

Sept. 5, 1944.

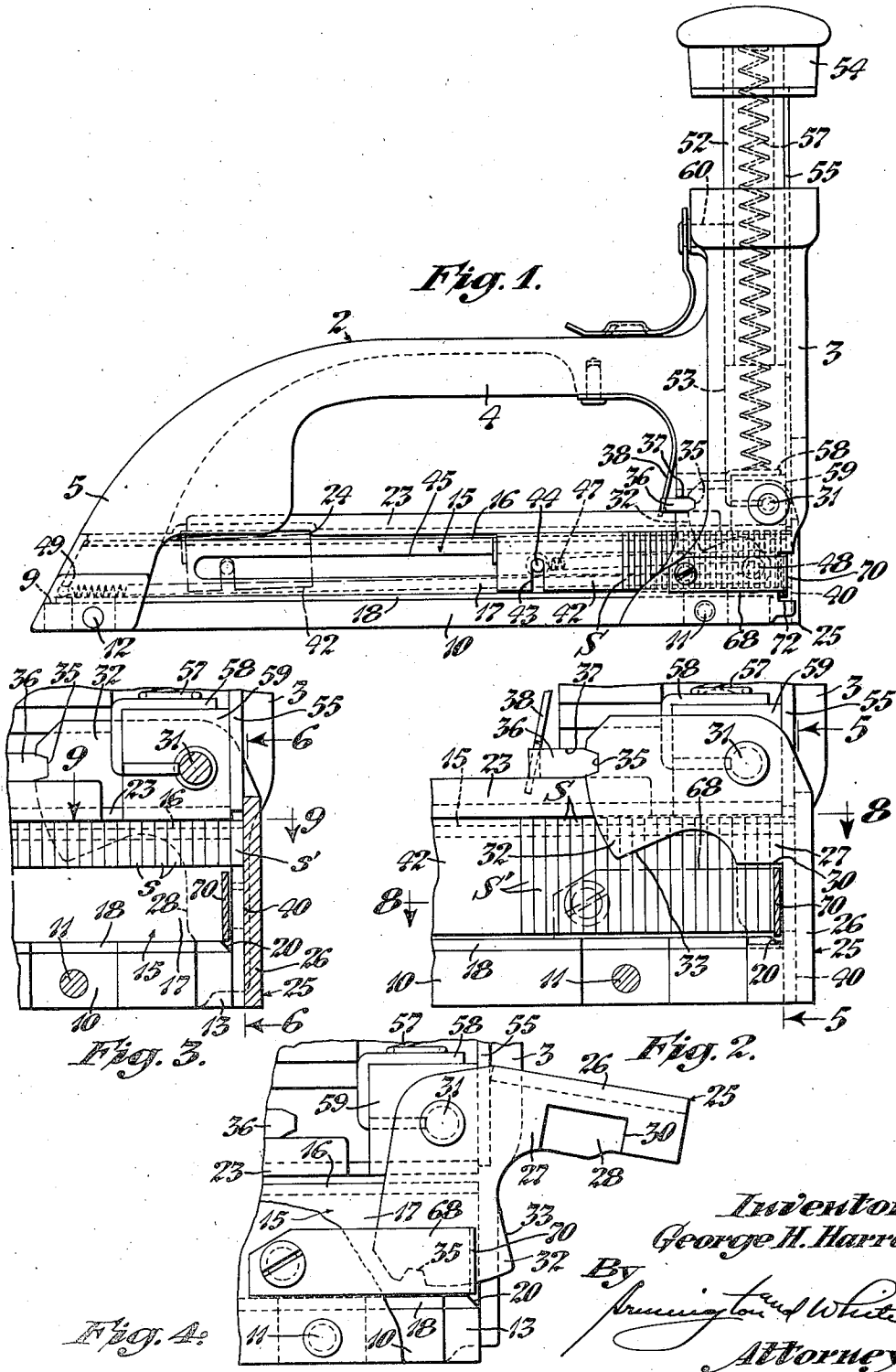
G. H. HARRED

2,357,737

STAPLING IMPLEMENT

Filed Sept. 4, 1943

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

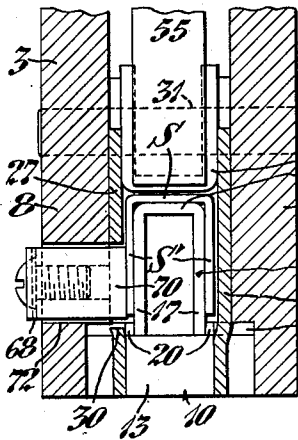


Fig. 5.

