

July 22, 1952

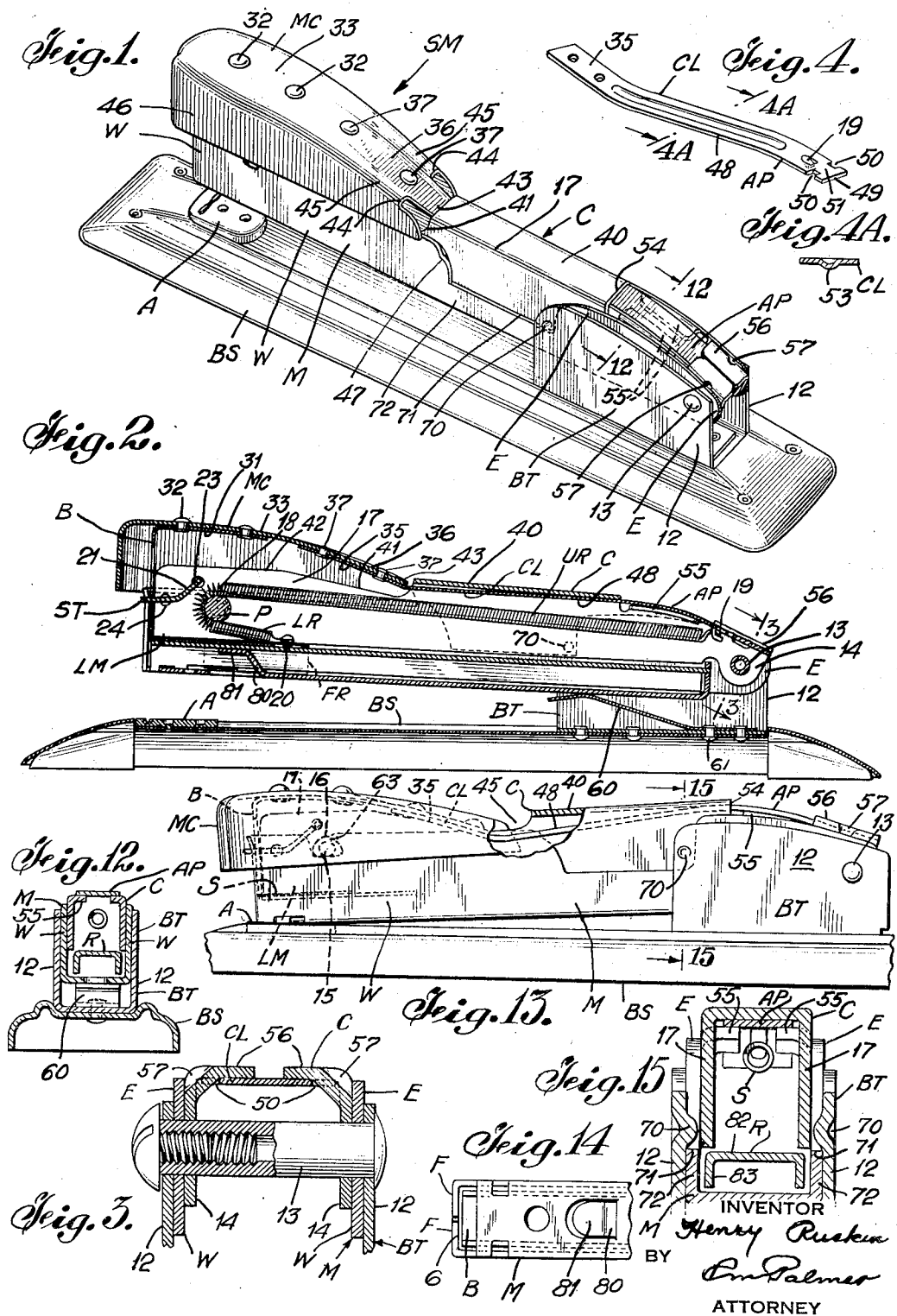
H. RUSKIN

2,603,781

STAPLING MACHINE

Filed April 25, 1949

2 SHEETS--SHEET 1



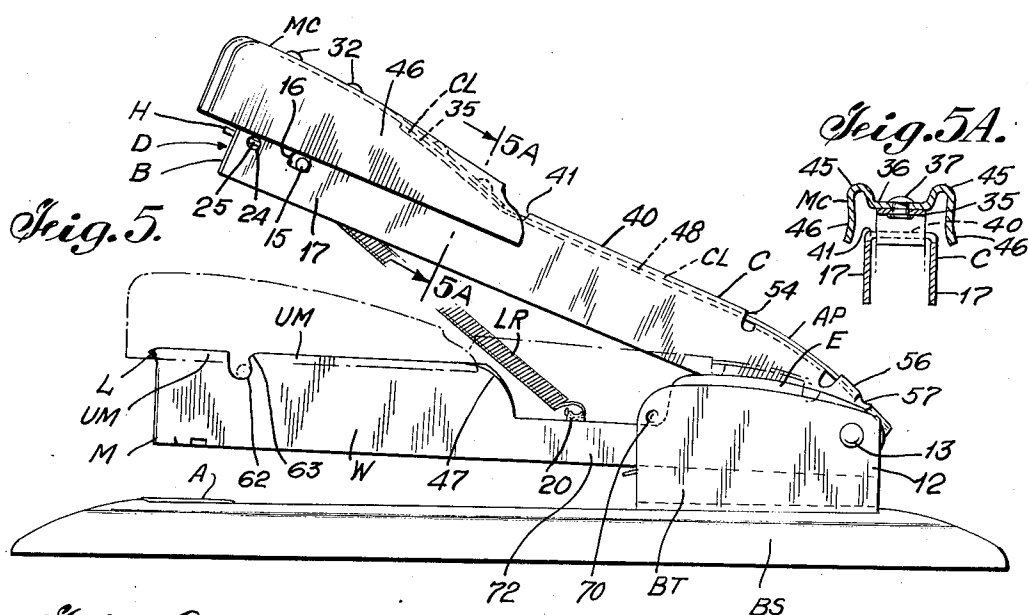
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2 SHEETS--SHEET 2



UNITED STATES PATENT OFFICE

2,603,781

STAPLING MACHINE

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9 Claims. (Cl. 1—3)

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The present invention is directed to the art of fastening in utilizing a stapling machine for driving wire staples. Specifically the invention pertains to improvements in a stapling machine permitting full access to the staple strip within a staple guide channel in the magazine when the cover thereof is fully opened for quickly loading the machine and for quickly closing the latter upon movement of the cover over the magazine. Broadly the invention includes the provision of a simplified cover for the magazine wherein a relatively elongated cantilever spring is effectively seated and anchored at the rear part of the cover and constitutes means at the front part therein for supporting the manipulatable cap carrying a driving blade for expelling the foremost staple of the strip out of the magazine for fastening purposes with or without the aid of an appropriate anvil mounted on a swingable base carrying a suitable saddle for movably sustaining the magazine at the rear part thereof. One of the principal objects and advantages which characterize the present invention resides in the provision of means of aligned reentrant relief recesses at the forward part of the spaced sides of the cover to allow the manipulatable cap of the staple driving means to appreciably straddle and telescope over the upper end of the magazine