

June 6, 1939.

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2,161,449

FASTENER APPLYING IMPLEMENT

Filed July 22, 1937

3 Sheets-Sheet 1

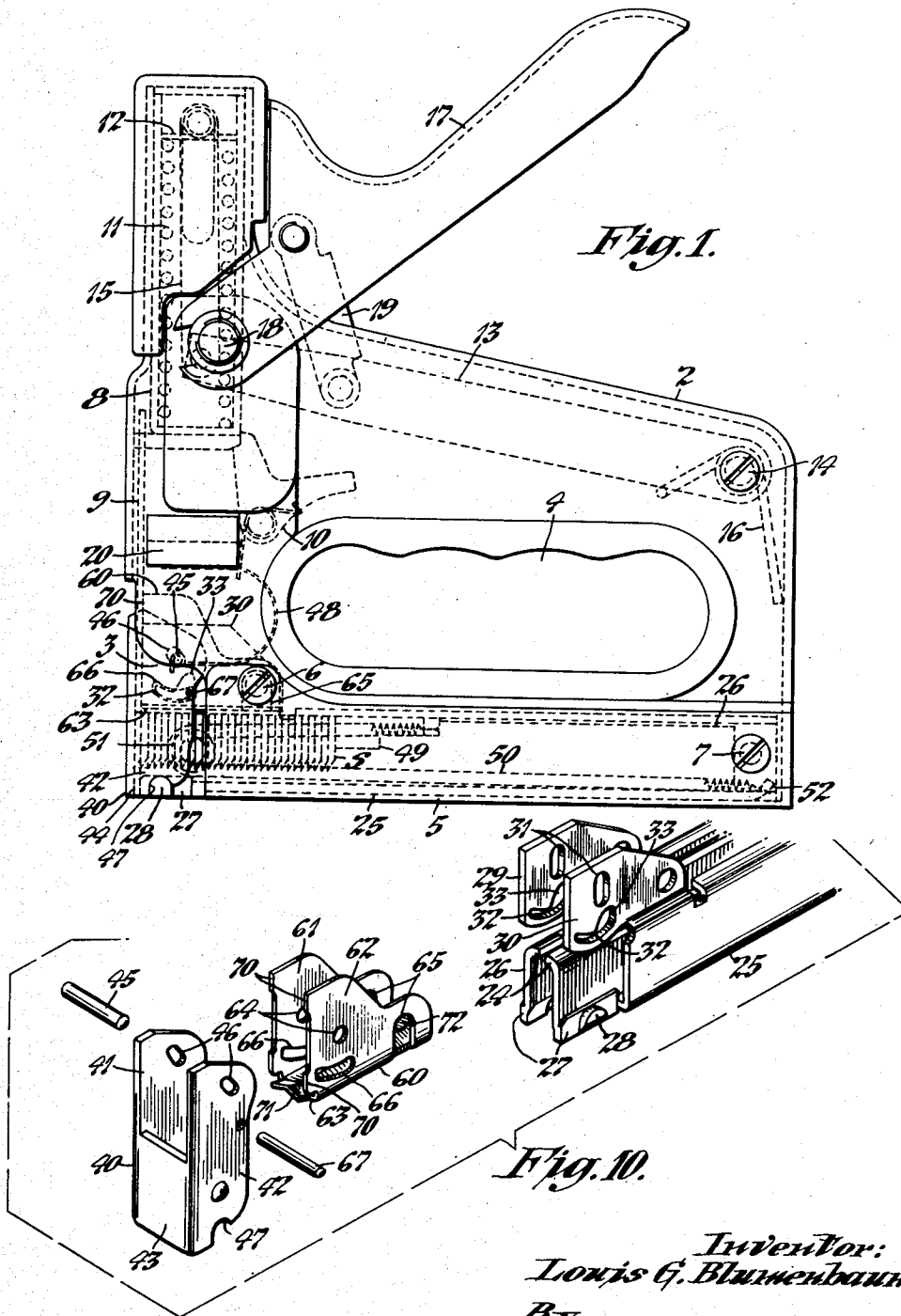


Fig. 10.

