

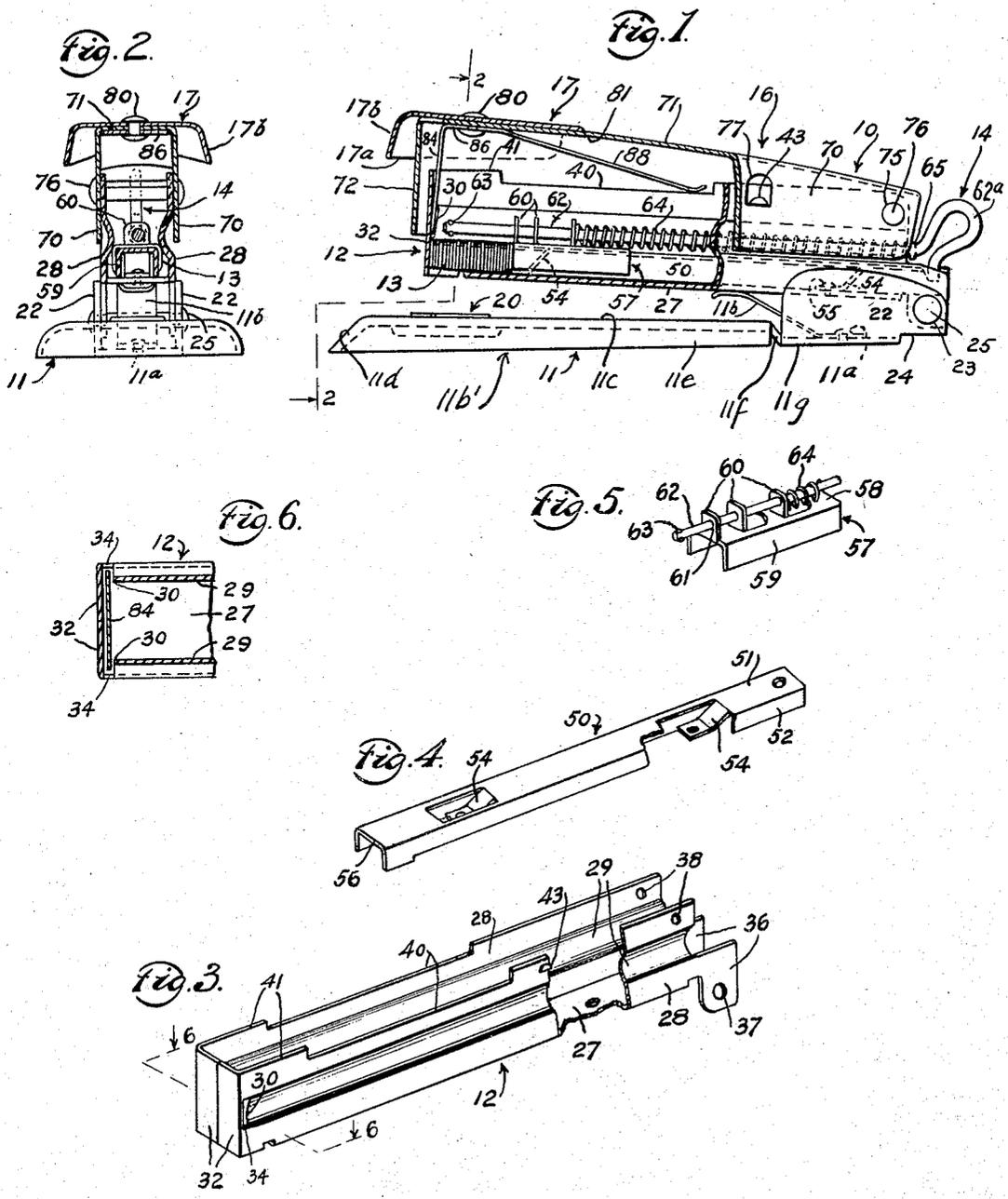
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STAPLING DEVICE

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STAPLING DEVICE

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This invention relates to stapling devices, and is particularly directed to a stapling device for driving U-shaped wire staples.

An object of the present invention is to provide a stapling device having a combination spring and driver made of a single elongated strip of spring material.

Another object of the present invention is to provide in a stapling device of the character described, a staple magazine, and a cover hinged thereto and carrying the combination driver and spring, the cover being depressible to swing relative to the staple magazine for driving the staples.

Yet a further object of the present invention is to provide in a stapling machine of the character described, a staple magazine having improved means to guide the driver as the cover is oscillated relative to the staple means, the cover and staple magazine being further provided with improved means to limit relative rotation therebetween.