in the matter of effecting a complete staple driving stroke of the staple ejecting blade. Another object is concerned with the provision of forwardly overhanging and biased lips at the front wall of the magazine to guide the lower end of the staple driving blade into the staple raceway on closing of the magazine by the cover. A further object resides in employing the manipulator cap of the staple driving means as an intervener or interconnecting means for the rear end of the driving blade and the forward end of the cantilever spring. Another object is concerned with the provision of outwardly flared lips on the spaced sides of the magazine to effectively guide the spaced sides of the cover between the sides of the magazine on closing of the latter by the cover. Another object is realized in forming the rear part of the cover with inwardly turned flanges constituting fulcrum means for seating the cantilever spring. Another object comprehends in anchoring the rear end of the cantilever spring by inwardly turned lips at the rear part of the cover and having inwardly struck lugs interlocking with aligned notches interrupting the rear end of the cantilever spring. Another object resides in the provision of appropriate detent means struck out of the magazine supporting saddle and dis-

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engageably cooperating with the magazine to limit upward displacement and concomitantly prevent accidental unlocking of the magazine. Other important objects and functional and structural features will appear from the following detailed specification taken with the accompanying drawings wherein:

Fig. 1 is a perspective view of the stapling machine according to my invention illustrating the pivoted cover closed.