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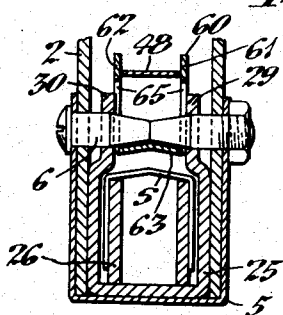
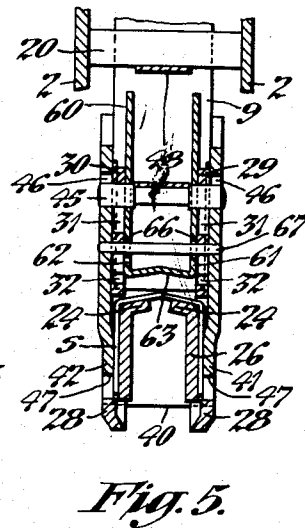
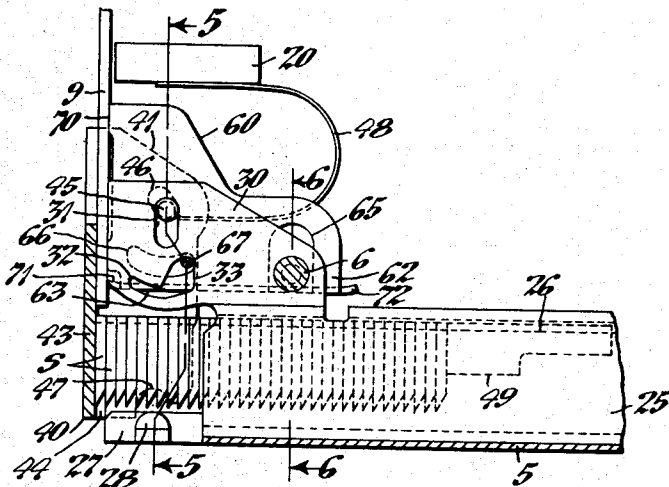
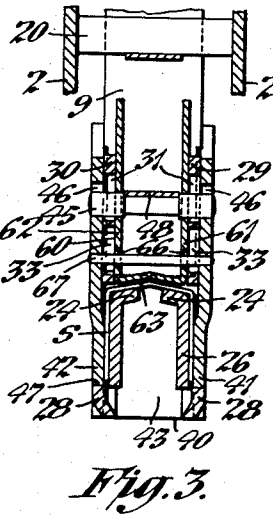
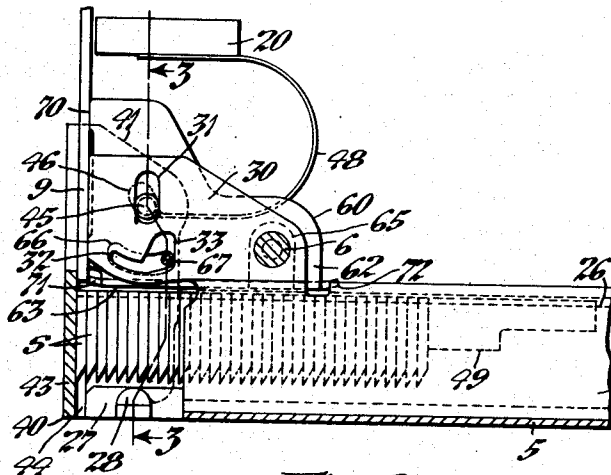
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FASTENER APPLYING IMPLEMENT

