

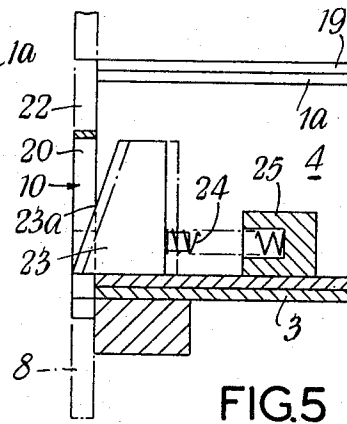
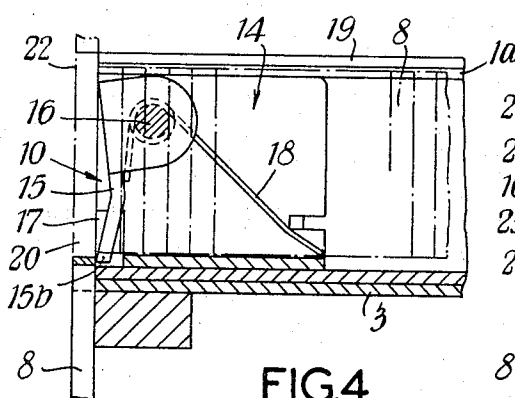
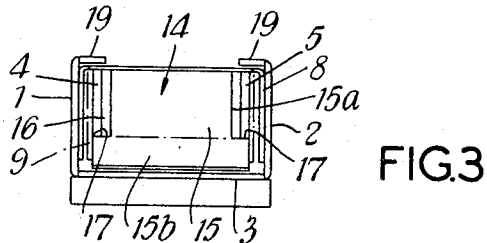
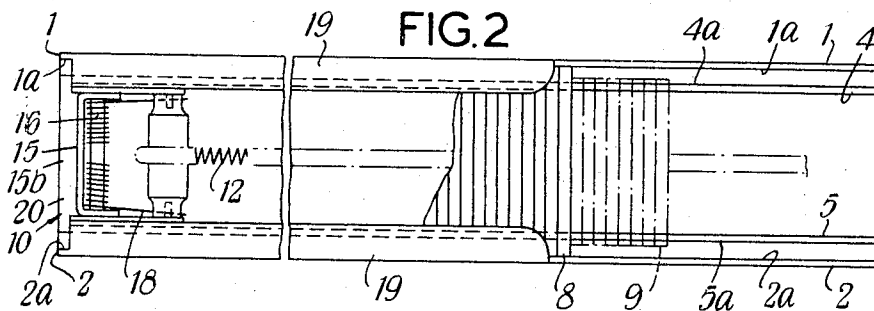
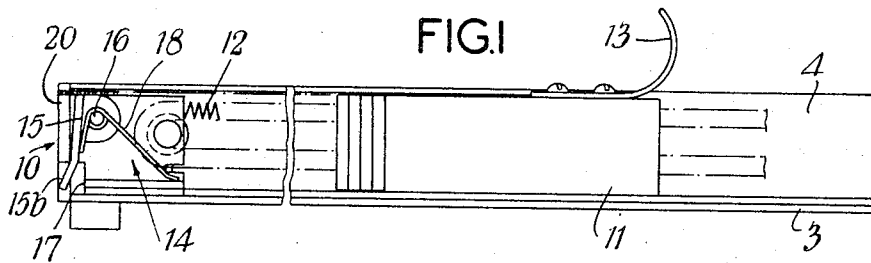
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A. G. WHEBLE
STAPLE MAGAZINES

