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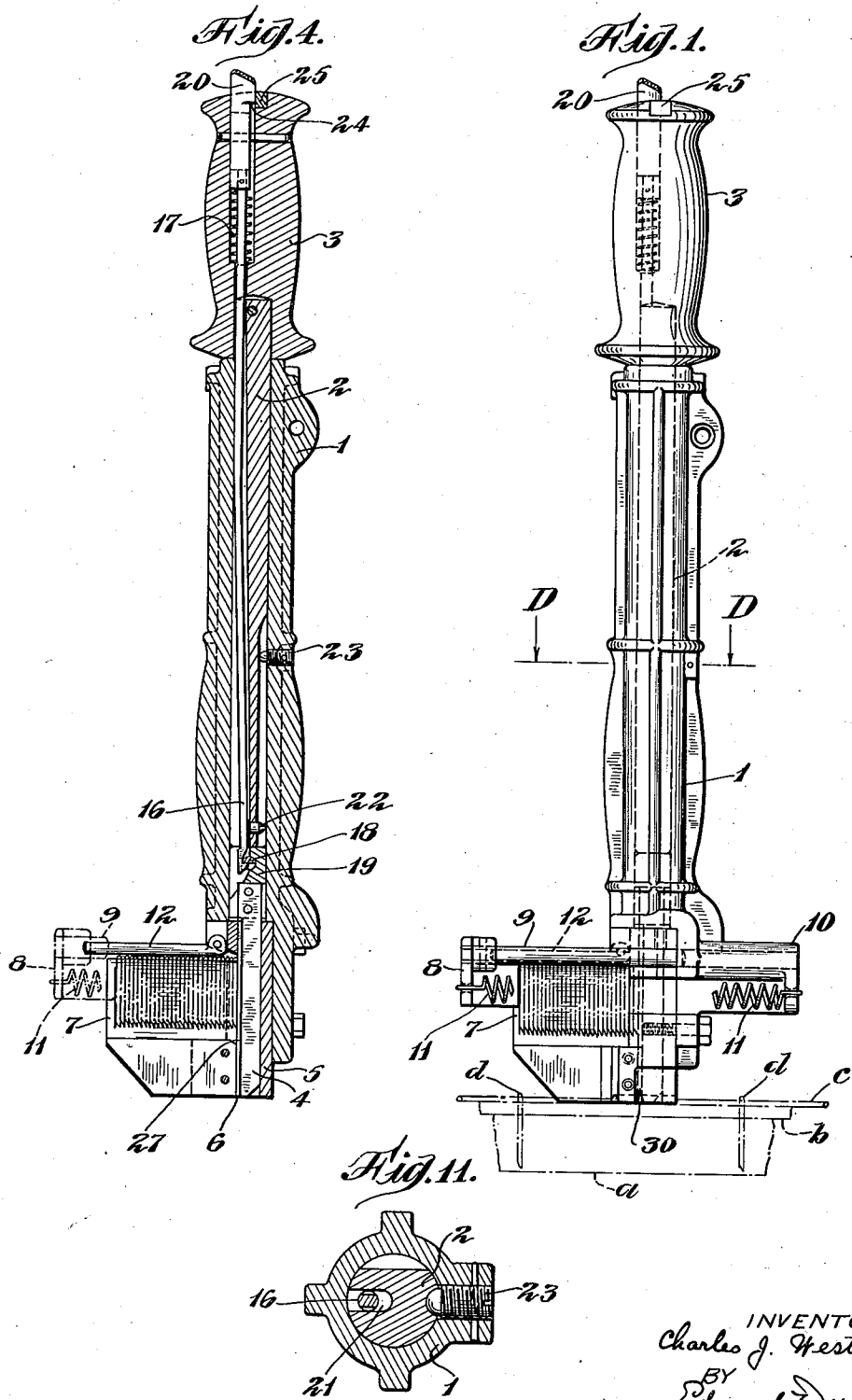
C. J. WESTIN