Filed July 22, 1937

3 Sheets-Sheet 2



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FASTENER APPLYING IMPLEMENT

Filed July 22, 1937

3 Sheets-Sheet 3

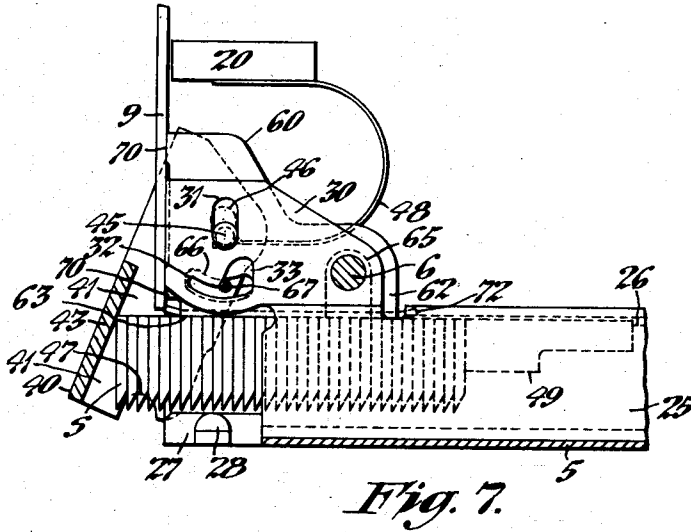


Fig. 7.

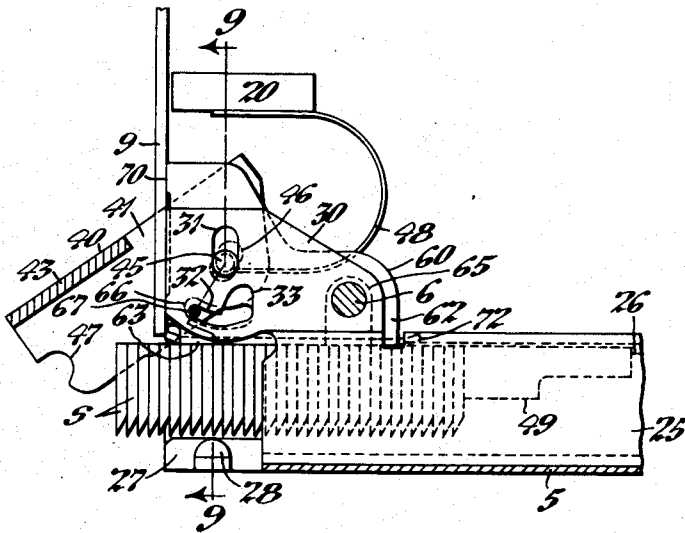


Fig. 8.

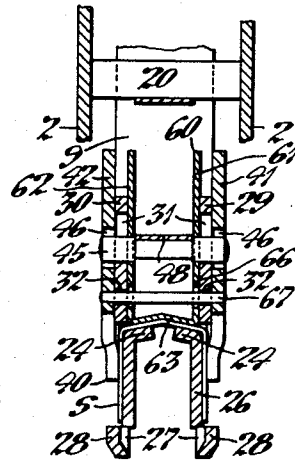


Fig. 9.

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UNITED STATES PATENT OFFICE

2,161,449

FASTENER APPLYING IMPLEMENT

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Application July 22, 1937, Serial No. 154,997

11 Claims. (Cl. 1—49)

This invention relates to fastener-applying implements of the type in which the fasteners are supplied to a magazine at its end and more particularly to an automatically-operated retainer for preventing ejection of the fasteners when the magazine is opened.

One of the objects of the present invention is to provide an implement of the type indicated having a novel form of fastener-retainer which is not liable to become inoperative from wear.

Another object of the invention is to provide a fastener-retainer of the type indicated having an extended face engageable with the fasteners to hold the latter by frictional contact thereon.

Another object of the invention is to provide a retainer of the type indicated which is yieldingly urged into frictional contact with the fasteners and actuated by the closing of the closure for the magazine to release the fasteners.

Still another object of the invention is to provide a retainer of the type indicated which is of simple and compact construction, positive and efficient in performing its intended function and one which is adapted for use over long periods of time without requiring repair or replacement.

Further objects of the improvement are set forth in the following specification which describes a preferred embodiment of the invention, by way of example, as illustrated by the accompanying drawings. In the drawings:

Fig. 1 is a side elevation of a fastener-applying implement incorporating the present invention;

Fig. 2 is a longitudinal sectional view of the forward end of the magazine of the implement showing the fastener-retainer held by the magazine-closure free from engagement with the fasteners;

Fig. 3 is a transverse sectional view on line 3—3 of Fig. 2 showing the retainer with its bottom face raised above the fasteners;

Fig. 4 is a view similar to Fig. 2 showing the magazine-gate or -closure raised to release its latching means;