Yet a further object of this invention is to provide a stapling device of the character described, comprising a base, a staple magazine pivoted thereto and normally retained in raised position by a spring interposed between the base and the staple magazine, a cover hinged to the staple magazine and provided with spring means to swing the cover upwardly relative to the staple magazine, and driver means to drive the staple when the cover is depressed, to swing the staple magazine downwardly relative to the base, and the cover downwardly relative to the staple magazine.

Yet a further object of this invention is to provide in a stapling device of the character described, means to prevent the spring which moves the cover relative to the staple magazine, from being fully compressed on a full downstroke of the cover.

Still another object of this invention is to provide a strong, durable and compact stapling device of the character described, which shall be relatively inexpensive to manufacture, comprise few and simple parts which shall be easy to manipulate, and yet practical and efficient to a high degree in use.

Other objects of this invention will in part be obvious and in part hereinafter pointed out.

The invention accordingly consists in the features of construction, combinations of elements, and arrangement of parts which will be exemplified in the construction hereinafter described,

and of which the scope of application will be indicated in the following claims.

In the accompanying drawing, in which is shown one of the various possible illustrative embodiments of this invention,

Fig. 1 is a side elevational view of a stapling device embodying the invention, with parts broken away and in cross-section;

Fig. 2 is a cross-sectional view taken on line 2—2 of Fig. 1;

Fig. 3 is a perspective view of the staple magazine, with the inner guide member for the staples removed, and with parts broken away and in cross-section;

Fig. 4 is a perspective view of the inner guide member for the staples, with parts broken away and in cross-section;

Fig. 5 is a partial perspective view of the pushing device for the staples; and

Fig. 6 is a cross-sectional view taken on line 6—6 of Fig. 3.

Referring now in detail to the drawing, 10 designates a stapling device embodying the invention, comprising generally of a base 11, a staple magazine 12, in which are housed staples 13, a staple pusher device 14 for feeding the staples, and a cover 16 pivoted to the staple magazine and carrying a cap 17.

The base 11 carries on its upper face, a usual anvil 20 at its forward end. At the rear end of a base 11 are a pair of parallel, upwardly extending walls 22 formed with aligned bearing openings 23. The base 11 is formed with a notch 24 on the underside thereof, and adjacent the rear end thereof, for the purpose hereinafter appearing.

Mounted on the walls 22 and within the bearing openings 23, is a transverse pivot pin 25 on which the staple magazine 12 is pivotally mounted. The staple magazine 12 may be made from sheet metal and comprises a bottom wall 27 and parallel, vertical, upwardly extending, symmetrical side walls 28. The side walls 28, are formed with longitudinal, inwardly curved channel portions 29 extending to the rear ends of the walls 28, but terminating short of the front ends of said side walls. The forward ends of the channels 29 are inclined upwardly and rearwardly, as at 30, for the purpose hereinafter appearing.

Extending inwardly toward each other, from the side walls 28 are aligned, front wall portions 32. The walls 32 form with the ends 30 of the channels 29 tapering guide grooves 34, for the purpose hereinafter appearing. The grooves 34 increase in width from the lower to the upper

ends thereof. The front walls 32 are preferably inclined upwardly and rearwardly about one degree, for the purpose hereinafter appearing.

At the rear ends of the side walls 28 are downwardly extending parallel ears 36 formed with bearing openings 37 through which the pivot pin 25 passes. The ears 36 are disposed between the side walls 22 and the base 11. The side walls 28 are formed adjacent the upper edges thereof, and adjacent the rear ends thereof, with aligned bearing openings 38, for the purpose hereinafter appearing. Said side walls 28 are furthermore formed at their upper ends with aligned longitudinal cut-outs, grooves or notches 40 terminating short of the front and rear ends thereof. The edges 41 of the side walls 28 disposed between the notches 40 and the front walls 32 incline downwardly and forwardly, for the purpose hereinafter appearing.

Extending outwardly from one side wall 28, just rearwardly of the rear end of a notch 40, is a projection 43, which engages a slot 77 in cover 16 to limit the upward movement of the staple magazine 12.

The bottom wall 27 terminates short of the front walls 32 leaving a space through which the staples may be driven. Mounted on the bottom wall 27, and between the side walls 28, is an inner guide member 50 for the staples 13. The inner guide member 50 has a top wall 51, parallel to wall 27 and side walls 52, parallel to and spaced inwardly of the bottom portions of the side walls 28. The top wall 51 of the guide member is spaced just below the channel portions of member 12. Said top wall 51 is furthermore formed with downwardly depressed tongues 54 cut from the metal thereof and contacting the wall 27, and riveted thereto by rivets 55. The front end 56 of member 50 terminates short of the front walls 32, by a distance sufficiently to permit one staple to be driven between said front walls 32 and the front edge 56 of said inner guide member.