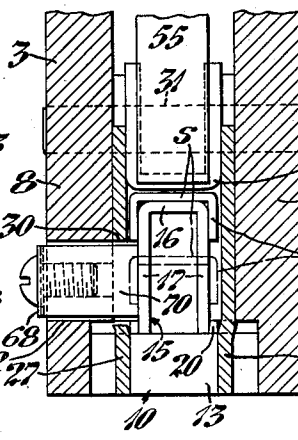


Fig. 6.

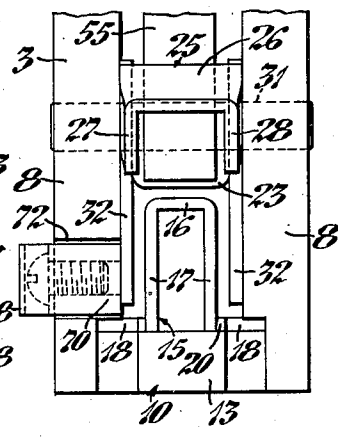


Fig. 7.

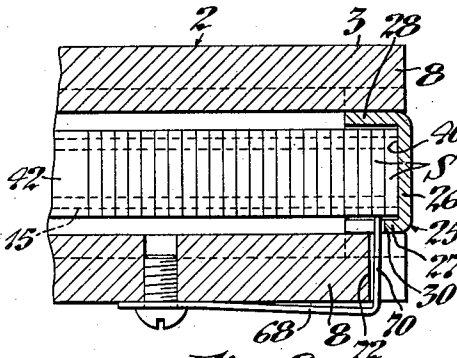


Fig. 8.

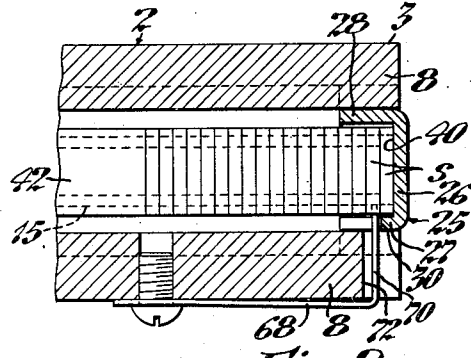


Fig. 9.

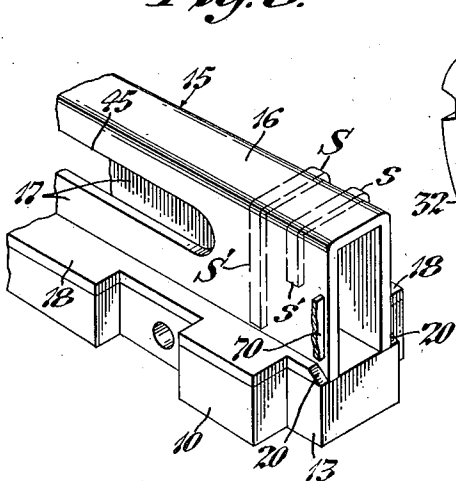


Fig. 10.

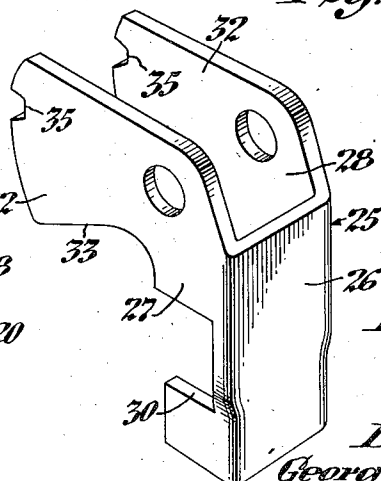


Fig. 11.

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UNITED STATES PATENT OFFICE

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STAPLING IMPLEMENT

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Application September 4, 1943, Serial No. 501,257

5 Claims. (Cl. 1—49)

This invention relates to improvements in stapling implements for attaching papers together, fastening tags and labels to boxes and cases, tacking paper to drawing boards and for fastening various other articles to different ob- 5
jects.

One object of the invention is to provide an implement of the type indicated which is adaptable for use with staples having legs of different lengths.

Another object of the invention is to provide an implement of the type indicated having a magazine provided with a core for mounting staples having legs of different lengths and guiding means cooperating with the core for supporting staples 15
having relatively short legs to prevent them from canting as they are driven into the work.

