

May 18, 1954

C. M. LINDSTROM
FASTENER-APPLYING IMPLEMENT

2,678,443

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3 Sheets-Sheet 1

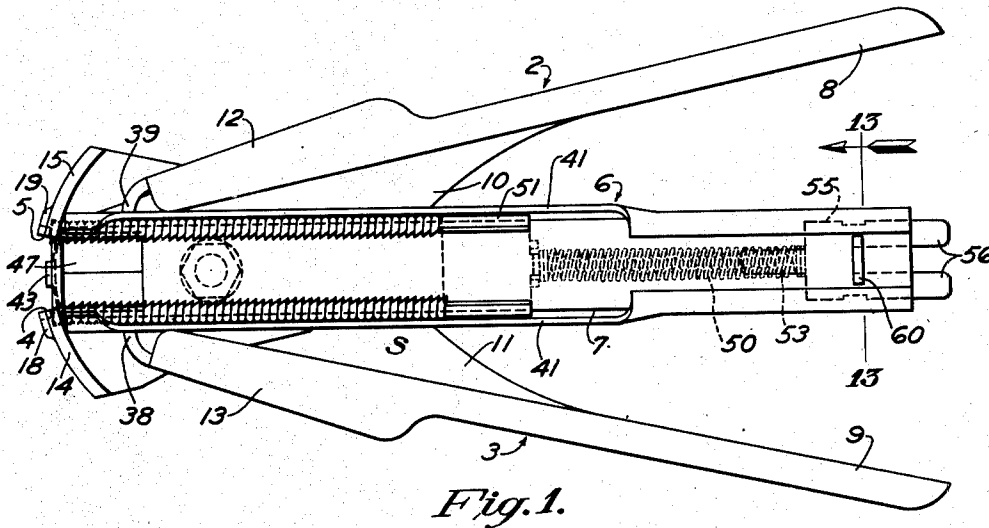


Fig. 1.

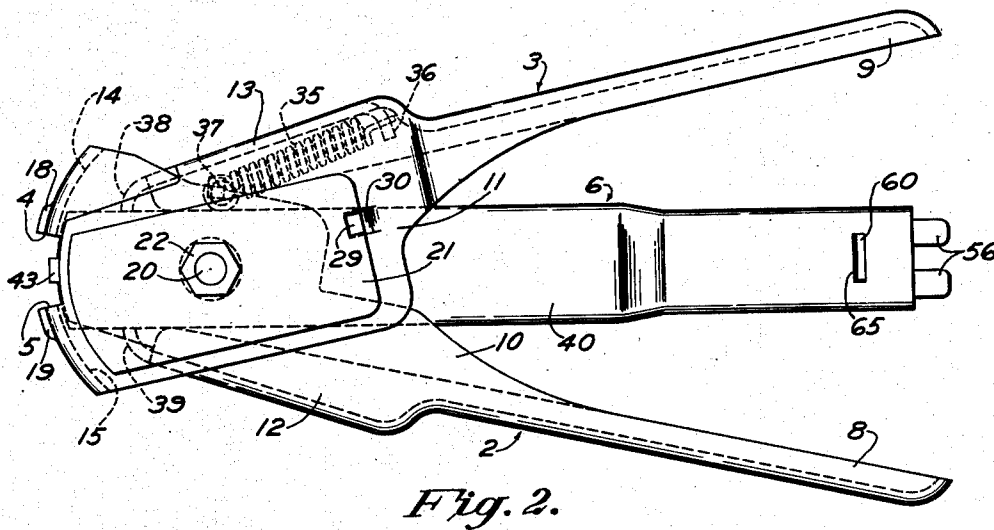


Fig. 2.

Inventor:
Charles M. Lindstrom
By *Wm. H. Sullivan*
Attorneys.