3,348,752

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2 Sheets-Sheet 1



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FIG. 6

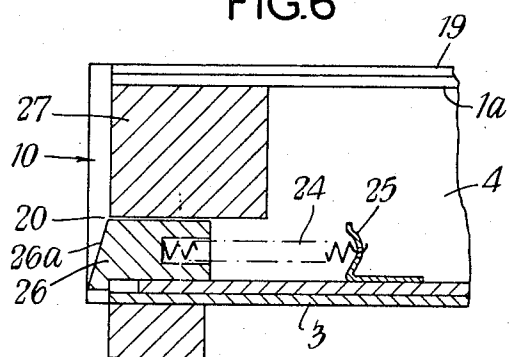
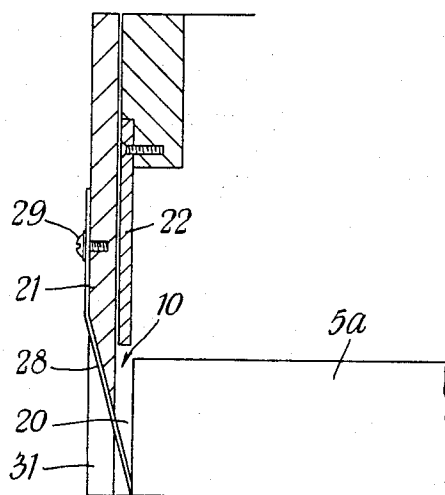


FIG. 7



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STAPLE MAGAZINES

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9 Claims. (Cl. 227—109)

ABSTRACT OF THE DISCLOSURE

A staple magazine for carrying and feeding alternately clips of wide crown or narrow crown staples having an outer pair of parallel walls and an inner pair of parallel walls, narrow crown staples closely straddling the inner pair of walls and wide crown staples straddling the inner pair of walls and being constantly laterally confined between the inner surfaces of the outer pair of walls, even during ejection of a wide staple from the magazine; a narrow crown staple being laterally confined during its ejection from the magazine by deflectable guide means which when undeflected restrains the narrow staple from lateral movement during its ejection and can deflect between the inner pair of walls out of the path of movement of the narrow staple during its ejection to permit full ejection of the narrow staple.

This invention relates to a staple magazine for use with a stapling machine of the type which includes a staple driving blade capable of reciprocal movement adjacent and parallel to a stationary end plate and which blade moves in a staple driving plane that is substantially perpendicular to the plane of the material being stapled.

Staple magazines at present in use with stapling machines of the kind specified are usually in the form of a staple loading and retaining trough within which staple impelling means are provided for causing a staple or a clip or staples retained in the trough to be impelled towards a discharge end of the trough. The discharge end of the trough is so positioned with respect to the stapling machine as to allow a staple situated at the discharge end to lie in the staple driving plane of the staple driving blade; operational movement of the staple driving blade thus causing the removal of a staple from the vicinity of the discharge end and the driving of it towards and into the material to be stapled.

Known staple magazines are only capable of carrying and feeding staples of one width, and although the majority of stapling machines are suitable for performing the stapling operation with staples of varying widths, in order to supply such varying widths of staples the staple magazine has to be changed in each case to one that will successfully carry and feed a staple of the required size to the plane of operation of the stapling driving blade. It will be realised that if it becomes necessary for a stapling operation to require the use of more than one width staple either, several stapling machines must be provided, or a plurality of suitably sized magazines available which are capable of being interchanged in one stapling machine. Naturally the procedure of changing machines and/or magazines is not only tedious for numerous operations but becomes rather expensive in the number of stapling machines and magazines required.

It is therefore an object of the present invention to provide a staple magazine for use with a stapling machine of the type set forth which can carry and feed alternatively wide or narrow staples.

According to the present invention there is provided a staple magazine for a stapling machine of the type set

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forth adapted to carry and feed alternatively clips of wide or narrow staples in which there are upstanding perpendicularly from a flat base an outer pair of parallel walls and an inner pair of parallel walls all of which serve to define a straight feed path for staples carried slidably as clips in the magazine; the inner walls being adapted to support a clip of staples mounted to straddle them; the wide staples being guided by and laterally confined between the inner surfaces of the outer pair of walls; the narrow staples being guided by and laterally restrained astride the outer surfaces of the inner pair of walls; the inner pair of walls and base at the staple discharge end terminating short of the outer pair of walls by a distance equal to the thickness of a staple; and deflectable guide means operatively associated with the staple discharge end of the pair of inner walls and adapted to restrain lateral movement of each successive end-most narrow staple while such staple is being driven downwardly through a gap formed between the staple discharge end of the pair of inner walls and the end plate of the stapling machine and lying in the staple driving plane, and to deflect to permit downward movement of a staple of either size in the staple driving plane.