Another object of the invention is to provide an implement of the type indicated in which the guiding member is adapted to be brought into 20
play when staples having relatively short legs are used and to be automatically displaced from operative position when staples having longer legs are employed.

Another object of the invention is to provide an implement of the type indicated having a door or gate for closing the forward end of the magazine to retain the staples therein and adapted to be opened to permit loading of the staples onto the magazine-core, with means on the gate engageable with the staple-guiding member for displacing it when the gate is opened for a staple-loading operation.

Another object of the invention is to provide an implement of the type indicated having staple-guiding means which are of simple construction and efficient in operation for performing the intended function.

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

Fig. 1 is a side-elevational view of a conventional type of stapling implement or tacker illustrating the present improved staple-guiding means as applied to use therewith;

Fig. 2 is an enlarged side-elevational view of the forward end of the implement with a part of the casing shown as removed and the resilient staple-guiding means displaced from operative position by the use of staples having relatively long legs;

Fig. 3 is a part-sectional view similar to Fig. 2 showing the staple-guiding means in position for 55

operating on staples having relatively short legs;

Fig. 4 is a view showing the gate as in open position to permit the insertion of staples into the magazine and indicating the manner in which the operation of opening the gate renders the staple-guiding means inoperative;

Fig. 5 is a transverse sectional view taken on line 5—5 of Fig. 2 and illustrating the staple-guiding member as moved to inoperative position when staples with long legs are used; 10

Fig. 6 is a similar view taken on line 6—6 of Fig. 3 showing the staple-guiding member in operative position to guide staples having relatively short legs;

Fig. 7 is a front elevational view of a portion of the implement with the parts shown in the same relationship as in Fig. 4;

Fig. 8 is a sectional plan view of the front end of the implement taken generally on line 8—8 of Fig. 2; 20

Fig. 9 is a similar view taken generally on line 9—9 of Fig. 3;

Fig. 10 is a perspective view of the forward end of the staple-core indicating the manner in which staples having legs of different lengths are supported thereon; and 25

Fig. 11 is a perspective view of the door or gate for closing the end of the staple-magazine.

It is a common practice for attaching sheets of paper together, fastening tags and labels to boxes and cases and for other purposes to provide a stapling implement for driving the staples. Such devices usually comprise a magazine enclosing a core upon which the staples are mounted to adapt them to be fed into position to be driven into or through the work by a staple-driver arranged for reciprocation at the forward end of the magazine. For different types of work it is necessary to use staples having relatively short or long legs and unless the magazine-core is adapted for supporting such varieties of staples, several different stapling devices must be employed. This is especially true when tacking various articles to boards and other objects since it is necessary that the staple-legs be driven into the board to a depth sufficient to properly secure the article thereto. To avoid the necessity for providing different stapling devices for driving staples having legs of varying lengths it has been proposed to construct the staple-core of suitable dimensions for supporting both staples having long legs as well as those having short legs. The staples are fed forwardly into a throat at the front end of the device and driven through the throat 55 into the work. Usually, as the staple is driven

through the throat it will be guided at the rear by the remaining staples on the core to prevent it from canting and being bent to clog the machine. This means of guiding the staples is practicable with staples having relatively long legs, but when staples with shorter legs are supported on a core adapted for those with relatively long legs the staples with short legs are liable to cant rearwardly as they are driven downwardly beyond the staples remaining on the core.

It is therefore a purpose of the present invention to provide means for guiding staples having relatively short legs as they are driven into the work to prevent them from rocking or canting in the throat for use in conjunction with a magazine-core adapted for supporting staples with either long or short legs. The present improved guiding means comprises, in general, resiliently-operated means positioned adjacent the throat of the implement and adapted to contact the legs of staples having relatively short legs as they are driven through the throat beyond the staples remaining on the core whereof to prevent them from canting in the throat. The guiding means is adapted to be displaced by staples having longer legs as the latter are placed on the core to render the guiding means inoperative. The guiding means is also adapted to be displaced or shifted out of operative position for loading staples onto the magazine-core.

Referring to the present drawings, the improved staple-guiding means is herein illustrated as applied to use with an implement of the so-called "tacker" type, but it is to be understood that it may be employed to advantage with other forms of stapling devices. The implement as herein shown by way of example comprises a main frame 2 which may be constructed as a die-casting formed with a head 3 for containing the stapling mechanism and a handle 4 terminating in a rearward leg 5. The lower portion of the head 3 is cored out or slotted to provide opposite flanges 8, between which the forward end of a base-plate 10 is fastened, the rearward end of the plate being held in an opening 9 in the foot 5. The base-plate 10 is fastened in place by a pin or rivet 11 inserted through the sides of the head 3 and a pin 12 extending through the foot 5. The forward end of the plate 10 is cut away at the sides to form a narrow projection 13, see Figs. 7 and 10.