May 18, 1954

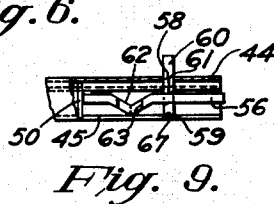
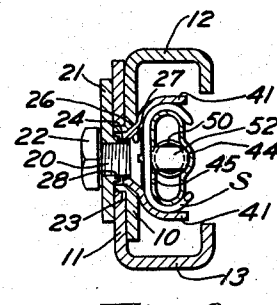
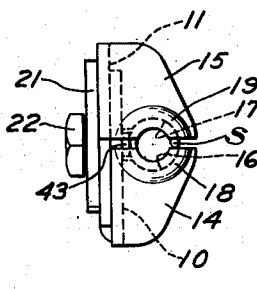
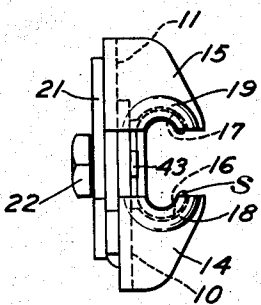
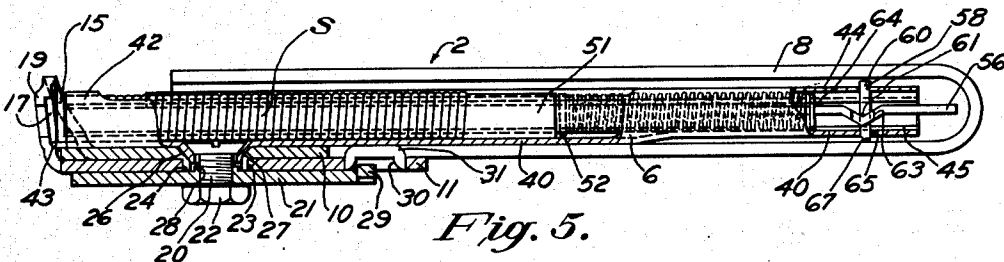
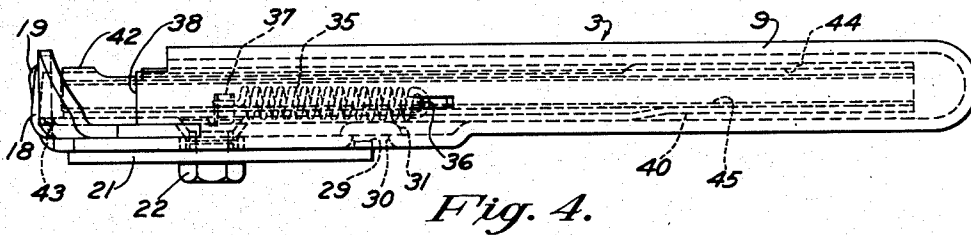
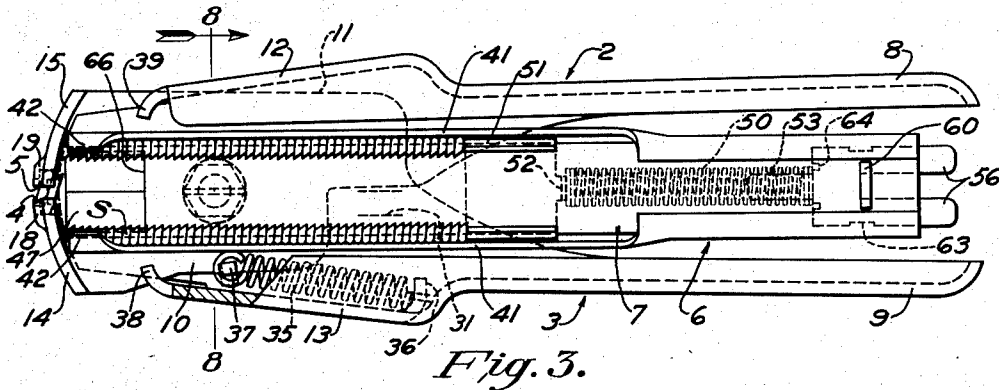
C. M. LINDSTROM

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FASTENER-APPLYING IMPLEMENT

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3 Sheets-Sheet 2



Inventor:
Charles M. Lindstrom
By *Armington and White*
Attorneys.