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STAPLING TOOL

Filed March 10, 1924

4 Sheets-Sheet 1



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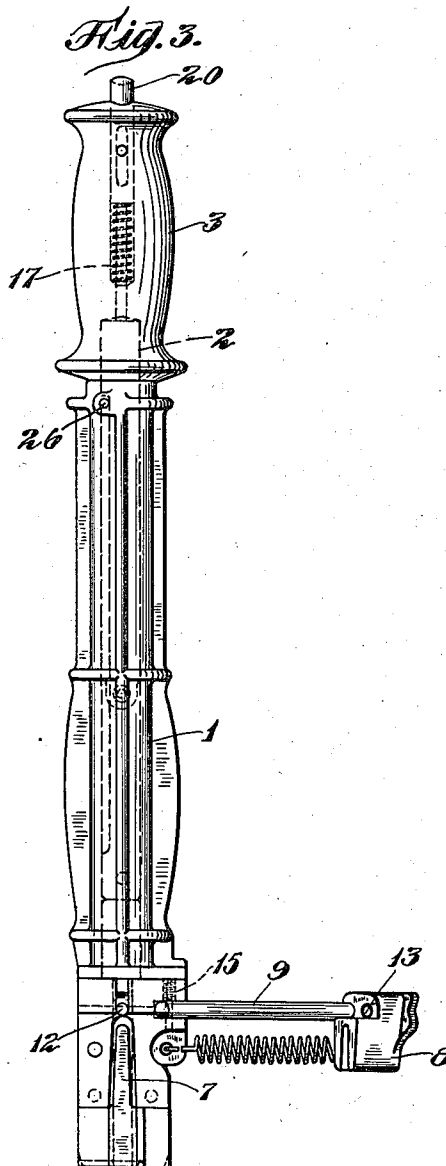
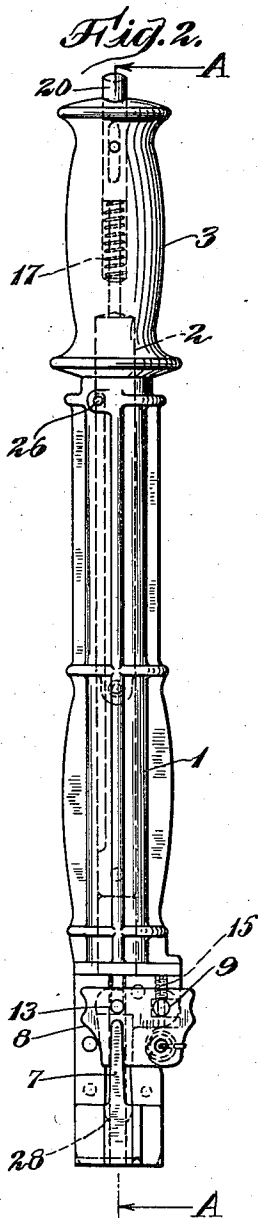
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STAPLING TOOL