Several embodiments of the present invention will now be described by way of example only, and with reference to the accompanying diagrammatic drawings, in which:

FIG. 1 illustrates a side view of a staple magazine constructed according to the present invention and cut away to expose the deflectable guide means;

FIG. 2 shows a plan view of the staple magazine in FIG. 1;

FIG. 3 shows a discharge end view of the magazine in FIG. 1;

FIG. 4 shows in part section the position of the deflectable guide means associated with the magazine in FIG. 1 after a staple has been driven; and

FIGS. 5, 6 and 7 show, in part section, alternative embodiments of the deflectable guide means.

Throughout the following description, the similar members of each embodiment will be accorded the same reference characters.

Referring to the FIGS. 1 to 4, the staple magazine has a pair of outer parallel walls 1 and 2 upstanding from a base 3 and a pair of inner parallel walls 4 and 5 similarly upstanding from the base 3. The pairs of parallel walls 1 and 2 and 4 and 5 serve to define a straight feed path for staples carried slidably as clips in the magazine. A clip comprising a plurality of wide staples 8 can be inserted into the magazine so that they straddle and are supported by the inner walls 4 and 5; the distance apart of the inner surfaces 1a and 2a of the outer walls 1 and 2 being such that the wide staples are laterally confined closely but longitudinally slidably, by the said inner surfaces. A clip comprising a plurality of narrow staples 9 can also, or alternatively, be placed in the magazine so that they straddle and are supported by the inner walls 4 and 5; the distance apart of the outer surfaces 4a and 5a of the inner walls 4 and 5 is arranged so that the narrow staples straddle the inner walls in such a manner as to permit longitudinal sliding movement but to inhibit lateral movement.

Provided in the magazine are means for impelling the staples towards a staple discharge end 10. In this example the impelling of the staples longitudinally along the magazine is achieved by a staple pusher 11 designed to be supported by and closely but longitudinally slidably straddle, the inner walls 4 and 5 (similarly to a narrow staple) and to move under the action of a coil spring 12 towards the staple discharge end 10; consequently, either wide or narrow clips of staples are also pushed towards the discharge end. A cocking lever 13 is provided

for withdrawing the staple pusher 11 from the discharge end 10 thus enabling further clips of staples to be inserted in the magazine. It is to be realised that the magazine according to the present invention is not necessarily limited to this type of staple impelling means and many of the known staple impelling means can be utilised.

Operatively associated with the pair of inner walls 4 and 5 at the staple discharge end 10 are deflectable guide means shown generally at 14. In this instance the deflectable guide means is provided by a plate 15 comprising an upper portion and a lower angled portion which lower portion forms a guide tongue 15b, the upper portion (i.e., the portion remote from the base) is cut away at 15a (see FIG. 3) to fit between the internal surfaces of the inner walls 4 and 5, and the lower angled portion slidably fits into recesses 17 in the ends of the inner walls 4 and 5 so that the lower side edges of the plate 15 are flush with the outer surfaces 4a and 5a of the inner walls. The plate 15 is supported on a pivot or hinge 16 associated with which is a deflection spring 18. One end of the spring 18 is fixedly attached to the magazine base 3 whilst the other end presses against the plate 15 to cause the plate 15 to rotate about the pivot 16 with the guide tongue 15b protruding from the ends of the inner walls as illustrated in FIG. 1.

In order to prevent staples in the magazine from being accidentally removed and to ensure ease of loading, the outer walls 1 and 2 are provided of a depth greater than the depth of the inner walls 4 and 5; each of the top edges of the outer walls 1 and 2, for a substantial part of the length of the magazine from the staple discharge end, are then provided with an inwardly projecting guard portion 19. Thus in loading the magazine the staple pusher 11 must be withdrawn sufficiently clear of the guard portions 19 to enable the staples to be inserted in the part of the magazine not having the guard portions.