May 18, 1954

C. M. LINDSTROM

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FASTENER-APPLYING IMPLEMENT

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3 Sheets-Sheet 3

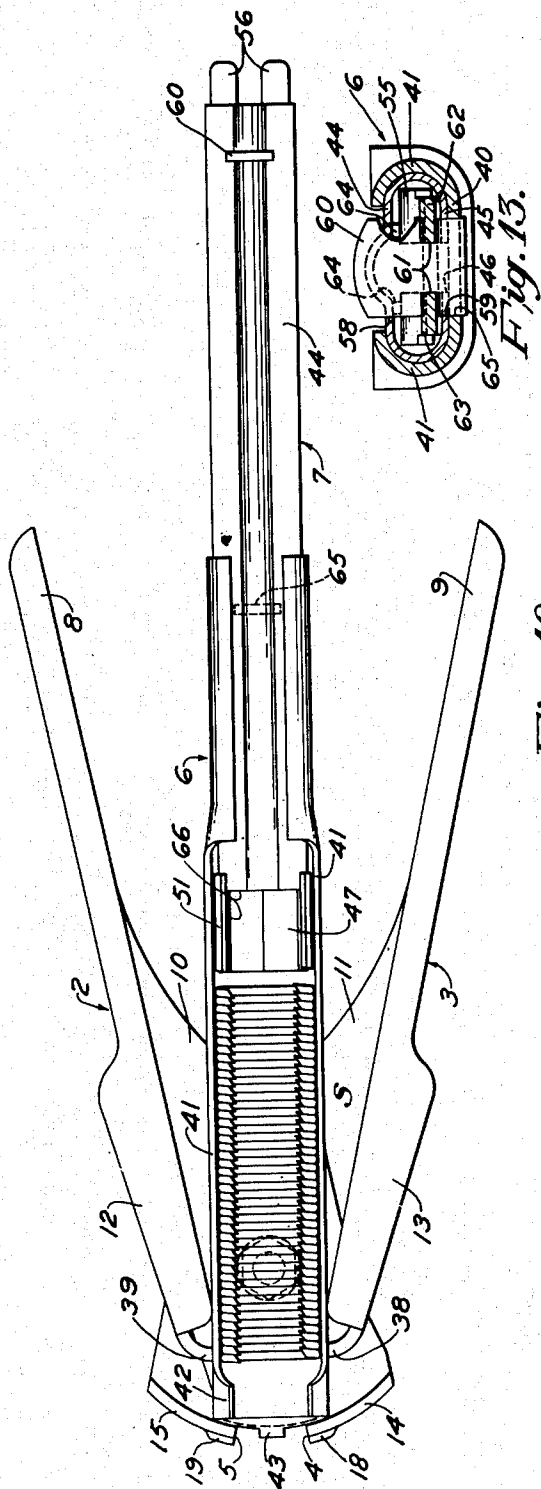


Fig. 10.

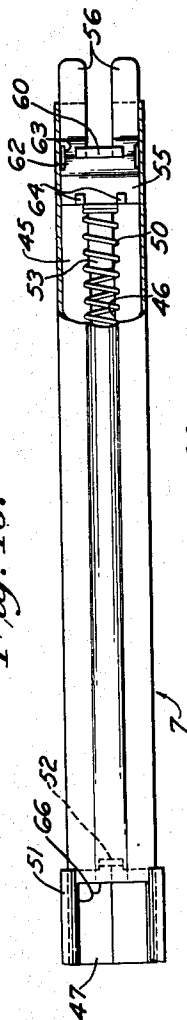


Fig. 11.

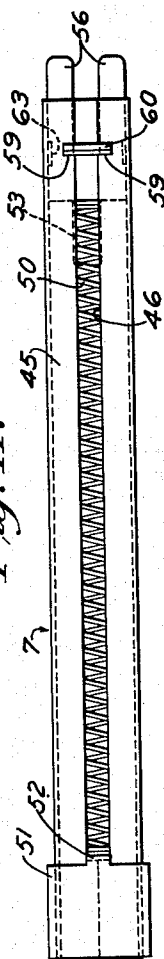


Fig. 12.

Inventor:
Charles M. Lindstrom
By *Samuel J. Lindstrom*
Attorneys.

UNITED STATES PATENT OFFICE

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FASTENER-APPLYING IMPLEMENT

Charles M. Lindstrom, Westerly, R. I., assignor,
by mesne assignments, to Bostitch, Inc., a corporation of Rhode Island

Application March 13, 1947, Serial No. 734,298

9 Claims. (Cl. 1—187)

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This invention relates to an improved manually-operable staple-applying implement in the form of pliers for bending the legs of preformed staples to clinch their ends into overlapping contiguous relationship and form them into closed loops or rings.

One object of the invention is to provide an implement of the type indicated adapted for various uses such as packaging small articles by binding them together in a bundle or attaching them to cards; fastening the coil-springs of upholstery to a base or to the textile covering in the manufacture of seats and cushions; binding together meshed strands of wire or the like at their crossing points to form fencing or screening; and for a multitude of other uses too numerous to mention.

Another object is to provide an implement of the type indicated comprising pivotally-connected plier-like handles having opposed jaws at their forward ends for bending the legs of the staples into overlapping clinched relationship and embodying a hollow magazine for containing a relatively large supply of staples attached in parallel relationship in a stick or refill with resiliently-operated means for feeding the staples to the jaws of the implement.

Another object is to provide an implement of the type indicated in which the staple-feeding means may be retracted in the magazine for conveniently loading the staples therein through an open side of the magazine.

Another object is to provide an implement of the type indicated having a staple-support or core adapted to be withdrawn through the magazine to open it for insertion of the staples therein and thereafter being shiftable through the staples to hold them in place in the magazine for feeding to the clinching jaws.