Fig. 5 is a transverse sectional view on line 5—5 of Fig. 4 showing the position of the retainer when the gate is raised;

Fig. 6 is a transverse sectional view on line 6—6 of Fig. 4 showing the construction of the magazine and the relationship of the parts therein;

Fig. 7 is a view similar to Figs. 2 and 4 showing the magazine-gate rocked about its pivot toward its open position with the retainer in frictional engagement with the fasteners;

Fig. 8 is a view similar to Fig. 7 showing the gate rocked to its extreme open position and restrained from vertical movement;

Fig. 9 is a transverse sectional view on line 9—9 of Fig. 8 showing the retainer yieldingly held in frictional contact with the fasteners; and

Fig. 10 is a detailed perspective view of the parts at the forward end of the magazine shown in disassembled relationship.

The fastener-retaining means constituting the subject-matter of the present invention is illustrated in the accompanying drawings as applied to an implement of the type shown and described in a copending application for United States Letters Patent of John Cavanagh, Serial No. 144,406, filed May 24, 1937. Such implements are employed for applying U-shaped staples to the work, but it is to be understood that the invention may be used with other types of implements or with similar devices for applying other forms of fasteners.

The stapling implement as herein illustrated is of the type commonly known as a "tacker" for use in attaching labels, tags and the like to articles of commerce and for various other purposes. It comprises a hollow two-part casing 2 having an opening 3 at its lower front end and an opening 4 thereabove which serves as a finger-grip. The bottom of the casing 2 is closed by a U-shaped channel-member 5 having parallel side walls overlapping the sides of the casing and held in place by transverse bolts 6 and 7, see Figs. 1 and 6. A hollow plunger 8 of rectangular shape in cross-section is mounted to reciprocate in the forward part of the hollow casing 2 and is connected to a blade-like staple-driver 9. The plunger 8 is normally held in raised position as illustrated in Fig. 1 by a pivoted latch 10. A compression spring 11 is positioned in the hollow plunger 8 with its lower end bearing against the bottom of the plunger and its upper end against a follower 12 movable longitudinally thereof. The follower 12 is adapted to be actuated by a lever 13 extending longitudinally within the casing 2. The lever 13 is pivotally mounted at its rearward end on a pin 14 extending transversely of the casing 2, being connected at its forward end to the follower 12 by means of a pair of links 15. A hairpin-shaped spring 16 coiled about the ends of the pin 14 has its looped portion bearing against the under side of the lever 13 with its opposite bifurcated end bearing against the casing 2, thereby tending to rock the lever in a clockwise direction as viewed in Fig. 1. The lever 13 is adapted to be rocked in a counterclockwise direction by a manually-operated lever 17 pivoted at its forward end on trunnions 18 extending transversely of the casing 2. For this purpose the lever 17 is connected to the lever 13 by means of a bifurcated link 19. A yielding abutment 20 of any suitable construction extends transversely of the casing 2 below the bottom of the plunger 8 to serve as a buffer therefor.

A self-contained magazine unit is mounted in the hollow casing 2 and preferably it comprises a U-shaped trough-like member 25 having an inner

support or core 26 for the fasteners extending longitudinally therein, see Fig. 6. The member 25 has its bottom seated on the bottom of the channel-member 5 and is held in place in the casing 2 by the bolts 6 and 7 which extend therethrough. The member 25 of the magazine terminates at the forward end of the channel-member 5 adjacent the edge of the bottom opening 3 in the casing 2. The inner fastener-support or core 26 is comprised of vertical spaced-apart plates which are suitably secured to the bottom of the member 25 and project forwardly beyond the end thereof into the opening 3 in the casing 2. The forwardly-projecting ends of the plates constituting the fastener-support or core 26 have offset depending flanges 27, see Fig. 10, which project downwardly to align their bottom edges with the bottom of the member 5. Inwardly-directed flanges 24 at the upper edges of the plates cooperate to form a bridge for supporting the crossbars of the fasteners when these are in the form of U-shaped staples s, see Figs. 5 and 10. The depending flanges 27 are offset laterally of the sides of the support or core 26 and are provided with laterally-projecting lugs 28 employed for a purpose as later explained. The core 26 is adapted to support staples s straddled across its top and held in place thereon by the inwardly offset sides of the U-shaped member 25.