The inner walls 4 and 5 and the base 3 terminate at the staple discharge end at a position short of the outer walls 1 and 2 by a distance substantially equal to the thickness of a staple, and when the magazine is operatively connected with a stapling machine a gap 20 is provided between an end plate 21 (see FIG. 7) of the stapling machine and the staple discharge ends of the inner walls 4 and 5. The magazine is operatively arranged in the stapling machine so that the gap 20 is situated in the staple driving plane of the staple driving blade 22.

We will now consider operation of the magazine illustrated in FIGS. 1 to 4 in conjunction with a stapling machine of the type set forth.

For stapling a material with a wide staple 8; a clip of staples is impelled longitudinally along the magazine towards the staple discharge end 10 by the staple pusher 11 until a wide staple is situated in the staple driving plane between the end plate of the stapling machine and the ends of the inner walls. Operational downward movement of the staple driving blade 22 causes the wide staple to be discharged from the magazine by the driving effect of the blade forcing the staple downwards through the gap 20 towards and into the material; the staple being confined laterally (i.e., prevented from floating) by the inner surfaces 1a and 2a of the outer walls. During the driving movement of the staple the plate 15 is inwardly deflected (relative to the magazine) when the staple reaches the guide tongue 15b of the angle plate; the amount of inward deflection is such as to permit the staple to continue in its driving movement without hindrance. For stapling a material with a narrow staple 9; a clip of staples is impelled towards the discharge end 10 until a narrow staple is situated in the staple driving plane between the end plate of the stapling machine and the ends of the inner walls. Operational downward movement of the staple driving blade 22 causes a narrow staple to be discharged from the magazine by the driving effect of the blade 22 forcing the staple down-

wards through the gap 20 toward and into the material; in this case the staple is confined laterally by the side edges of the lower angled portion of the plate 15. As the staple is driven further towards and into the material the amount of deflection of the angle plate 15 increases so that the staple can continue to be driven without hindrance.

In both cases (i.e., narrow and wide staples) once a staple has been driven home and the staple driving blade returned to its inoperative position the plate 15 under the action of the spring 17, returns to the position shown in FIG. 1 to intersect the staple driving plane.

It will thus be realised that the magazine can be loaded with either all narrow staples or all wide staples.

In the embodiments illustrated in FIGS. 5 to 7, which illustrate alternative deflectable staple guide means operatively associated with the staple discharge end of the inner walls, the method of operation of the deflectable member in each case is similar to that as has previously been described with reference to FIGS. 1 to 4. In FIG. 5 the deflectable guide means is in the form of a latch member 23 having an angled face 23a which member is slidably mounted within recesses (not shown) in the staple discharge end ends of the inner walls 4 and 5 so that the side surfaces of the latch member 23 are flush with, and slidable relative to, the outer surfaces 4a and 5a of the inner walls and the angled face 23a is at an acute angle to the staple driving plane. The latch member 23 is spring loaded to be urged towards the discharge end 10 by a spring 24 acting on a fixed thrust block 25 on the base 3.

In FIG. 6 the deflectable guide means, again in the form of a latch member 26 having an angled face 26a, is slidably mounted between the base 3 and a guide block 27 associated with the staple discharge end ends of the inner walls; the side surfaces of the latch member 26 being located in recesses in the inner walls 4 and 5 so that they are flush with, and slidable relative to, the outer surfaces 4a and 5a of inner walls 4 and 5. The deflectable member 26 is spring loaded similarly to the embodiment shown in FIG. 5 and is likewise urged towards the staple discharge end 10 so that the angled face 26a intersects the staple driving plane.