Another object is to provide manually-releasable means for locking the staple-core in place after it has been inserted through the staples in the magazine.

Another object is to provide an implement of the type indicated having staple-feeding means in the nature of a spring-operated pusher which may be retracted with the staple-core for loading the magazine with staples.

Another object is to provide means for readily disassembling the staple-core and pusher from the magazine for convenience in repairing or replacing the parts.

Another object is to provide an implement of the type specified that may be manufactured from parts struck up from sheet-metal and as-

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sembled without the use of screws, pins or the like except for a single pivot-stud or bolt.

Another object is to provide an implement of the type specified comprising a minimum number of elements and durable over long periods of use without requiring repair or replacement of its parts.

Further objects of the improvement are set forth in the following specification describing a preferred form of construction of the implement, by way of example, as illustrated by the accompanying drawings. In the drawings:

Fig. 1 is a plan view of the implement showing its magazine loaded with a supply of preformed staples having curved or arcuately-shaped legs adapted to be clinched together in overlapping relationship to form a closed loop or ring;

Fig. 2 is a similar view showing the implement in reversed or inverted position;

Fig. 3 is a view showing the implement in the same position as in Fig. 1, but with its plier-handles actuated to closed their jaws together to clinch a staple fed thereto from the magazine;

Fig. 4 is a side elevation of the implement corresponding to Fig. 3;

Fig. 5 is a view of the implement similar to Fig. 4 showing certain of its parts in section in a plane common to its longitudinal axis;

Fig. 6 is a front view of the jaws of the implement shown in open relationship;

Fig. 7 is a front view of the jaws shown in closed relationship;

Fig. 8 is a transverse sectional view on line 8—8 of Fig. 3;

Fig. 9 is a detailed view of the latching means for the staple-core for fastening it in the magazine;

Fig. 10 is a view showing the implement with the staple-core and pusher withdrawn for opening the magazine to receive a supply of staples;

Fig. 11 is a part-sectional plan view of the core showing the latching means for fastening it in the magazine;

Fig. 12 is a similar view showing the core in reverse position; and

Fig. 13 is an enlarged transverse sectional view of the latching means for the core taken on line 13—13 of Fig. 1.

The present improved stapling implement comprises, in general, a pair of plier-handles 2 and 3 pivoted together for rocking motion toward each other and formed at their forward ends with opposed jaws 4 and 5 for bending the legs of the staple into overlapping clinched relationship to form the staple into a closed ring. Mounted

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between the opposite handle-members 2 and 3 of the implement and extending rearwardly from the jaws 4 and 5 for a considerable distance is a hollow magazine 6 open on its side for receiving the staples *s*; and slidable therein is a support or staple-core 7 adapted to extend through the whole series of staples to hold them in the magazine.

The plier-members 2 and 3 are of substantially the same form, being constructed from sheet-metal with concavo-convex handles 8 and 9 at one end merging into wider flat flanges 10 and 11 adapted to overlie one another for pivotal connection as indicated more particularly in Figs. 2 and 5. On their opposite sides the handle-members 2 and 3 have narrower flanges 12 and 13 folded inwardly in opposite parallel relation to the flanges 10 and 11. The wider flanges 10 and 11 are formed at their ends with extensions 14 and 15 bent or folded at right-angles thereto and of generally arcuate shape in edge view as shown most clearly in Fig. 1, these extensions forming the jaws 4 and 5 of the implement and being provided with circular recesses 16 and 17 in their opposed edges, see Fig. 6. The recesses 16 and 17 are formed by swaging the metal to cause it to be projected outwardly at the front of the jaws in convex semicircular flanges 18 and 19, see Figs. 3 and 5; and each recess is offset at an angle to the opposite recess to accommodate the offset legs of the staples *s* which extend in opposite angularly-inclined planes. The flanges 18 and 19 prevent the staples *s* from passing through the jaws when they are fed into the recesses 16 and 17 and between their edges is a circular opening, see Fig. 7, for receiving the work to be stapled.