The staple pusher member 14 is mounted on the inner guide member 50, and comprises a channel shaped member 57 slidably engaging the guide member and made of sheet metal. The same has a top wall 58 and side walls 59 contacting the top wall 51 and side walls 52 of the inner guide member. Extending upwardly from the top wall 58 of said member 57, are three parallel vertical tongues formed with through openings 61. Extending from the openings 61 is a rod 62 formed with projections 63 at its forward end.

The rod 62 has an upwardly and downwardly curved handle portion 62a at its rear end. On the rod 62 is a coil compression spring 64 interposed between one of the tongues 60, and a projection 65 on the rod 62 just forwardly of the handle 62a formed by a compression of the metal, pressed out enough to hold the spring in position.

It will now be understood that the spring 64, presses the member 57 forwardly and the latter in turn presses the frozen staples to always keep a staple in driving position. Channels 29 retain the staples on the inner guide 50. Attached to the upper side of the base 11, as by rivet 11a, is a leaf spring 11b contacting the underside of the staple magazine 12, to raise the same.

The cover 16 comprises parallel side walls 70 disposed on opposite sides of the side walls 28, and a top wall 71, inclined somewhat upwardly and forwardly, and front walls 72 being inwardly from the front ends of the side walls 70. The

side walls 70 are formed adjacent their rear ends with bearing openings 75 to receive a pivot pin 76 passing through bearing openings 28 and the bearing openings 75. The cover 16 is thus pivoted to the staple magazine 12. One side wall 70 is formed with a vertical slot 77 through which the projection 43 extends. The projection 43 and slot 77 serve to limit relative rotation between the cover 16 and the staple magazine. Attached to the underside of the top wall 71 of the cover, as by rivet 80, is a combination spring and driver member 81 made from a single elongated piece of spring metal and having a downwardly extending driver portion 84, the side edges of which are disposed within the grooves 34, a top portion 86 contacting the underside of the top wall 71 of the cover and engaged by the rivet 80, and a rearwardly and downwardly inclined free portion 88 contacting the upper edges of the side walls 28 within the longitudinal cut-outs or grooves 40. The portion 88 of member 81 serves as a spring to cause relative rotation between the cover and the staple magazine 12. When the cover is depressed, the staple magazine 12 will move downwardly until it moves no further, and the cover will then move downwardly relative to the staple magazine, and driver portion 84 of member 81 will drive the forwardmost staple towards the anvil 20.

It will be noted that the tapering groove 34 permits variations in the angle of the driver portion 84 as the cover is depressed.

It will be further noted that the forward and downward inclination of the edges 41 will permit the cover to be fully depressed until stopped by said edges. The cut-outs 40 permit the cover to be fully depressed without fully flattening the spring portion 88.

The cap 17 is attached to the front top portion of the cover by the rivet 80 and has downwardly extending side walls 17a and a downwardly extending front wall 17b.

It will be noted that there is only one projection 43 on one side wall of the staple magazine, and it serves as a stop for the cover on its return stroke. The reason for not having stops on both sides is that should faulty staples become stuck in a machine, it is an easy matter to wedge something between the staple magazine or frame and the cover, thereby releasing the projection 43 from the slot 77 and permitting the cover to be swung upwardly all the way, allowing complete access to the inside of the device for removing the faulty staples. If projections 43 were made on opposite sides of the staple magazine, it would not be an easy matter to release the cover from the staple magazine.

The bottom wall 27 of the frame or staple magazine 12 may be embossed or pressed upwardly at the openings which receive the rivets 55, to accommodate the heads of the rivets, so that the rivet heads will not project below the underside of said wall 27.

It will be noted that the base 11 comprises a front portion 11b' having a raised wall 11c carrying the anvil, and downwardly extending, outwardly inclined, side and front walls 11e and 11d. The wall 11c is slightly inclined upwardly and forwardly, as shown in Fig. 1 of the drawing. Extending from the rear end of said wall 11c is a rearwardly and downwardly inclined interconnecting portion 11f, from which there extends rearwardly, a flat, horizontal, bottom wall portion 11g, from which the side walls 22 extend upwardly.

It will be noted that the spring 11b is attached at 11a to the wall 11g. Since the end at which the spring is anchored is below the top wall 11c, said spring will not be fully compressed during the stapling operation.

The rear end of wall 11g terminates short of the rear ends of said walls 22 to form the cut-out or notch 24, to permit the staple magazine and cover to be swung back and used as a tacker in the well known manner.

It will thus be seen that there is provided a device in which the several objects of this invention are achieved, and which is well adapted to meet the conditions of practical use.

