pierced the side flaps and bottom flaps just prior to the clinching over of the ends of the legs of the staple;

Fig. 6 is a view in elevation showing a modified form of staple; and

Fig. 7 is a view in elevation showing another modified form of staple.

In Fig. 1 a carton is shown generally indicated at 10. The top of this carton has two side flaps 11 and 12 connected together by staples 13 in such a manner that the ends of the cartons are snugly closed together. Underlying the side flaps 11 and 12 are two end flaps 14 and 15, indicated by the dotted lines.

The fastening of the side flaps 11 and 12 to the end flap 15 is indicated in Figs. 2 through 4. As shown in Fig. 2, a staple 13 is provided which has a flat head 16, two protuberances at the ends of the head designated at 17, and a slanting shoulder 18 interposed between the vertical portions of legs 19.

This staple, designated generally at 13, is of a special configuration wherein the shoulder 18 is of a vertical height, taken from the head 16 to the top portion of the leg 19, equal to the thickness of the side flaps 11 and 12. Thus, as shown in Figs. 4 and 5, the shoulder 18 extends entirely through the side flaps 11 and 12 when the staple completely pierces the carton flaps. Also, the shoulder

of the staple is set at a particular angle with respect to the vertical legs 19, which is about 30°. This slanting of the shoulder 18 permits the drawing together of the side flaps 11 and 12 at their ends, as will be further described in the operation of this invention.

A modified form of staple is shown in Fig. 6. In this staple, generally indicated at 22, the head 16 is of the same form as that of staple 13, and similarly the legs 19 are identical therewith. However, there is a shoulder 23 which is curved inwardly and provides a cam-like side flap engaging means which tends to draw together inwardly the side flaps in the stapling operation. Here the top portion of the shoulder 23 adjacent the jointure with the head 16 is substantially vertical, which gives a greater rigidity in the staple driving operation.

A further modification of the novel staple of this invention is shown in Fig. 7 wherein a staple 25 is shown. This staple has a head 16 and vertical legs 19 similar to that of staples 13 and 22. However, the shoulder 26 has a top vertical portion 27 and a lower slanting portion 28. The forming of this staple is somewhat simpler than that of the staple of Fig. 6 as it comprises straight edges rather than a curved surface, but it will be noted that both the shoulder 23 for staple 22, and the shoulder 26 for the staple 25, are of a height substantially equal to the thickness of the side flaps 11 and 12 through which they are interfitted. Also, in both cases, the jointure of the shoulder with the head is offset about 30° from the jointure of the shoulder with the staple leg relative to a vertical extension of the staple leg as a reference line.

Use

The stapling operation of this invention is best shown in Figs. 2 and 4 wherein the side flaps 11 and 12 are connected to an underlying end flap 15 in such a manner that the inner ends of the side flaps are drawn together. At the beginning of the operation the staple 13 is loaded in a conventional stapling magazine, such as the type shown in Patent No. 2,469,054, and operates in the same manner as that disclosed in the operation of this machine.

The staple 13 is then driven downwardly over the overlying side flaps 11 and 12 into the top of these flaps, as shown at the beginning in Fig. 2. In Fig. 3 the operation is continued so that the straight legs 19 pierce a hole entirely through the side flap 11, the end flap 15, the side flap 12, and again in the end flap 15 at a spaced point from the first piercing.

As the operation continues to that stage shown in Fig. 4, it will be seen that the shoulders 18 have begun to pass through the side flaps 11 and 12. Since these side flaps are conventionally made of corrugated material, there is a slight give of the material so that the top portion is, in each flap 11 and 12, pressed somewhat inwardly in the direction of the arrow. As the operation continues to that shown in Fig. 5, substantially the entire ends of side flaps 11 and 12 are totally closed together and the staple has been driven completely through the overlying side flaps 11 and 12 and the underlying end flap 15. The top portion of the side flaps 11 and 12 will be somewhat more closely fitted together than the bottom portion of these flaps due to the fact that the tops of the shoulder 18 are closer together than the bottom thereof, as appears in Fig. 5. This provides a very close engagement of the ends of the flaps and since the staple is clinched tightly on the tops of these side flaps, there is a tight sealing effected.

The completion of the stapling operation is shown in Fig. 5 when the ends of the vertical legs 19 are clinched over together in the direction of the arrow, as is conventional, when they contact a retractable anvil, which thereby finishes the clinching operation.

The protuberances 17 in the staple 13 provide for easy insertion of the ends of the staple remover so that it can be inserted therein and easily withdraw the staple. Yet, at the same time, there is nothing lost in the tight clinch-

ing together of the material, since the head 16 presses downwardly upon the sealed together top portion of the ends of the side flaps 11 and 12.