Stanchions 29 and 30, formed integrally with the side walls of the U-shaped member 25, project upwardly and forwardly to overhang the forward end of the core 26. The opposite stanchions 29 and 30 are provided with aligned vertical slots 31 and arcuate slots 32 therebelow. At their rearward ends the arcuate slots 32 merge into wider openings 33 to provide a clearance space for a purpose as hereinafter explained.

The forward end of the magazine may be provided with any suitable form of movable door or closure which, as herein illustrated, consists in a U-shaped gate 40. The gate 40 has side walls 41 and 42 which overlap the sides of the stanchions 29 and 30, and a front wall 43 adapted to cooperate with the end of the core 26 to form a throat 44 through which the staples are driven. The gate 40 is pivotally mounted at the front of the casing by means of a pin 45 extending through the aligned vertical slots 31 in the stanchions 29 and 30 with its ends projecting outwardly into inclined slots 46 in the side walls 41 and 42 of the gate. The lower edges of the side walls 41 and 42 of the gate 40 are formed with notches 47 which are adapted to engage with the lugs 28, previously referred to, on the forwardly-projecting end of the core 26 to releasably latch the gate in closed position. The notches 47 are yieldingly held in latched engagement with the lugs 28 by a bowed spring 48 having one end hooked around the pivot-pin 45 and its opposite end anchored to the bottom of the abutment 20. The gate 40 is movable vertically on the stanchions 29 and 30 against the action of the spring 48 to release the notches 47 from latched engagement with the lugs 28, the vertical slots 31 in the stanchions permitting the pin 45 to move upwardly therein during the movement of the gate with respect to the magazine. The gate 40 may then be rocked to its open position illustrated in Figs. 7 and 8.

The lower end of the staple-driver 9 is guided by the forward edges of the stanchions 29 and 30 and the front wall 43 of the gate 40 when the latter is closed whereby to adapt the driver to be reciprocated in the throat 44. Staples s supported on the core 26 are slid forwardly in the

magazine and fed successively into the throat 44 by means of a staple-pusher 49. The staple-pusher 49 is of usual construction, being of inverted U-shape in cross-section to adapt it to ride on the core at the rear of the staples s with its sides sliding in the space between the sides of the core and the sides of the member 25. The staple-pusher 49 is urged forwardly in the magazine by means of an elastic cord or spring 50 connected thereto at one end, see Fig. 1, and looped around a suitable post 51 with its opposite end anchored to a lug 52 on the bottom of the member 25.

In accordance with the present invention there is provided a novel form of fastener-retainer 60 which is movable into frictional engagement with the staples s to dog thereagainst when the gate 40 is opened and movable out of engagement with the staples to release them when the gate is closed. Although the retainer 60 may take other forms, as herein illustrated it comprises a U-shaped member having side walls 61 and 62 and an extended bottom wall providing a friction face 63. As shown in Figs. 9 and 10, the friction face 63 has its opposite sides inclined inwardly and upwardly toward a central peak to adapt it for use with crowned staples, but it is to be understood that the friction face may have any desired contour to conform to the shape of the heads of the staples or other fasteners.

The U-shaped retainer 60 is positioned between the stanchions 29 and 30 so that the friction face 63 overlies the core 26. Its side walls 61 and 62 are provided with aligned holes 64, through which the pivot-pin 45 extends with a close fit to adapt the retainer for vertical movement with the pin. At the rear of the holes 64 the side walls 61 and 62 are slotted at 65 to provide a clearance for the crossbolt 6 which passes therethrough. The side walls 61 and 62 are also provided with arcuate slots 66 of the same radius as the arcuate slots 32 in the stanchions 29 and 30, but of slightly greater width. The relative position of the slots 32 in the stanchions 29, 30 and the slots 66 in the retainer 60 is such that they register in both the closed and open position of the gate 40, see Figs. 2 and 8. A pin 67 extends transversely through the arcuate slots 32 and 66 and has its ends secured in the side walls 41 and 42 of the gate 40, see Figs. 2 and 3. The swinging movement of the gate 40 on the stanchions 29 and 30 is thus controlled by the engagement of the pin 67 with the edges of the arcuate slots 32 and openings 33 and the diameter of the pin is preferably only slightly less than the width of the arcuate slots 32 to provide a close fit therein.