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4 Sheets-Sheet 2



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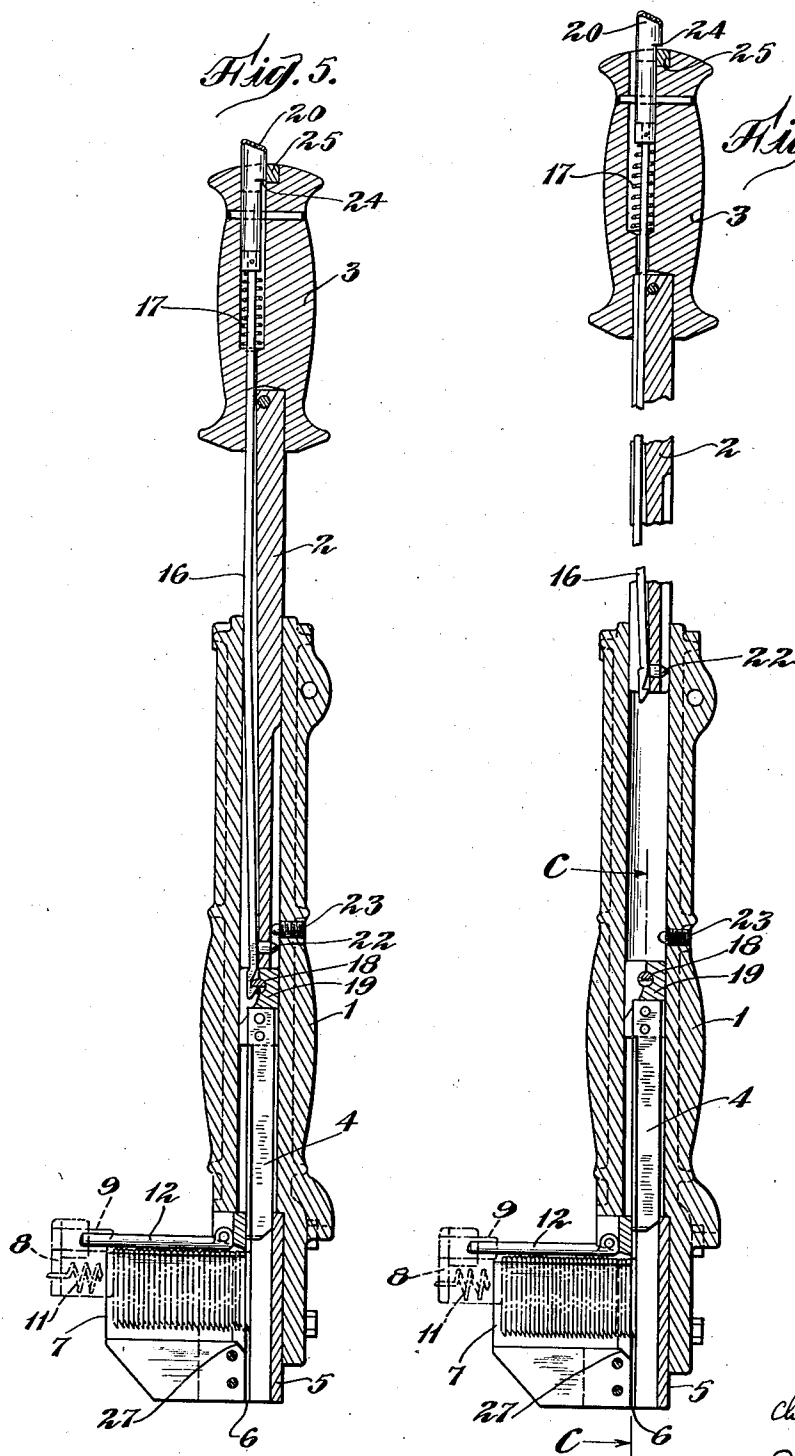
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STAPLING TOOL

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4 Sheets-Sheet 3



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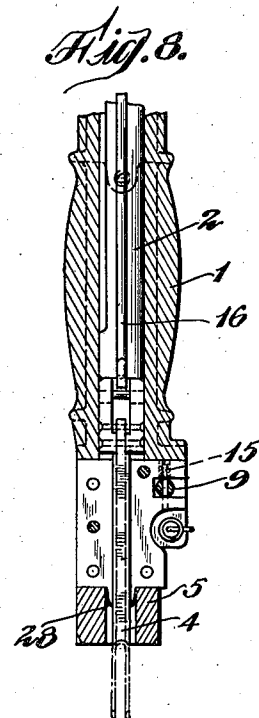
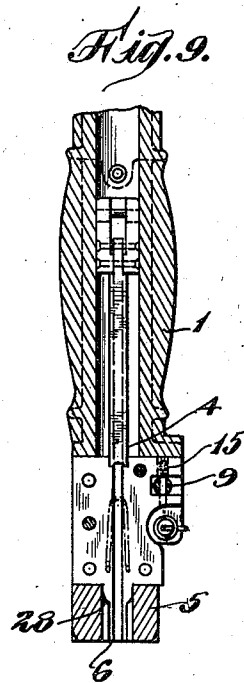
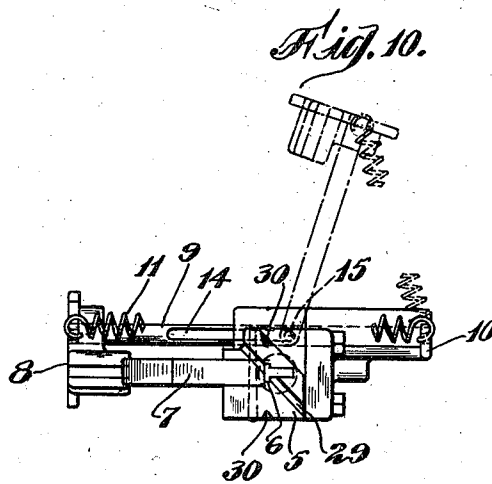
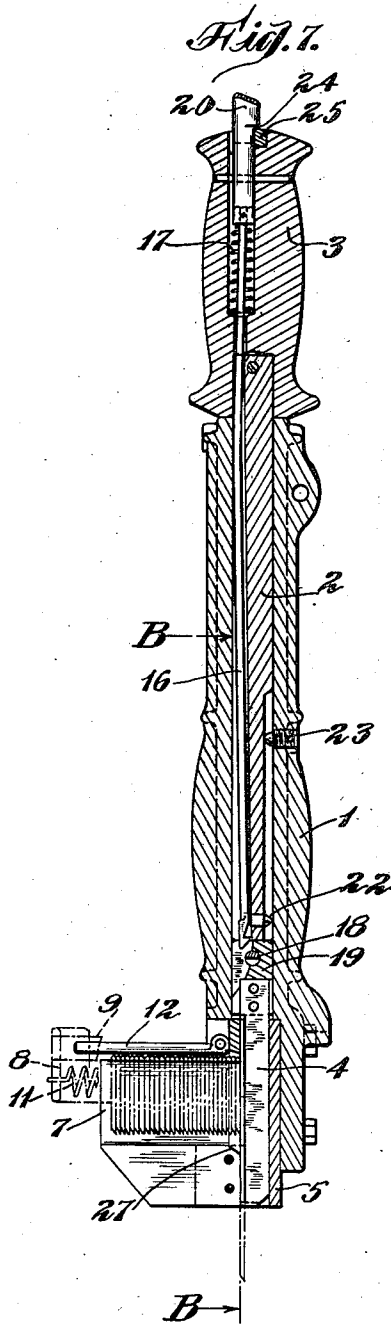
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STAPLING TOOL