Fig. 2 is a longitudinal and vertical sectional view of Fig. 1.

Fig. 3 is an enlarged transverse sectional view on the line 3—3 of Fig. 2.

Fig. 4 is a perspective view on a reduced scale of a staple driver supporting spring.

Fig. 4A is a transverse sectional view on the line 4A of Fig. 4.

Fig. 5 is a side elevational view of Fig. 1 showing in full lines the pivoted cover partly opened.

Fig. 5A is a sectional view on the line 5A—5A of Fig. 5.

Fig. 6 is a plan view of the stapling machine showing the cover fully opened.

Fig. 7 is an enlarged fragmentary view of Fig. 2.

Fig. 8 is a transverse sectional view on the line 8—8 of Fig. 7.

Fig. 9 is a horizontal sectional view on the line 9—9 of Fig. 7.

Fig. 10 is a fragmentary front view of Fig. 2 however with the cap removed.

Fig. 11 is a perspective view of the staple driving spring blade.

Fig. 12 is a vertical sectional view on the line 12—12 of Fig. 1.

Fig. 13 is a side elevational view of the stapling machine, partly shown in section and with the magazine and driver depressed relative to the base.

Fig. 14 is an underneath view of the front part of the magazine.

Fig. 15 is a sectional view on the line 15—15 of Fig. 13.

The stapling machine generally designated SM is characterized by the base BS and the pivoted magazine M, the pivoted cover C, the slidably guided staple follower or pusher FR, the staple driver D and the anchored driver supporting cantilever leaf spring CL.

Fixedly mounted within the magazine is the inverted U-shaped rail R which slidably guides the staple strip S towards the vertical staple guide-way G defined by the front face of the rail and the inwardly turned flanges F constituting the

front wall of the magazine having at their upper ends outwardly biased or inclined lips L cooperating with the lower end of the blade B of the driver D to direct the latter on closing of the pivoted cover C directly in back of the flanges F as desired.

The staple follower or pusher FR is provided at its lower ends with the inwardly turned flanges 11 coacting with the bottom faces of the sides of the rail R to prevent upward displacement of slidable pusher FR as it is reciprocated back and forth during opening and closing of the pivoted cover.

More specifically, base BS has fixedly attached thereto the U-shaped bracket BT having upstanding side walls 12 appropriately carrying fulcrum pin 13 pivotally sustaining spaced ears E constituting the rear parts of side walls W of the magazine M. It will be observed that the rear part of cover C is provided with the spaced ears 14 pivotally sustained on fulcrum pin 13. By this arrangement the cover may be swung to the full open position illustrated in Fig. 6 to assume an angle of approximately one hundred and eighty degrees with the magazine M.

Extending transversely of the channel shaped cover C is the locking pin P having its reduced cylindrical ends 15 (Fig. 8) loosely disposed in the relatively large openings 16 in the spaced depending sides 17 of the cover C.

About pin P is trained the looped helicoidal and expandible spring 18 having its upper reach UR appropriately retained on lug or hook 19 (Fig. 2) extending downward from the rear part of cantilever spring broadly designated CL. The lower reach LR of spring 18 is effectively secured to lug 20 projecting from the slidably guided staple follower or pusher FR. Spring 18 thus has three functions, namely; one, to urge the locking pin P rearwardly; two, to shift the pusher F automatically rearwardly when the cover is opened, and three, to urge the pusher always forwardly towards the raceway or guideway G in the closed position of the cover.