Mounted on top of the plate 10 and fastened in place in any suitable manner is a staple-core 15 of inverted channel shape. As shown most clearly in Fig. 10, the core 15 is constituted by a top wall 16 with side walls 17 folded downwardly therefrom and bent laterally outward in flanges 18 overlying the top of the plate 10. In the present form of construction the side walls 17 of the core 15 are of considerable depth to adapt it for supporting staples having relatively long legs as well as staples with shorter legs. As shown in Fig. 10, the forward ends of the flanges 18 of the core 15 are of reduced width corresponding to the width of the projection 13 on the plate 10 and these ends are chamfered or beveled to provide opposite cam-surfaces 20.

The present drawings illustrate a type of staples S having relatively long legs while those having shorter legs are indicated by the reference character s the legs of the staples being designated by the reference characters S' and s', respectively. The staples S or s are mounted on the core 15 by sliding them rearwardly through the opening at the front of the head 3 with their

crossbars resting across the top of the core and their legs straddling the sides 17 thereof as represented by full lines in Figs. 5 and 6 and indicated by dash-lines in Fig. 10. The staples are prevented from rising on the core 15 by means of a channel-shaped guide-plate 23 attached to the frame 2 and overlying the entire length of the core, the guide-plate being provided on its under side with a detent-shoulder 24 adjacent its rearward end.

The forward end of the magazine-core 15 is closed by a pivoted door or gate 25. The gate 25, shown in detail in Fig. 11, comprises a front wall 26 for cooperation with the end of the core 15 to provide a throat 40 through which the staples S or s are driven and side walls 27 and 28 extending rearwardly from the front wall in spaced relation to the sides of the core. One side wall 27 of the gate 25 is cut away at a point substantially midway between its upper and lower ends to provide an opening 30. The gate 25 is positioned within the opening between the flanges 8 at the lower end of the head 3 and pivotally mounted on a pin 31 extending through the sides of the head. The side walls 27 and 28 of the gate 25 are extended rearwardly from the pivot-pin 31 in wings 32 having their rearward edges curved in an arc concentric to the axis of the pin. The lower straight edge 33 of one of the wings 32 of the gate 25 is designed to serve as the means for retracting the staple guide from its operative position when the gate is opened in a manner as explained hereinafter.

The arcuate edges of the wings 32 of the gate 25 are provided with detent-recesses 35 for engagement with the forward edge of a latch-bar 36 slidably mounted in guideways 37 formed as slots in the rearward side of the head 3 of the frame 2. The rearward edge of the latch-bar 36 is engaged by the lower end of a leaf-spring 38 fastened to the under side of the handle 4 of the implement, see Fig. 1. To permit the gate 25 to be rocked to the position shown in Fig. 4 for loading the staples onto the magazine-core 15 the gate is first unlocked by sliding the latch-bar 36 rearwardly in the guideways 37 against the action of the spring 38. The forward edge of the latch-bar 36 thru will be disengaged from the detent-recesses 35 in the gate, after which the gate may be manually rocked to open position.

The staples S or s on the magazine-core 15 are advanced therealong into the throat 40 by means of a channel-shaped pusher 42 closely fitting the top and sides of the core and slidably therealong. As shown in Fig. 1, the pusher 42 has vertical slots 43 in its opposite sides for receiving the reduced ends of a pin 44 projecting through longitudinally-extending slots 45 in the sides of the magazine-core 15. The pusher 42 is caused to be advanced along the core 15 by means of a helical spring 47 connected at one end to the pin 44. The spring 47 extends longitudinally between the sides of the core 15 and is looped around a stud 48 at the forward end thereof and then stretched rearwardly with its opposite end anchored to a transverse pin 49 at the rearward end of the core. The pusher 42 may be retracted to inoperative position manually by sliding it rearwardly against the action of the spring 47 to the position indicated by dash-lines in Fig. 1. To retain the pusher 42 in this position its upper forward edge is engaged with the detent-shoulder 24 on the under side of the guide-plate 23.