In FIG. 7 the deflectable guide means operatively associated with the staple discharge end of the magazine is in the form of a spring plate 28 attached by a bolt 29 to the end plate 21 of the stapling machine. The whole or bottom portion of the spring plate 28 forming a guide tongue is of width equal to the distance between the outer surfaces 4a and 5a of the inner walls 4 and 5 and is positioned such that its lower side edges are flush with the said outer surfaces and in an undeflected position the bottom of the guide tongue abuts the discharge end ends of the inner walls, as illustrated. The spring plate 28 is capable of deflecting in a direction out of the staple driving plane towards the end plate 21 and into a cut away section 31 of the end plate 21. As previously described deflection of the plate 28 is caused when a staple, driven by the staple driving blade 22, is driven through the gap 20, towards and into a suitable material. The withdrawal, after stapling, of the staple driving blade 22 allows the plate 28 to spring back, under its own action, to the position illustrated in FIG. 7.

I claim:

1. A staple magazine for a stapling machine of the herein described type having an end plate and a staple driving blade, and carrying and feeding alternately clips of wide crown or narrow crown staples, which comprises
 - a generally flat base;
 - an outer pair of parallel walls and an inner pair of parallel walls perpendicularly upstanding from said base;
 - said outer pair of walls and inner pair of walls defining a straight feed path for staples carried slidably as clips in said feed path,

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said feed path having a staple discharge end adjacent said base;

said pair of inner walls being a support for a clip of staples mounted to straddle said inner walls;

wide staples being guided by and laterally confined between the inner surfaces of said outer pair of walls, and

narrow staples being guided by and laterally restrained astride the outer surfaces of said inner pair of walls; said inner pair of walls and said base at said staple discharge end of said feed path terminating short of said outer pair of walls by a distance equal to the thickness of a staple to partly define a staple driving plane;

deflectable guide means mounted within said pair of inner walls at the discharge end of said feed path, said guide means having an angled part which enters said staple driving plane at an acute angle thereto when said guide means is undeflected, said angled part having a width substantially equal to the width between the outer surfaces of said pair of inner walls;

said guide means being mounted to deflect from said staple driving plane to a position at which side edges of said angled part are substantially flush with the outer surfaces of said pair of inner walls;

said guide means restraining lateral movement of a narrow staple when a narrow staple is located in said staple driving plane and deflecting to permit said narrow staple to be driven downwardly through said plane whilst maintaining said lateral restraint, and said guide means deflecting to permit downward movement of a wide staple located in said staple driving plane,

said wide staple being restrained from lateral movement by the inner surfaces of said outer pair of walls.

2. A staple magazine according to claim 1 wherein said pair of inner walls at their ends adjacent said discharge end of said feed path define recesses and said guide means is mounted to deflect to a position at which said angled part enters said recesses and side edges of said angled part are substantially flush with the outer surfaces of said pair of inner walls.

3. A staple magazine according to claim 2 wherein said guide means is a plate, said plate being pivoted for movement relative to and between said pair of inner walls, and

spring means associated with said plate urging said plate to pivot to enter said staple driving plane.

4. A staple magazine according to claim 2 wherein said guide means is a latch member and said angled part is

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provided by an angled face of said latch member which enters said staple driving plane,

said latch member being slidably mounted for movement between and relative to said pair of inner walls, and

spring means associated with said latch member urging said latch member to slide towards said staple driving plane and said angled face to enter said plane.

5. A staple magazine according to claim 3 wherein said plate is angled and an end thereof remote from said pivotal mounting is a guide tongue which provides said angled part,

said guide tongue being urged to enter said staple driving plane by the action of said spring means on said plate.

6. A staple magazine according to claim 3 wherein said plate is pivotally mounted on said pair of inner walls.

7. A staple magazine according to claim 1 wherein a spring loaded staple pusher impels staples along said feed path towards said staple discharge end.

8. A staple magazine according to claim 7 wherein said staple pusher rests on, and closely but longitudinally slidably straddles, said pair of inner walls in a manner similar to a clip of narrow staples.

9. A staple magazine according to claim 8 wherein said pair of outer walls have a depth greater than that of said pair of inner walls, each outer wall being provided with an inwardly projecting guard portion at its edge remote from said base,

said guard portions extending from said staple driving plane for a substantial length of the magazine whereby staples and said staple pusher can pass beneath said guard portions during their movement to the staple driving plane and staples cannot be removed from, or inserted in, the magazines in the region of the guarded portion.

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