Appropriately anchored between the side walls 17 of the case or cover C (Figs. 6, 7 and 9) is the stop ST for limiting vertical displacement of blade B and provided with the rearward inclined portion 21 including the laterally extending lugs 22 fixed in the spaced openings 23 in the aforementioned sides 17 which also include lower openings 24 for fixedly staking lugs 25 extending laterally from the forwardly projecting part 26 of stop ST embodying the attenuated neck 27 integral with the head H receivable in notch or opening N defined by the biased lips L and upper faces UF of flanges F and adapted to be seated on the upper faces on closing of the cover. Stated in another way when head H meets the stop walls UF the magazine M is fully closed by the cover at which time the lower margins LM of the spaced depending sides 17 are just slightly above the staple strip S to prevent upward displacement of the latter.

Driver D embodies blade B which is of effective relatively thin steel and has the rectangular opening 30 through which neck 27 of stop ST projects and this neck cooperates with the upper and lower walls of opening 30 to limit upward and downward displacement of this reciprocally guided blade B integral with the upper offset portion 31 fastened by rivets 32 to the underface of the top wall 33 of the manipulatable cap MC.

For maintaining the driving blade B normally elevated whereby the lower wall of opening 30 abuts neck 27 of stop ST, the cantilever leaf

spring CL heretofore referred to has its upper inclined or biased portion 35 secured to the downwardly and rearwardly sloping intermediate depressed portion 36 of the manipulating cap MC by the rivets 37.

The top wall 40 of the cover C which interconnects the depending sides 17 has its front part removed to provide the spaced relief recess 41 in the sides 17. Such construction therefore leaves these forward parts the sides 17 uncovered but retained in place by the stop ST. The transversely spaced relief recesses 41 therefore slope downwardly and rearwardly and are disposed below the elevation of the top faces 42 of the forward parts of these sides B.

Of interest to observe is that the rear end of the intermediate depressed portion 36 of cap MC constitutes a tongue or tail portion formed in part by the reentrant notches 44. Cap MC is further characterized by the beaded margins 45 constituting strengthening means from which depend spaced and arcuate sides 46 straddling in the fully closed relation of the cover, the upper margins UM of the side walls W of the magazine M and the latter includes the outwardly flared or overhanging wings 47 to facilitate guiding of the spaced side walls 17 of the cover between the side walls W on closing of the magazine by the cover.

Offset downwardly and rearwardly relative to the biased forward part 35 of the cantilever spring CL is the intermediate and sloping part 48 merging with the rearwardly disposed slightly arched portion AP terminating in a rectilinear T-shaped end 49 defined by notches 50 and web or neck 51. For reinforcing purposes spring CL is provided with downwardly facing bead 53.

Referring back to the cover C, it will be observed that the rear upper part thereof is interrupted by the opening 54 and in alignment therewith are the spaced inwardly turned and arcuate flanges 55 which are below the elevation of bridge or top wall 40 and below the rearwardly arranged inwardly turned retaining and spaced lips 56. Flanges 55 constitute fulcrum means in the form of a seat or abutment for the arcuate portion AP of leaf spring CL which is held between the side walls 17 of the cover against longitudinal displacement by the lugs or detents 57 struck out of lips 56 and disposed in notches 50 to interlock with the walls thereof.

On downward displacement of driver D, the intermediate portion 48 of the cantilever spring CL flexes downwardly relative to the inwardly turned flanges 55 which characterize a seat and upon removal of pressure on cap MC the front portion 35 of spring CL automatically retracts the cap.

Where pressure is applied to cap MC the offset leaf spring 60 which is fastened to the base by rivets 61 is also caused to flex downwardly until the staple driving blade has completed clinching of the foremost staple against the anvil A and upon removal of such pressure spring 60 automatically elevates the pivoted magazine to the position shown in Fig. 2.

For loading the magazine the operator merely grasps and then applies a lifting thrust on the cap. This action causes the reduced ends 15 of the roller P to leave the bottom parts of the notches 62 in the side walls W of the magazine. Thereafter the roller P is urged bodily forwardly as the reduced ends 15 strike the overhanging cams or lobes 63. When ends 15 clear cams 63, loop spring 18 automatically retracts the roller. Now cover C' may be swung to assume an angle

of one hundred and eighty degrees with the magazine.