Filed March 10, 1924

4 Sheets-Sheet 4



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UNITED STATES PATENT OFFICE.

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STAPLING TOOL.

Application filed March 10, 1924. Serial No. 698,052.

This invention relates to stapling mechanism, and particularly to a hand-operated tool for driving staples over binding wire into box parts to secure the box parts together and the binding wire thereto.

Among other objects, the invention is intended to provide an efficient hand-operated tool for driving staples into box parts and which is adapted for use in stapling binding wire to box parts; to provide a hand-operated stapling tool with means for positioning a staple over a binding wire and for driving such staple over such wire into box parts; to provide a hand-operated stapling tool with means automatically to feed staples to driving position and means to control the feed of staples to the driver whereby the driver may be operated a plurality of times in driving each staple, thus permitting the driving of long staples which require more than one driving blow to force them into the work.

One illustrative embodiment of the invention is shown in the accompanying drawings, in which:

Fig. 1 is a side elevation of a stapling tool embodying the invention, the tool being shown in driving position on a portion of a wirebound box blank to illustrate the use of the tool in driving a staple over a binding wire into box parts.

Fig. 2 is an end elevation of the illustrative tool seen from the left in Fig. 1.

Fig. 3 is the same as Fig. 2 except that the staple-feeding mechanism is swung out of feeding position to permit a new supply of staples to be inserted.

Fig. 4 is a vertical section taken on the line A—A of Fig. 2 and showing the position of the parts just prior to the raising of the driver to permit the feeding of a staple to driving position beneath the driver.

Fig. 5 is a similar view showing the driver in raised position and a staple fed to driving position beneath the driver.

Fig. 6 is a similar view showing the hammer raised and ready to be driven downward against the driver to force the staple out of the tool.

Fig. 7 is a similar view showing the position of the parts upon completion of a staple-driving operation.

Fig. 8 is a section taken on the line B—B of Fig. 7.

Fig. 9 is a section taken on the line C—C of Fig. 6.

Fig. 10 is a plan view of the bottom of the tool and showing in dotted lines the manner in which the staple-feeding mechanism is swung out of position to permit the insertion of a new supply of staples.

Fig. 11 is a section taken on the line D—D of Fig. 1.

The illustrative tool is particularly well adapted for stapling binding wire to cleats and side sheets of a wirebound box blank, and is a valuable addition to the equipment of a wirebound box manufacturing plant in which wirebound box blanks are made on power-operated box blank machines which staple a plurality of binding wires to a succession of box parts automatically fed past the staple-forming and driving mechanism. In the operation of such box blank machines, it sometimes happens that a stapling head will fail to function properly, and, as a result, a defective box blank will come through the machine, that is, a blank in which sufficient staples have not been driven to properly secure the parts together and the binding wire thereto. Such a defective box blank is either thrown away, or an attempt is made to render it effective by driving additional staples over the binding wire with a hammer. Such a procedure only renders the defective blank partially effective as it is most difficult, and almost impossible, to drive a long staple into a substantial thickness of wood with a hammer owing to the fact that the legs of the staple, not being supported, will collapse under the blows of the hammer. The illustrative tool is designed primarily for use in driving staples over the binding wire of these defective box blanks to render them effective, and is adapted to position and drive the same length of staple as is driven by the box blank machine which produced the defective box blank, which machine usually forms and drives a staple approximately one and one-quarter inches in length.