As various possible embodiments might be made of the above invention, and as various changes might be made in the embodiment above set forth, it is to be understood that all matter herein set forth or shown in the accompanying drawing is to be interpreted as illustrative and not in a limiting sense.

Having thus described our invention, we claim as new and desire to secure by Letters Patent:

1. In a stapling device, a staple magazine comprising a bottom wall and upwardly extending side walls, said side walls being formed with longitudinally extending inwardly projecting channels and inwardly bent front walls, the front ends of the channels terminating short of said front walls and forming guide grooves therewith, a cover having side walls, a top wall and pivoted to the staple magazine, the side walls of the cover being disposed on the outer sides of the side walls of the staple magazine, the side walls of the staple magazine having longitudinal cut-outs in the upper edges thereof; a combination driver and spring member attached to the underside of the top wall of the cover and having at one end a downwardly extending driver arm received within said guide grooves and at the other end a rearwardly and downwardly inclined spring arm engaged within the cut-outs in the side walls of the staple magazine.

2. In a stapling device, a staple magazine comprising a bottom wall and upwardly extending side walls, said side walls being formed with longitudinally extending inwardly projecting channels and inwardly bent front walls, the front ends of the channels terminating short of said front walls and forming guide grooves therewith, a cover having side walls, a top wall, and pivoted to the staple magazine, the side walls of the cover being disposed on the outer sides of the side walls of the staple magazine, the side walls of the staple magazine having longitudinal cut-outs in the upper edges thereof, a combination driver and spring member attached to the underside of the top wall of the cover and having at one end a downwardly extending driver arm received within said guide grooves and at the other end a rearwardly and downwardly inclined spring arm engaged within the cut-outs in the side walls of the staple magazine, one side wall of the cover being formed with a slot, and a projection on a side wall of the staple magazine received within said slot.

3. In a stapling device, a staple magazine comprising a bottom wall and upwardly extending side walls, said side walls being formed with longitudinally extending inwardly projecting channels, and inwardly bent front walls, the front ends of the channels terminating short of said front walls and forming guide grooves therewith, a cover having side walls, a top wall and pivoted to the staple magazine, the side walls of

the cover being disposed on the outer sides of the side walls of the staple magazine, the side walls of the staple magazine having longitudinal cut-outs in the upper edges thereof, a combination driver and spring member attached to the underside of the top wall of the cover and having at one end a downwardly extending driver arm received within said guide grooves, and at the other end a rearwardly and downwardly inclined spring arm engaged within the cut-outs in the side walls of the staple magazine, one side wall of the cover being formed with a slot, and a projection on a side wall of the staple magazine received within said slot, said guide grooves increasing in width from the lower to the upper ends thereof.

4. In a stapling device, a staple magazine comprising a bottom wall and upwardly extending side walls, said side walls being formed with longitudinally extending inwardly projecting channels and inwardly bent front walls, the front ends of the channels terminating short of said front walls and forming guide grooves therewith, a cover having side walls, a top wall and pivoted to the staple magazine, the side walls of the cover being disposed on the outer sides of the side walls of the staple magazine, the side walls of the staple magazine having longitudinal cut-outs in the upper edges thereof, a combination driver and spring member attached to the underside of the top wall of the cover and having at one end a downwardly extending driver arm received within said guide grooves, at the other end a rearwardly and downwardly inclined spring arm engaged within the cut-outs in the side walls of the staple magazine, a side wall of the cover being formed with a slot, and a projection on a side wall of the staple magazine received within said slot, said guide grooves increasing in width from the lower to the upper ends thereof, the front wall of said staple magazine being inclined upwardly and rearwardly.

5. In a stapling device, a staple magazine comprising a member having a bottom wall and side walls extending upwardly from said bottom wall, and walls extending inwardly from the front ends of the side walls and forming a front wall, said side walls being formed with longitudinal channels, the front ends of the channels terminating short of the front wall to form grooves therewith, an inner staple guide member attached to the bottom wall and between the side walls, said channels serving to retain the staples on the inner guide member, a cover pivoted to said side walls adjacent the rear ends thereof, and a plunger on said cover and engaging within said grooves.

6. In a stapling device, a staple magazine comprising a bottom wall and upwardly extending side walls, said side walls being formed with longitudinally extending inwardly projecting channels and inwardly bent front walls, the front ends of the channels terminating short of said front walls and forming guide grooves therewith, a cover having side walls, a top wall and connected to the staple magazine for up and down movement relating thereto, a combination driver and spring member attached to the underside of the top wall of the cover and having at one end a downwardly extending driver arm received within said guide grooves, and at the other end a rearwardly and downwardly inclined spring arm engaged with the staple magazine.

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