When the gate 40 is closed, as illustrated in Figs. 3 and 3, the pin 67 is located in the openings 33 and the ends of the pivot-pin 45 bottom in the elongated slots 46 in the side walls 41 and 42 of the gate. The retainer 60 is then held suspended to release its friction face 63 from engagement with the staples s. When the gate is opened to the position illustrated in Figs. 8 and 9 the pin 67 slides in the arcuate slots 32 in the stanchions 29 and 30 which limit the gate to pivotal movement on the pin 45. The retainer 60 is then capable of vertical movement with respect to the gate 40 to engage its friction face 63 with the staples s, due to the relatively wide slots 66 in the side walls 61 and 62 of the retainer which embrace the pin 67 and the elongated slots 46 in the gate 40 which receive the ends of the pivot-pin 45. The retainer 60 is preferably constructed so that the forward edges of its side walls 61 and 62 engage the rearward

face of the staple-driver 9 to prevent tilting movement of the retainer; and with the forward and rearward ends 71 and 72 of the friction face 63 slightly curved upwardly to facilitate movement of the staples *s* thereunder. One embodiment of the invention having now been described in detail its mode of operation will be next explained.

To load the magazine with a refill of staples *s* the gate 40 is first lifted to release its notches 47 from latched engagement with the lugs 28 at the base of the casing 2 and then rocked on the pivot-pin 45. During the initial upward movement of the gate 40 on the stanchions 29 and 30 the pivot-pin 45 moves in the slots 31 and the pin 67 moves in the clearance openings 33 at the rear of the arcuate slots 32, as shown in Figs. 4 and 5. While the gate is being lifted any staples in the magazine are held by the front wall 43 of the gate as illustrated in Fig. 7. As the gate 40 is rocked on the pivot-pin 45 the pin 67 engages the forward edges of the clearance openings 33 which control the forward movement of the gate, see Fig. 7. Before the gate 40 can be swung to its fully opened position illustrated in Fig. 8, the pin 67 must be aligned with the arcuate slots 32 in the stanchions 29 and 30 and the forward inclined edges of the openings 33 have the effect to cam the pin downwardly for this purpose while carrying the gate 40 downwardly as shown in Fig. 7.

When the gate 40 has been depressed in the manner as above explained to align the pin 67 with the arcuate slots 32 the staple-retainer 60 will be released to allow it to be depressed by the spring 48 acting on the pin 45 to engage its friction face 63 with the heads or crossbars of the staples *s*. Due to the relatively wide slots 66 in the side walls 61 and 62 of the retainer 60 and the loose connection between the ends of the pivot-pin 45 with the side walls 41 and 42 of the gate 40 the retainer is movable relatively of the gate under the action of the bowed spring 48 to yieldingly hold the face 63 in frictional contact with the staples *s* or with the pusher 49 when the latter has been moved forwardly beneath the retainer. The staples are thus automatically engaged by the retainer 60 to hold them by frictional contact when the gate 40 is in position to be swung to its open position. When the gate is rocked on the pivot-pin 45 from the position shown in Fig. 7 to that illustrated in Fig. 8, the close fit of the pin 67 in the arcuate slots 32 in the stanchions 29 and 30 prevents vertical movement of the gate and pivot-pin 45 so that the retainer 60 cannot be moved upwardly to release the staples until the gate is again closed.