The plier-members 2 and 3 are pivoted together by means of a stud 20 passing through their overlying flat plate-portions or flanges 10 and 11. Referring to Figs. 2 and 4, a rectangularly-shaped flat plate 21 is clamped against the flange 11 on the member 3 by a nut 22 screwed onto the stud 20. The flange 10 of the plier-member 2 underlies the bottom wall of the hollow magazine 6, considering the implement as in the position shown in the two views of Figs. 1 and 4. The flange 11 of the member 3 is provided with an enlarged circular hole 23 for receiving the stud 20, and a similar hole in the flange 10 of the member 2 is surrounded by a cylindrical neck 24 which fits into the hole 23, see Fig. 5, to form a pivot bearing for the two handle-members. The opening through the flanged neck 24 is beveled on its sides at 25 for receiving a beveled or conical neck 27 formed up from the bottom wall of the magazine 6. The plate 21 is swaged around the hole for the stud 20 to form a cylindrical flange 28 providing an extended bearing tapped with screw-threads for engagement with the threads of the stud. By this form of construction an especially secure pivot-joint is provided between the parts of the implement, the stud 20 being adjustable in the threaded opening of the plate 21 to permit free movement of the two handle-members 2 and 3 with the nut 22 serving to lock the parts in their adjusted relationship. The nut 22 has a circular washer-face on its engaging side, see Fig. 5, for binding it against the face of the plate 21.

The plate 21 is prevented from turning on the stud 20 by means of a finger or lug 29 formed by indenting the metal of the plate to force the lug into a recess 30 in the flange 11 on the plier-member 3. The recess 30 is formed by indenting

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the metal of the flange 11 to force out a projection 31 adapted to serve as a detent for engagement with the edge of the flange 10 on the member 2, whereby to limit the pivotal movement of said members when they are closed together, see dotted lines in Fig. 3. The provision of such detent-means is for the purpose of preventing the jaws 4 and 5 from striking together when the instrument is operated to apply the staples to the work, thus avoiding injury to the flanged recesses in the jaws which hold the staple being operated upon. A helical spring 35, see Figs. 2 and 3, located within the hollow at the forepart of the member 3 is connected between the handle-members to hold them normally in spaced apart relationship as shown in Fig. 2 with their jaws 4 and 5 open. One end of the spring 35 is anchored to a lug 36 bent inwardly from the lateral wall of the member 3 and its opposite end is hooked around a lug 37 bent upwardly from the edge of the flange 10 of the handle-member 2. The movement of the handle-members 2 and 3 under the tension of the spring 35 is limited by projecting portions 38 and 39 of the lateral walls of the members curled around to adapt their ends to impinge against the side walls of the magazine 6, see Fig. 1.

The hollow staple-magazine 6 is constructed from sheet-metal struck up in dies or formed by bending operations in the manner as next explained. Considering the magazine, as in the loading position illustrated in Figs. 1, 3, 4 and 5, it comprises a relatively flat bottom wall 40 and lateral walls 41 bent upwardly therefrom in arcuate form to correspond to the arcuate shape of the legs of the preformed staples *s*, see Fig. 8. The forward portion of the magazine 6, including the greater part of its length, forms a hollow receptacle open at the top for insertion of the staples *s* that are generally connected together in parallel contiguous relationship by means of an adhesive to provide a stick or refill as is usual in the art. Throughout this forward part of the magazine 6 the walls 41 are curved only at the bottom, continuing toward the top in straight portions, see Fig. 8, to provide a relatively wide entrance for the staples *s* in placing them in the magazine. At its forward end, however, the side walls 41 are continued around in relatively short portions 42 to overlie the terminal portions of the legs of the staples, see Fig. 3, so as to guide the foremost staple into the jaws of the implement when the stick is first placed in the magazine before the core 7 has been inserted there-through. A lug 43 projects forwardly from this end of the magazine 6 above the opening between the jaws 4 and 5 to overlie each staple and prevent its straight portion from arching upwardly as it is being formed into a ring, see Figs. 2 and 6. The bottom wall 40 of the magazine 6 is elevated or offset upwardly toward its rearward end, viewing it in the position shown in Figs. 4 and 5, to form a rest for the staple-core 7 while its lateral walls 41 are bent into substantially semicircular form to overlie the core at the top, thus forming a guideway for the core to support it in place in line with the staples in the magazine.

The staple-support or core 7 is constructed from sheet-metal of somewhat lighter gauge than that of the magazine 6, being of hollow elliptical form in cross-section as shown more particularly in Fig. 8. The core 7 comprises a closed top wall 44 curled around in semicircular form at the sides and continued inwardly in bottom portions 45 arranged with their edges spaced apart to

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form a slotted opening 46 extending throughout the greater portion of the length of the core as shown in Fig. 12. At its forward end, however, the bottom portions 45 are continued inwardly for a short distance longitudinally of the core to meet at the center, thus forming a closed partial bottom wall 47. The top wall 44 is convexed or crowned upwardly at the center along its entire length as shown in Figs. 8 and 11 to provide clearance for a helically-coiled spring 50 which serves as the resilient means for advancing the staple-pusher 51 in the magazine 6. The pusher 51 is constructed from sheet-metal with a flat bottom and rolled over arcuate side portions for embracing the semicircular sides of the core 7 to slide longitudinally thereof. Projecting upwardly from the bottom of the pusher 51 is a lug 52, see Figs. 5 and 8, having its upper end rounded to fit within the crowned portion of the core 7 and serving as an abutment to take the thrust of the spring 50.