The stapling operation and clinching of the staples 22 and 25, shown in Figs. 6 and 7, respectively, are identical with that described for staple 13 in connection with Figs. 2 through 4. These staples can also be provided with the protuberances 17 at the juncture of the shoulders and the head of the staple, and the withdrawal of the clinched staple is the same as that previously described.

In the case of all of the staples 22 and 25, the average angle of the shoulder is set at about 30° from the vertical legs 19. For the case of shoulders 23 and 26 in staples 22 and 25, this angle would be measured from the jointure of the shoulder with the flat head 16, which provides an average cam angle of 30°. This angle provides the best clinching together of the ends of the side flaps and prevents any substantial tearing of the holes in the side flaps, which is to be avoided.

Although this invention has been particularly described for use in connection with a sealing together of side flaps over an underlying end flap of a carton, it is to be understood that two pieces of material could be joined together over a single piece of sheet-like material, using a conventional stapling machine which has a bed plate underlying the bottom single piece of material, and wherein the stapling operation is carried out in the same manner as described in connection with Figs. 2 through 4. The staple of this invention with the modified form shown may be used in stick form in the various stapling machines heretofore known without any change in the construction of these machines other than to provide for proper reception and feeding of these staples.

Various changes and modifications in the staple of this invention may be made, as will be apparent to those skilled in the art, and should come within the teachings of this invention as defined by the scope of the claims appended hereto.

What is claimed is:

1. A staple having a flat head, two perpendicular legs, and a pair of opposed inwardly inclined shoulders extending between and joining each of said legs with said head, each shoulder being of a height of substantially half the distance from said head to the end of its associated leg and forming an extension on said leg which joins with the flat head at an angle of not more than about 30°, said angle being formed between a first line connecting said head junction with the junction of said extension at the leg and a second line vertically extending above said leg, and each of said shoulders extending inwardly about one-half the height of said shoulder.

2. A staple having a flat head, two perpendicular legs, and a pair of opposed inwardly inclined shoulders extending between and joining each of said legs with said head, each shoulder having a straight slanting shoulder surface extending from the junction with the perpendicular legs up to the level of said flat head and being of a height of substantially half the distance from said head to the end of its associated leg and forming an extension on said leg which joins with the flat head at an angle of not more than about 30°, said angle being formed between a first line connecting said head junction with the junction of said extension at the leg and a second line vertically extending above said leg, and each of said shoulders extending inwardly about one-half the height of said shoulder.

3. A staple having a flat head, two perpendicular legs, and a pair of opposed inwardly inclined shoulders extending between and joining each of said legs with said head, each shoulder being of a height of substantially half the distance from said head to the end of its associated leg and forming an extension on said leg which joins with the flat head at an angle of not more than about 30°, said angle being formed between a first line

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connecting said head junction with the junction of said extension at the leg and a second line vertically extending above said leg, and each of said shoulders extending inwardly about one-half the height of said shoulder and shallow indented protuberances at the junction of each of said shoulders and the staple head for receiving a staple removing tool, said protuberances extending above said head substantially half the height of said shoulders.

4. A staple having a flat head, two perpendicular legs, and a pair of opposed inwardly inclined shoulders extending between and joining each of said legs with said head, each shoulder being of a height of substantially half the distance from said head to the end of its associated leg and forming an extension on said leg which joins with the flat head at an angle of not more than about 30°, said angle being formed between a first line connecting said head junction with the junction of said extension at the leg and a second line vertically extending above said leg, and each of said shoulders extending inwardly about one-half the height of said shoulder and shallow indented protuberances at the junction of said shoulders and the staple head for receiving a staple removing tool.

5. A staple having a flat head, two perpendicular legs, and a pair of opposed inwardly inclined shoulders extending between and joining each of said legs with said head, each shoulder having a concave configuration and being of a height of substantially half the distance from said head to the end of its associated leg and forming an extension on said leg which joins with the flat head at an angle of not more than about 30°, said angle being formed between a first line connecting said head junction with the junction of said extension at the leg and a second line

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vertically extending above said leg, and each of said shoulders extending inwardly about one-half the height of said shoulder.

6. A staple having a flat head, two perpendicular legs, and a pair of opposed inwardly inclined shoulders extending between and joining each of said legs with said head, each shoulder having a slanting shoulder surface connected at one end to one of said perpendicular legs and at its other end to a short vertical portion connected to one end of the staple head, each of said shoulders being of a height of substantially half the distance from said head to the end of its associated leg and forming an extension on said leg which joins with the flat head at an angle of not more than about 30°, said angle being formed between a first line connecting said head junction with the junction of said extension at the leg and a second line vertically extending above said leg, and each of said shoulders extending inwardly about one-half the height of said shoulder.

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