After the gate has been opened in the manner as last explained a refill stick of staples *s* may be inserted into the magazine at its forward end by sliding it rearwardly on the core 26 against the action of the pusher 49. During the rearward movement of the stick of staples *s* the face 63 of the retainer is in frictional engagement therewith and the stick must be pushed rearwardly with sufficient force to overcome the friction. When the stick is manually released, however, the friction caused by the face 63 bearing on the staples *s* is sufficient to hold the staples against ejection from the magazine by the action of the pusher 49. After the magazine has been fully loaded the gate 40 is rocked on the pivot-pin 45 until the pin 67 is clear of the arcuate slots 32 in the stanchions 29 and 30 and located in the clearance openings 33 at the rear of the arcuate slots. The gate is then in the position illustrated in Fig. 7 so that its front wall 43 will oppose any

movement of the staples outwardly of the magazine. The rocking movement of the gate 40 is then continued to cause the lower curved rearward edges of its side walls 41 and 42 to ride over and engage the notches 47 with the lugs 28 to latch the gate in closed position. During the upward movement of the gate 40 the extended ends of the pivot-pin 45 bottom in the inclined slots 46 in the gate and the pin and retainer 60 connected thereto are lifted bodily against the action of the spring 48 whereby to release the friction face 63 from engagement with the staples *s*. The staples *s* when released by the retainer 60 are then adapted to be fed forwardly in the magazine by the staple-pusher 49 to position the foremost staple of the stick in the throat 44.

The foremost staple in the throat 44 may be driven into the work by depressing the manually-operable lever 17. Rocking movement of the lever 17 is transmitted to the lever 13 through the link 19 which, in turn, causes the follower 12 to be moved longitudinally downward in the plunger 8 to compress the spring 11. During the compression of the spring 11 the plunger 8 is held by the latch 10 and thereafter the latch is actuated by the lever 13 adjacent the end of the stroke of the manually-operable lever 17 to release the plunger. The plunger 8 when released by the latch 10 is actuated by the expansive force of the compressed spring 11 to slide the driver 9 down through the throat 44 with considerable force to drive the staple into the work. Upon release of the manually-operable lever 17 the spring 16 rocks the lever 13 to its uppermost position and thereby returns the follower 12 and plunger 8 to first position. At the upper limit of movement of the plunger 8 the latch 10 is automatically actuated to engage the under edge of the plunger to hold it in raised position. The staples are successively advanced into the throat 44 by the pusher 49 and driven into the work by the driver 9 through the actuation of the manually-operable lever 17. When the supply of staples *s* is exhausted, or if a staple becomes jammed in the throat 44, the gate 40 is again opened in the manner as previously explained to permit the magazine to be refilled or to release the jammed staple. It will be noted that each time the gate 40 is rocked to open position the retainer 60 is yieldingly urged downwardly by the spring 48 to engage its face 63 with the staples to hold them against ejection from the magazine.

It will be observed from the foregoing that the present invention provides a novel form of fastener-retainer which is automatically moved into frictional engagement with the fasteners in the magazine when the gate is opened and released from such engagement when the gate is closed.

Moreover, it will be observed that the retainer is of simple and compact construction, adapted to dog the staples by its frictional engagement therewith and due to its extended contact therewith it is not liable to deterioration by wear.

While the improved device is herein described and illustrated as embodied in a preferred form of construction, it is to be understood that various modifications may be made in the structure 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 fastener-applying implement of the type comprising a magazine provided with a movable closure to adapt fasteners to be supplied thereto, the combination with said magazine of

a retainer having a substantially flat friction face engageable simultaneously with a plurality of adjacent fasteners in the magazine to retain them against ejection from the magazine when the closure is opened.

2. In a fastener-applying implement of the type comprising a magazine provided with a movable closure to adapt fasteners to be supplied thereto, the combination with said magazine of a retainer having a friction face, and means for mounting the retainer to slide bodily in a direction angularly related to the direction in which the fasteners are fed for engaging its friction face with the fasteners to retain them in the magazine when the closure is opened.

3. In a fastener-applying implement of the type comprising a magazine provided with a movable closure to adapt fasteners to be supplied thereto, the combination with said magazine of a retainer having a friction face, means for mounting the retainer to slide bodily in a direction angularly related to the direction in which the fasteners are fed, means for yieldingly urging the retainer to engage its friction face simultaneously with a plurality of adjacent fasteners in the magazine, and means controlled by the closure for sliding the retainer against the action of the yielding means to release the fasteners.