The staple-applying means may comprise a

hollow plunger 52 slidably mounted in a vertical guideway 53 in the head-portion 3 of the frame 2. The plunger 52 has a hand-rest or knob 54 at its upper end and a driver 55 attached to its forward face. The lower end of the driver 55 depends below the plunger 52 with its edge positioned in the throat 40 slightly above the top of the staple to be driven. The plunger 52 and driver 55 normally are maintained in elevated position by means of a helical spring 57 having one end bearing against the under side of the knob 54 and its opposite end seated on an angular abutment 58 supported by the ends of wings 59 bent upwardly from the guide-plate 23, see Figs. 1 and 3. The upward movement of the plunger 52 is limited by a spring-actuated pin 60 in the head 3 engageable with a shoulder at the end of a longitudinal slot in the plunger.

It has been explained that when staples S having relatively long legs S' are used in the implement the legs of the staples on the core 15 provide guiding edges along which the staple being driven is adapted to slide to prevent its legs from rocking or canting rearwardly. When staples s having relatively short legs s' are employed, however, the staple being driven will eventually pass beyond the end of the legs of the foremost remaining staple on the core and consequently its legs will be free to rock or cant rearwardly in the throat 40.

In accordance with the present invention, means are provided for guiding staples having relatively short legs to prevent them from canting rearwardly in the throat 40 during the driving operation. A preferred form of construction of the staple-guiding means comprises a member 68 embodied in a leaf-spring having one end fastened to the side of the head 3 of the frame 2 and its opposite free end bent inwardly at right-angles to provide a finger 70. The finger 70 normally projects inwardly through a slot 72 in one side flange 8 of the head 3 and also through the slot or opening 30, previously described, in the side of the gate 25. The end of the finger 70 thus engages against the side of the magazine-core 15 at a slight distance rearwardly of its forward end as shown most clearly in Figs. 6, 9 and 10 of the drawings. The complete stapling implement having been described in detail, its method of operation is explained as follows:

To prepare the implement for operation the magazine-core 15 is loaded with a supply of staples. This is accomplished by first retracting the pusher 42 to its inoperative position, indicated by dash-lines in Fig. 1, with the forward edge of its top portion engaged by the detent-shoulder 24 on the guide-plate 23. The latch-bar 36 next is withdrawn from engagement with the recesses 35 in the side wings 32 of the gate 25, whereafter the gate may be swung to the open position shown in Figs. 4 and 7. During this rocking movement of the gate 25 into open position the edge 33 of its side wing 32 will cam against the rearward side of the finger 70 to spring the guide-member 68 laterally outward and thereafter the wing will slide across the edge of the finger to maintain it in spaced relation to the side of the core 15 so that the staples may be slid into place thereon.

Assuming that the work is to be fastened with staples S having relatively long legs S', a strip or stick comprising a series of the staples cemented together is slid onto the core 15, after which the gate 25 is swung back into closed position. As the gate 25 reaches its closed position

the recesses 35 in its wings 32 will be brought into alignment with the latch-bar 36 and the latter will snap into the recesses to lock the gate in place. Substantially simultaneously with this action the wing 32 on the gate 25 will release the finger 70 to permit it to spring inwardly toward the side of the core 15 to engage against the legs of the staples mounted thereon. The staple-pusher 42 then may be released from the detent-shoulder 24 and permitted to move along the core 15 under the action of the spring 47 to feed the strip of staples S forwardly to enter the leading staple into the throat 40.

When staples S having relatively long legs S' are supplied to the implement their legs act to withhold the spring-pressed guiding finger 70 from engagement with the side of the magazine-core 15, the end of the finger then engaging against the side of the staple-strip as the staples are advanced along the core and into the throat 40. To apply a staple to the work the implement may be placed on the work and the knob 54 of the plunger 52 depressed to cause the driver 55 to descend. As the lower end of the driver 55 engages the crossbar of the forward staple it will shear this staple from the remainder of the strip and force it downwardly through the throat 40 and into the work. During the downward movement of the staple S its rearward side slides along the next succeeding staple in the strip. In this manner the staple will be guided in the throat 40 formed between the forward end of the magazine-core 15 and the rearward wall of the gate 25 while its legs will be prevented from canting rearwardly by their engagement with the legs of the next succeeding staple on the core. As an added precaution against rocking or tilting of the legs of the staple the cam-surfaces 20 formed at the end of the core 15 are adapted to engage the lower ends of the legs to cam them forwardly in alignment with the driver 55.