In Fig. 1, a portion of a wirebound box blank is shown comprising a cleat *a*, a sheet

of side material *b*, and a binding wire *c*. The cleat, sheet and binding wire have been secured together on a box blank machine by staples *d*, and the stapling mechanism of the box blank machine has missed one stapling operation, thus leaving a large space between adjacent staples *d* as shown in Fig. 1. The illustrative tool is shown in position to drive the missing staple between staples *d*.

The illustrative tool comprises generally means to hold a supply of staples, a staple-guide to embrace and support a staple while it is being driven, means to feed a staple to the staple-guide, means to control the staple-feeding means, a driver to drive the staple from the staple-guide into the box parts, a hammer to impart driving force to the driver, and means to position the tool relative to a binding wire in such manner that the staple, when driven, will straddle the binding wire.

As shown in the drawings, the several mechanisms are supported or carried by a housing 1 through which a hammer 2 is reciprocable vertically by means of a handle 3 bolted to hammer 2. A staple-driver 4 is reciprocable vertically in a casing 5 bolted to the lower end of housing 1. As best shown in Figs. 8 and 9, the opening in casing 5, through which the driver 4 reciprocates, forms a staple-guide 6 which receives the staple, forces its legs into parallelism and supports and guides the staple during the driving operation.

The supply of staples for the tool is carried by a staple-supply-arm 7 bolted to casing 5 and projecting laterally from an opening in casing 5 adjacent staple-guide 6. Staple-supply-arm 7 is formed to support a supply of staples which straddle the arm, as shown in the drawings, and which may be pushed along said arm and into staple-guide 6 when driver 4 is raised sufficiently to permit a staple to be pushed into the guide. The staples are fed along staple-supply-arm 7 toward staple-guide 6 by a staple-feed-block 8 which straddles supply-arm 7 and is supported by a rod 9 slidable in an extension 10 of housing 1. Block 8 constantly presses the supply of staples on arm 7 toward staple-guide 6 by means of a spring 11 connecting block 8 and extension 10.

To prevent the staples from being displaced on supply-arm 7, a rod 12 is pivoted to casing 5 and is held directly above arm 7 by being passed through an opening 13 in block 8, the arrangement being such that the rod 12 is held close enough to the supply of staples on arm 7 to prevent such staples from being dislodged from said arm.

To permit block 8 to be removed from feeding position when a new supply of staples is inserted on arm 7, rod 9 is pro-

vided with a slot 14 through which a pin 15 carried by casing 5 extends and upon which pin rod 9 may be pivoted and swung out of position, as shown in Figs. 3 and 10, when block 8 is moved out beyond the extremity of arm 7. The movement of block 8 beyond the extremity of arm 7 also releases rod 12 which may then be swung upward to permit the placing of staples on the arm 7.

It will be noted that staple-feed-block 8 through the action of spring 11 presses the supply of staples on staple-supply-arm 7 toward staple-guide 6 but that no staple can be forced into staple-guide 6 until driver 4 which is reciprocable in said guide, is raised above the staples carried by arm 7. Whenever driver 4 is so raised, a staple is forced into guide 6 beneath the driver and in position to be driven downward by the driver.

Driver 4 is raised to permit a staple to be fed beneath it by a latch 16 carried by handle 3 and which is adapted to be pressed downward against the action of a spring 17 and engage a latch pin 18 carried by a driver-back 19 riveted to the upper end of driver 4. Latch 16 which extends up through handle 3 is provided at its upper extremity with a knob 20 which may be pressed downward by the thumb of the operator. Latch 16 fits in a groove 21 formed in hammer 2 and is slightly bent at a point intermediate its extremities so that pressure of housing 1 at the point of bending will force the lower extremity of the latch into engagement with latch pin 18 when the latch is pressed downward. After latch 16 has been pressed downward into engagement with latch pin 18, handle 3 is raised carrying driver 4 upward until it has passed above the supply of staples on staple-supply-arm 7 whereupon a staple is forced into staple-guide 6 beneath the driver 4.