4. In a device of the type indicated, a magazine, a movable closure for the magazine, means for advancing fasteners in the magazine, a retainer mounted to slide bodily in a direction angularly related to the direction in which the fasteners are fed in the magazine and having a flat friction face engageable simultaneously with a plurality of adjacent fasteners, and means controlled by the closure for sliding the retainer to engage its friction face with the fasteners when the closure is opened and to release the fasteners when the closure is closed.

5. In a device of the type indicated, a magazine, a movable closure for the magazine, means for advancing fasteners in the magazine, a retainer mounted to slide bodily in a direction angularly related to the direction in which the fasteners are fed in the magazine and having a face engageable simultaneously with a plurality of adjacent fasteners, resilient means for bodily sliding the retainer to engage its face with the fasteners to retain them by friction, and means controlled by the movement of the closure for actuating the retainer to release the fasteners.

6. In a device of the type indicated, a magazine for holding a supply of fasteners, a gate pivotally mounted on the magazine and cooperating therewith to form a throat through which the fasteners are driven, means for advancing the fasteners along the magazine and into the throat, a retainer above the magazine, means for mounting the retainer to slide bodily toward the fasteners in the magazine, means for yieldingly urging the retainer into frictional contact with the fasteners, and means for actuating the retainer during the closing movement of the gate to release the fasteners.

7. In a device of the type indicated, a magazine for holding a supply of fasteners, a gate pivotally mounted on the magazine, latching means for holding the gate in closed position on the magazine, said gate being movable vertically to engage and release the latching means, a retainer having a friction face overlying the fasteners and adapted to engage simultaneously

with a plurality of adjacent fasteners, means for yieldingly urging the retainer into frictional contact with the fasteners, and means operative by the vertical movement of the gate to actuate the retainer to release the fasteners.

8. In a device of the type indicated, a magazine for holding a supply of fasteners, a gate pivotally mounted on the magazine, a retainer having a friction face overlying the fasteners and adapted to engage simultaneously with a plurality of adjacent fasteners, means for yieldingly urging the retainer into contact with the fasteners, means connecting the gate and retainer, and cooperating means on the gate and magazine for controlling the movement of the gate whereby the retainer is engaged with the fasteners when the gate is opened and released from the fasteners when the gate is closed.

9. In a device of the type indicated, a magazine for holding a supply of fasteners, a gate pivotally mounted on the magazine, cooperating means on the gate and magazine for latching the gate in closed position, said gate being vertically movable to release it from latched engagement with the magazine, a retainer having a friction face engageable with the fasteners, a spring for yieldingly urging the retainer into frictional contact with the fasteners, means on the magazine for restraining the gate from vertical movement after it has been unlatched, and means connecting the gate and retainer whereby to move the latter vertically with the gate when the latter is raised to engage the latching means.

10. In a device of the type indicated, a magazine for holding a supply of fasteners, stanchions at the forward end of the magazine, a gate pivotally mounted on the stanchions and bodily movable vertically thereof, said gate cooperating with the end of the magazine to form a throat through which the fasteners are driven, means for advancing the fasteners along the magazine and into the throat, a U-shaped retainer positioned between the stanchions with its bottom face overlying the fasteners, a pin connecting the gate and retainer whereby the latter is moved vertically with the gate, and a spring engaging the pin to urge the retainer into engagement with the fasteners, said retainer being moved to release the fasteners by the movement of the gate to closed position.

11. In a device of the type indicated, a magazine for holding a supply of fasteners, stanchions at the forward end of the magazine having arcuate slots, a gate pivotally mounted on the stanchions and bodily movable vertically thereof, said gate cooperating with the end of the magazine to form a throat through which the fasteners are driven, means for advancing the fasteners along the magazine and into the throat, a transverse pin connected to the gate and extending through the arcuate slots in the stanchions, a U-shaped retainer positioned between the stanchions with its bottom face overlying the fasteners, said retainer having slots through which the pin extends, a pivot-pin connecting the gate and retainer whereby the latter is moved vertically with the gate, and a spring engaging the pivot-pin to urge the retainer into engagement with the fasteners, said first-named pin cooperating with the arcuate slots in the stanchions whereby to engage the retainer with the fasteners when the gate is opened and to release the fasteners when the gate is closed.

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