Upward displacement of the tiltable magazine M is limited by the detents or projections 70 which are struck out of the sides of the bracket BT and overhang upper faces 71 of the intermediate reduced parts 72 of the side walls W of the magazine. These projections while constituting stop means for the magazine also permit the forward parts of the flanges 12 of the bracket or saddle BT to be swung rearwardly to permit the base BS to be pivoted rearwardly away from the magazine whereby the stapling machine may be employed as a tackler. In other words, detents 70 may be snapped by the side walls of the magazine when desired to be completely free thereof.

Of course when the cover is opened, the follower FR is moved rearwardly along the rail and upon closing of the cover the reduced ends 15 about the cams 63, thereby bodily shifting roller P forwardly and spring 18 is tensioned until the reduced ends snap by cams 63 after which spring 13 slightly recoils causing ends 15 to be effectively interlocked under and with these cams.

By the present invention the manipulatable cap MC serves as an intervener or bridge for the cantilever spring CL and for the staple driving blade B and by reason of the anchored cantilever leaf spring, cap MC is yieldingly maintained elevated and conveniently adapted to be displaced downwardly for appropriate action to expel a staple from the magazine into suitable material to be fastened either with or without the aid of the anvil.

The aligned openings or slots 16 allow adequate play of the reduced portions 15 of the roller P and on downward displacement of the cap MC the latter also flexed the intermediate part 48 of the cantilever spring CL away from the bridge or top wall 40 (Fig. 13) of the cover C. This intermediate part 48 thus moves downwardly relative to the fulcrum means or seat defined by the inwardly overhanging lugs 55. Ultimately however, the reduced portions 15 of the roller P strike the bottom walls of the aligned slots 16, thereby pivoting the spaced sides 17 of the cover downwardly to permit the front parts of the lower margins LM (Fig. 2) of the sides to bear against the staple strip at a time when blade B is about to expel the foremost staple out of the raceway, thus precluding buckling of this strip during the staple ejection operation of the driver, namely, in a direction away from the driver blade. Consequently the staple strip is braked against rearward displacement and upon removal of hand pressure from cap MC, the latter is automatically elevated until the intermediate part 48 of spring CL strikes the top wall or stop 40 of the cover C, the stop being disposed between the aligned relief recesses 41 at the front part of the spaced sides 17 and the gap or opening 54 at the rear part of the cover C.

Rail R is appropriately anchored within the magazine and in spaced relation to the front and side walls thereof and is further operatively retained in place, that is, spaced from the front and side walls of the magazine by the biased lug 80 struck out of the bottom wall of the magazine and having its offset terminal 81 welded to the underface of bridge 82 interconnecting the depending and spaced sides 83 of the rail. It should also be observed that the head H of the staked stop ST (Fig. 9) holds blade B adjacent

to the front faces of the spaced sides 17 of the cover, that is, prevents outward spreading thereof.

Various changes may be made in details of construction and arrangement of parts without departing from the spirit of the invention or sacrificing any of the advantages thereof inherent therein.

I claim:

1. In a stapling machine, a magazine for supporting a strip of staples and including a raceway, a cover having spaced sides, a cap, a blade secured to said cap and slidably guided in said raceway, means extending from and inwardly overhanging said sides and constituting fulcrum means, a cantilever spring embodying an intermediate portion mounted on said fulcrum means and having a front portion secured to said cap, means at the rear of said cover for anchoring said spring against displacement longitudinally of said cover, and means movably holding said cover to said magazine.

2. In a stapling machine, a magazine for supporting a strip of staples and including a raceway, a cover having spaced sides, a cap having a rear reduced portion, a staple driving blade slidably guided in said raceway and including an offset portion secured to said cap, means inwardly overhanging said sides and constituting fulcrum means, a cantilever spring embodying an intermediate portion bearing against said fulcrum means and having a front upwardly and forwardly sloping portion secured to said cap, means at the rear of said cover for anchoring said spring against displacement longitudinally of said cover, and means movably holding said cover to said magazine.