When it is desired to apply staples s having shorter legs s' to the work a strip or stick composed of staples of this latter type may be loaded onto the magazine-core 15 in the same manner in which the staples S are inserted into the implement. It will be noted that when staples s having legs of shorter length are used the ends of their legs s' will ride across the upper edge of the finger 70, as indicated in Figs. 3, 6 and 10, so that the inner end of the finger will remain engaged against the side of the core 15 by the action of the resilient arm or leaf-spring 68 of which it forms a part. When the staple-driver 55 is depressed to drive a staple s into the work the rearward side of the legs s' of the staple will be guided by the legs of the next succeeding staple in the series until it passes therebeyond. When the staple s passes beyond the next staple on the core 15 its legs s' will be prevented from rocking or canting rearwardly by the guide-finger 70 which serves to direct the staple in a substantially vertical path or in the plane of the descending driver.

The present drawings illustrate the staple-guiding means as embodied in a single member 68 having its finger 70 engageable with one leg of a staple to guide the latter during the staple-driving operation. It is to be understood however, that a pair of guide-members 68 may be provided if desired, one at each side of the head 3, with their fingers 70 adapted to engage with and support both legs of the staple being driven into the work.

It will be observed from the foregoing specification that the present invention provides a particularly simple yet ingenious means for adapting stapling implements to operate with staples of varying size, while insuring that each type of staple will be properly guided as it is driven down through the throat of the implement and into the work. By means of the resilient guide-member, which comes into play automatically in accordance with the size of the staples being used, staples having extremely short legs are properly supported at the rear so that they cannot rock or tilt to cause them to be bent or buckled to clog the machine.

The present improvement may be applied to practically all types of stapling devices wherein the staples are fed along a core or through a magazine, its parts being so constructed and related as to guard against their becoming deranged or getting out of order. Moreover, the staple-guiding means may be in-built in the implement at little added cost and through its employment the device is adapted for a wider range of usefulness in applying different types of staples in accordance with the requirements of the work.

While the staple-guiding device is herein illustrated as embodied in a preferred form of construction and applied to an implement of certain type, it is to be understood that modifications may be made in the structure and arrangement of its parts and in its method of application 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 magazine for supporting staples having legs of varying lengths, a gate normally closing the forward end of the magazine and adapted to be opened to supply staples thereto, means for feeding the staples in the magazine, means for driving staples fed progressively from the magazine, means for guiding staples having relatively short legs as they are driven into the work, and means operative by the gate for displacing the guiding means from operative position when the gate is opened to supply staples to the magazine.

2. In a stapling implement, a magazine comprising a core adapted to support staples having legs of varying lengths, a gate at the forward end of the magazine cooperating with the end of the core to form a throat through which the staples are driven, said gate being movable to open the front of the magazine for receiving a supply of staples, means for driving staples through the throat, means for successively feeding the staples to the driving means, means for guiding staples having relatively short legs as they are driven through the throat, and means

operative by movement of the gate to open the magazine for displacing the guiding means from operative position whereby to permit staples to be supplied to the magazine.

3. In a stapling implement, a magazine comprising a core adapted to support staples having legs of varying lengths, a gate at the forward end of the magazine cooperating with the end of the core to form a throat through which the staples are driven, said gate being movable to open the front of the magazine for receiving a supply of staples, means for driving the staples through the throat, means for successively feeding the staples to the driving means, means cooperating with the core at the rear of the throat for guiding staples having relatively short legs as they are driven through the throat, and means on the gate engageable with the guiding means to displace it with respect to the core when the gate is opened whereby to permit staples to be supplied to the magazine.

4. In an implement of the type indicated, a magazine comprising a core adapted to support staples having legs of different lengths, a gate at the forward end of the magazine cooperating with the end of the core to form a throat through which the staples are driven, said gate being movable to open the front of the magazine for receiving a supply of staples, means for driving the staples through the throat, means for successively feeding the staples to the driving means, and a resilient member at the rear of the throat for guiding staples having relatively short legs, said gate being engageable with the resilient member when moved to open position whereby to permit staples to be supplied to the magazine.

5. In an implement of the type indicated, a magazine comprising a core adapted to support staples having legs of different lengths, a gate at the forward end of the magazine cooperating with the end of the core to provide a throat through which the staples are driven, said gate being movable to open the front of the magazine to receive a supply of staples, means for driving the staples through the throat, means for successively feeding the staples to the driving means, a leaf-spring having a finger projecting inwardly toward the core at the rear of the throat, said finger arranged to guide staples having relatively short legs as they are driven through the throat and said leaf-spring yielding to permit staples having longer legs to pass by its finger, and means on the gate for engaging and moving the resilient member to displace its finger outwardly away from the core when the gate is moved to open the magazine whereby to permit staples to be supplied thereto.

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