The rearward end of the pusher-spring 50 engages around a relatively narrow tongue 53 which projects forwardly from a manually-operable slide 55 for actuating the latching means which locks the core 7 in place in the magazine 6, see Fig. 11. The rearward portion of the slide 55 is bifurcated to form two parallel legs 56 which normally project outwardly beyond the rearward end of the core 7 and are rounded at their ends to provide a smooth surface for contact with the finger or thumb of the operator. Referring to Figs. 5, 11 and 13, a flat latch 60 is mounted to slide vertically in a slot 58 adjacent the end of the crowned top wall 44 of the core 7 with its lower portion engaging through a pair of slots 59 in the edges of the spaced sides of the bottom wall of the core, see Fig. 12. Referring to Fig. 13, the latch 60 has slots or notches 61 cut into its sides through which the legs 56 of the slide 55 project, the edges of these notches being inclined slightly as shown in Fig. 9 to adapt them to be engaged with angular cam-portions 62 on the legs 56 of the slide 55. These cams 62 are formed by crimping or bending the legs 56 of the slide 55 into V-shaped portions. The outer lateral edges of the cams 62 are cut away or slotted at 63 to clear the interior curved walls at the sides of the core 7 while the bottom of the V-shaped cams rest on the opposite side portions 45 of the core, see Fig. 9. A pair of lugs 64 project upwardly from the slide 55 in engagement with the top wall 44 of the core 7 at the sides of its crown, see Figs. 11 and 13, to cooperate with the bottom of the cams 62 for guiding the slide in its movement in the rearward end of the core. The pusher-spring 50 normally acts against the inner end of the slide 55, tending to maintain it in its rearward position shown in Figs. 11 and 12, the end of the opening between the legs 56 of the slide engaging against the latch 60 to limit its rearward movement under the tension of the spring. In this normal position of the parts the latch 60 engages through a slot 65 in the bottom wall 40 of the magazine 6 to lock the core from longitudinal displacement in the magazine after it has been pushed through the staples s. The lower forward edge of the latch 60 may be slightly beveled at 67 to facilitate its engagement through the slot 65. To release the core 7 the slide 55 is pushed into the end of the core by pressure of the thumb or finger on the end of its legs 56, thereby causing the cams 62 to raise the latch 60 into the position shown in Fig. 9 to disengage its lower end from the slot 65 in the bottom of

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the magazine 6. When thus released the core 7 may be slid rearwardly through the guideway at the end of the magazine 6 to open the latter as shown in Fig. 10 for loading the implement with staples. It will be understood that the staple-pusher 51 will be withdrawn with the core 7, it being limited in its forward movement thereon by its lug 52 striking against the end of the opening 46 in the bottom of the core 7 through which it projects. It is further to be noted that the top wall of the core 7 is cut away at its forward end to provide an open space, indicated at 66 in Figs. 10 and 11, corresponding substantially to the length of the pusher 51. This open space 66 is for the insertion of the work through and inwardly beyond the jaws 4 and 5 of the implement; that is, to accommodate the parts to be connected by the staples.

The method of operation of the improved implement is explained as follows: The most convenient position of the implement for loading it with staples is represented in Figs. 1, 3, 4 and 10 of the drawings, that is with the open side of the magazine 6 exposed to view at the top. The core 7 is first released and withdrawn in the magazine 6 as indicated in Fig. 10 by pressing against the end of the slide 55 to raise the latch 60 and disengage it from the slot 65 in the bottom of the magazine. The staple-pusher 51 is retracted with the core 7 to expose the greater part of the opening in the top of the magazine 6 so that a stick or strip of staples s may be conveniently placed therein to rest on its bottom wall. Then, by sliding the core 7 forwardly the pusher 51 will engage the rearward end of the staple-stick to slide the latter forwardly and enter its foremost staple s into the recesses 16 and 17 in the opposed jaws 4 and 5 on the handle-members 2 and 3. At this juncture the foremost staples in the stick will be prevented from rising in the magazine 6 by the overhanging portions 42 of the side walls at its forward end which overlie the ends of the staple legs. Continued forward sliding movement of the core 7 will insert it through the whole series of staples to support them thereon in whatever position the implement may be held. As the forward end of the core 7 is carried into position at the rear of the jaws 4 and 5 the slide 55 is held telescoped within the outer end of the core by the pressure of the finger to maintain the latch 60 raised. Then as the lower end of the latch 60 comes into register with the slot 65 in the bottom wall of the magazine 6 the slide 55 is released, whereupon the pusher-spring 50 will force it rearwardly from its position shown in Fig. 9 to that illustrated in Fig. 5. During this rearward movement of the slide 55 its cams 62 will enter the inclined slots 61 at the sides of the latch 60 to force it down through the slot 65 in the bottom of the magazine 6 to lock the core 7 thereto. In this locking position of the latch 60 the end of the opening between the bifurcations or legs 56 of the slide 55 brings up against the side of the latch to restrain the slide from further rearward movement under the tension of the spring 50.