3. In a stapling machine, a magazine for supporting a strip of staples and including a raceway, a cover having spaced sides, a cap, a blade slidably guided in said raceway and having an offset portion secured to said cap, means integral with and near the rear of said cover and interposed between said sides and constituting fulcrum means, a cantilever spring disposed in part within and longitudinally of said cover and embodying an intermediate portion mounted on said fulcrum means and having a front upwardly and forwardly sloping portion secured to said cap, means at the rear of said cover for anchoring said spring against displacement longitudinally of said cover, and means movably holding said cover to said magazine.

4. In a stapling machine, a magazine for supporting a strip of staples and including a raceway, a cover having spaced sides, a cap, a blade slidably guided in said raceway and having an offset portion secured to said cap, spaced flanges integral with and interposed between said sides and constituting fulcrum means, a cantilever spring disposed in part within and longitudinally of said cover and embodying an intermediate portion mounted on said fulcrum means and having a front upwardly and forwardly sloping portion secured to said cap, means at the rear of said cover for anchoring said spring against displacement longitudinally of said cover, and means movably holding said cover to said magazine.

5. In a stapling machine, a magazine for supporting a strip of staples and including a raceway, a cover having spaced sides, a cap, a blade slidably guided in said raceway and having an offset portion secured to said cap, means near the rear of said sides and interposed therebetween

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and constituting fulcrum means, a cantilever spring disposed in part within and longitudinally of said cover and embodying an intermediate portion mounted on said fulcrum means and having a front upwardly and forwardly sloping portion secured to said cap, lips turned inwardly of said sides at the rear of said cover and including means for anchoring said spring against displacement longitudinally of said cover, and means movably holding said cover to said magazine.

6. In a stapling machine, a magazine for supporting a strip of staples and including a raceway, a cover having spaced sides, a cap, a blade slidably guided in said raceway and having an offset portion secured to said cap, flanges inwardly overhanging said sides, a cantilever spring disposed in part within and longitudinally of said cover and embodying an intermediate portion mounted on said flanges and having a front upwardly and forwardly sloping portion secured to said cap and a downwardly extending rear portion including notch means, lips turned inwardly of said sides at the rear part of said cover and including means extending into said notch means for anchoring said spring against displacement longitudinally of said cover, and means movably holding said cover to said magazine.

7. In a stapling machine, a magazine for supporting a strip of staples and including a raceway, a cover having spaced sides and provided with an intermediately disposed top wall and having recess means and an opening at the opposite ends of said wall, a cap movable relative to said recess means, a blade slidably guided in said raceway and having a vertical slot and having an offset portion secured to said cap, flanges integral with and interposed between said sides and below said wall, a cantilever spring disposed in part within and longitudinally of said cover and embodying an intermediate portion mounted on said flanges and having a front upwardly and forwardly sloping portion secured to said cap, means at the rear of said cover for anchoring said spring against displacement longitudinally of said cover, stop means secured between said sides and having a neck portion extending into

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said slot for limiting displacement of said blade relative to said magazine, and means movably holding said cover to said magazine.

8. In a stapling machine, a magazine for supporting a strip of staples and including a raceway, a cover having spaced sides and provided with an intermediately disposed wall and having recess means and an opening at the opposite ends of said wall, a cap movable relative to said recess means, a blade slidably guided in said raceway and having an offset portion secured to said cap, flanges near the rear of and interposed between said sides below said wall, a cantilever spring disposed in part within and longitudinally of said cover and embodying an intermediate portion mounted on said flanges and having a front upwardly and forwardly sloping portion secured to said cap, means at the rear of said cover for anchoring said spring against displacement longitudinally of said cover, a base, a saddle secured to said base, means pivotally sustaining said magazine and cover on said saddle, and detent means struck out of said saddle and cooperating with a wall of said magazine to limit and prevent displacement of the latter in a direction away from said base.

9. The stapling machine according to claim 2 wherein said sides are held staked by stop means intervening said sides also cooperating with said blade to hold the latter adjacent thereto, and said stop having means for guiding and limiting sliding movement of said blade.

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