The implement may be loaded in the manner explained above with the greatest convenience and facility whereof it may be operated in any desired position, either horizontal, vertical or at any angle thereto, to apply the staples to the work. The foremost staple in the stick is advanced to position between the jaws 4 and 5 by the action of the pusher 51, urged by the spring 50, with the curved and inclined legs of the

staples in the angularly-related recesses 16 and 17 of the jaws. By pressing on the handles 8 and 9 the members 2 and 3 may be rocked about the axis of the pivot-stud 20 to close the jaws 4 and 5 toward each other whereby to bend or curl the legs of the staple *s* with one leg sliding past the other into overlapping relation therewith as shown in Fig. 3 of the drawings. The forming and clinching of the staples in this manner may be effected to apply them around a series of articles for packaging them or attaching the articles to a display card, or the implement may be used for many other purposes such as binding crossing strands of wire together in manufacturing fencing, screening and the like. A particular use for which the implement is adapted is to fasten upholstery springs to a support in seats, cushions or mattresses. The implement may be operated continuously to apply the large supply of staples contained in the stick or refill and when the supply is exhausted the magazine may be opened conveniently and the staples loaded therein with the greatest facility.

Should it be required to remove the core 7 from the implement, this may be accomplished after the magazine 6 is emptied by sliding the core forwardly through the open jaws 4 and 5 after the latch 60 has been released. After the end of the core 7 has been slid past the overhanging portions on the lateral walls of the magazine 6 at its rearward end, this end of the core may be lifted and the core drawn rearwardly to release its forward end from the overhanging portions 42 on the magazine. The assembling of the core 7 in the implement is accomplished by reversing the order of these operations. The magazine 6 and handle-members 2 and 3 may be readily disconnected by removing the nut 22 and unscrewing the stud 20. Thus, the present novel and ingenious construction of the implement provides for easy assembling of its parts during its manufacture and also convenient disassembling of its elements for repair or replacement.

From the above specification it will be observed that the present improved implement is extremely simple in design; of strong and sturdy construction; not liable to dislocation or breakage of its parts; and durable in use over long periods of time without requiring repair or replacement of its elements. While the implement is herein shown and described as embodied in a preferred form of construction, it is to be understood that modifications may be made in the shape and arrangement of its parts without departing from the spirit or scope of the invention. Therefore, without limiting myself in this respect, I claim:

1. In a stapling implement, a hollow magazine having an opening in its side for the insertion of a supply of staples, a staple-core slidable in the magazine between the legs of the staples to sustain them in the magazine, a latch on the staple-core for engagement with the magazine to lock the staple-core in place therein, a slide slidable within the hollow core and formed with bifurcated legs engaging through slots in the sides of the latch, said legs formed with cams for actuating the latch, and a spring for sliding the slide in the core to cause the cams to engage the latch with the magazine.

2. A hollow core for stapling implements having a closed top wall continued downwardly and inwardly to form a bottom wall closed at its forward end with a slot extending longitudinally therefrom throughout the remainder of its

length, a staple-pusher underlying the bottom of the core with its sides extending upwardly to embrace the sides thereof, said pusher having a lug projecting through the slot in the core, and a helical spring within the core held at the rearward end thereof and engageable with the lug on the pusher to slide the latter forwardly along the core, said lug on the pusher being engageable with the end of the slot in the bottom of the core to limit the sliding motion of the pusher under the tension of the spring.

3. In a stapling implement, a hollow magazine for containing a supply of staples arranged therein in parallel contiguous relationship, said magazine having an opening on one side for insertion of the staples, a core slidably longitudinally in the magazine to uncover its opening and in the opposite direction for insertion through the whole series of staples therein to retain them in place in the magazine, means on the magazine engaging the core to retain it in the magazine in slidable relation thereto, a pusher embracing the core and slidable thereon to feed the staples forwardly in the magazine, a spring contained within the core for sliding the pusher forwardly in the magazine, a latch for locking the core in operative position in the magazine, and a manually-operable slide having camming means for releasing the latch, said spring for the pusher normally acting against the slide to cause it to maintain the latch in interlocking engagement with the magazine.

4. In a stapling implement, a hollow magazine open along its side for receiving a supply of staples arranged in parallel contiguous relationship, a hollow core slidably mounted in the magazine to adapt it to be inserted through the staples to hold them in place and retractible to permit loading the magazine, means on the magazine engaging the core to slidably retain it in the magazine, a staple-pusher slidable on the core, a spring contained within the core and operative on the staple-pusher to feed the staples forwardly in the magazine, a manually-operable slide within the rearward end of the core formed with camming means, and a latch slidable through slots in the core for engagement with a slot in the end of the magazine, said slide operative by the pusher-spring to cause its camming means to engage the latch with the slot in the magazine to lock the core from longitudinal movement therein.

5. In a stapling implement, a coverless magazine for containing a supply of staples arranged in parallel contiguous relationship therein, said magazine being substantially channel-shaped to provide an opening on its under side extending throughout the greater portion of its length through which a stick of connected staples may be bodily inserted in a lateral direction transversely thereof, a hollow core slidably longitudinally of the magazine to adapt it to be retracted to uncover the opening therein and slidable into the magazine to close the opening and pass it through the whole series of staples in the stick to support them in feeding position straddling its sides with their heads resting against the core, flanges engaging between the magazine and core for retaining the core therein, a pusher slidably embracing the core, said pusher being movable with the core when the latter is retracted for loading the staples into the magazine, and resilient means for sliding the pusher on the core to feed the staples therealong.

6. In a stapling implement, a hollow maga-

zine having an opening on its under side extending throughout the greater portion of its length with flanges at one end projecting inwardly on its open side forming a guideway, a hollow core slidably longitudinally within the magazine and held in place by the flanges of the guideway, means to latch the core to the magazine, said latch being releasable to adapt the core to be retracted in the magazine for inserting a whole stick of connected staples through its open side in a lateral direction transversely thereof, a pusher slidable on the core for feeding the staples therealong, a spring for sliding the pusher to feed the staples to the applying means, and means engaging between the core and pusher for retracting the pusher when the core is retracted to open the side of the magazine for loading the staples thereinto.

7. In a stapling implement, a channel-shaped sheet-metal magazine having an opening on its under side extending throughout the greater portion of its length, a hollow sheet-metal core shaped to adapt it to slide within the magazine in close fitting relation to its interior and adapted to be retracted to uncover the opening in the magazine for loading a whole stick of connected staples thereinto by moving them laterally transversely through the opening, means on the magazine engaging the core to slidably sustain the core in the magazine, said core adapted to be slid into the magazine to insert it through the whole series of staples in the stick held therein to prevent them from escaping through the opening on its under side, a pusher slidable along the core, and resilient means for sliding the pusher forwardly along the core.

8. In a stapling implement, a channel-shaped magazine for containing a supply of staples arranged in parallel contiguous relationship therein, said magazine having an opening on its under side extending throughout the greater portion of its length through which a whole stick of connected staples may be bodily inserted into the magazine in a lateral direction transversely thereof, a hollow core slidable rearwardly in the magazine to retract it therein for loading the staples through the opening and slidable into the magazine to insert it through the whole series of staples contained therein with their legs straddling its sides and their heads resting thereagainst whereby said core substantially closes the opening in the magazine, said magazine having inwardly extending flanges to retain said core,

a pusher slidable on the core, a spring extending longitudinally within the core for sliding the pusher to feed the staples forward, means engageable between the core and pusher to cause the latter to be retracted in the magazine when the core is slid rearwardly to open the latter, and means for latching the core in the operative position within the magazine.

9. In a stapling implement having means for applying the staples to the work, a channel shaped magazine for containing a supply of staples arranged in parallel contiguous relationship therein, said magazine having an opening on its under side and extending throughout the greater portion of its length, through which a whole stick of connected staples may be bodily inserted into the magazine in a lateral direction transversely thereof, a hollow core slidable rearwardly in the magazine to retract it therein for loading the staples through the opening and slidable into the magazine to insert it through the whole series of staples contained therein with their legs straddling its sides and their heads resting thereagainst whereby said core substantially closes the opening in the magazine, said magazine having inwardly extending flanges to retain said core, a pusher slidable on the core, a spring extending within the core for sliding the pusher to feed the staples forwardly to the staples applying means, means engageable between the core and pusher to cause the latter to be retracted in the magazine when the core is slid rearwardly to open the latter, and means for latching the core in operative position within the magazine.

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