To release latch 16 from its engagement with latch pin 18 after driver 4 has been raised sufficiently to permit a staple to enter staple-guide 6, latch 16 is provided with a trip-pin 22 which passes through an opening in hammer 2 and is adapted, when raised, to engage a trip-screw 23 carried by housing 1. The engagement between trip-pin 22 and trip-screw 23 forces latch 16 out of engagement with latch pin 18. Hammer 2 is cut away on one side to permit trip-screw 23 to extend into the path of travel of trip-pin 22.

When latch 16 is released from its engagement with latch pin 18, spring 17 raises latch 16 sufficiently so that it will not engage latch pin 18 when the handle 3 is subsequently lowered for the driving operation. Knob 20 of latch 16 is undercut at 24 to engage a hardened plate 25 bolted to the top of handle 3 when spring 17 has raised the latch sufficiently to permit such engage-

ment. This engagement, which is caused by the pressure of housing 1 against the bent portion of latch 16, serves to hold latch 16 above latch pin 18 during the driving blows of handle 3.

When latch 16 is released from its engagement with latch pin 18, driver 4 drops down until its lower extremity contacts with the head of the staple which has been fed in beneath it. The operator then raises and lowers handle 3 a sufficient number of times to drive the staple into the box parts, each lowering of the handle causing hammer 2 to strike driver-back 19 and force driver 4 and the staple downward. When the staple is fully driven into the work, the operator again presses latch 16 into engagement with latch pin 18, the driver 4 is raised, and another staple is fed into staple-guide 6.

It will be noted that each time the driver is raised above the supply of staples on staple-supply-arm 7, one staple is fed into staple-guide 6 and that no staple can be fed into staple-guide 6 while the driver occupies said guide, and that driver 4 and hammer 2 being disconnected, the driver may remain in staple-guide 6 until the staple beneath it is fully driven regardless of how many blows are required to force the staple into the work. This is particularly advantageous in driving the long staples required in wirebound box blanks as several blows are usually required to drive such a staple into box parts by a manual operation.

To prevent hammer 2 from turning in housing 1, the hammer is flattened for a certain distance on one side, as shown in Figs. 2, 3 and 11, and a pin 26 is driven through housing 1 in such position as to contact with the flat side of hammer 2, thus preventing any turning movement of the hammer. Said flattened side of hammer 2 and pin 26 also serves to limit the up and down movement of the hammer.

To facilitate the feeding of staples along staple-supply-arm 7, said arm is made wider at its base than at its top and its sides are tapered so that when staples are placed thereon the legs of the staples will be uniformly spread. This uniform spreading of the staple legs on the supply-arm insures a lengthwise contact between the legs of adjacent staples and prevents the leg of one staple from being forced under the leg of an adjacent staple. Thus the pressure of feed-block 8 is communicated uniformly to each staple on supply-arm 7 and said staples are fed along said arm without any tendency to jam.

To assist in guiding a staple from staple-supply-arm 7 into staple-guide 6, said arm 7 is provided with a bevelled surface 27 on which the points of a staple may slide when the staple is forced into guide 6.

Staple-guide 6, at the point where the

staples enter, is wider than at its lower extremity so that the staples fed to the guide from staple-supply-arm 7 may enter the guide without danger of jamming.

To force the legs of the staple into parallelism, the staple-guide 6 is provided with bevels 28 which engage the legs of any staple which may be spread and force them toward each other.

To position the tool relative to a binding wire over which a staple is to be driven, a groove 29 is cut across the bottom of the tool as best shown in Fig. 10. This groove is formed and proportioned to fit over a binding wire and hold it in such position that the staple, when driven, will straddle the binding wire at a definite angle (in the illustrative tool at an angle of 45° to the longitudinal center line of the wire).

To assist the operator in definitely locating the point along the wire where a staple is to be driven, notches 30 are cut in casing 5 opposite the staple-guide 6 as shown in Fig. 10. These notches indicate to the operator where the staple will be driven so that by shifting the tool along the wire until a notch 30 registers with the point on the wire where a staple is desired the operator is able to definitely control the location of the staples in the work.

The operation of the tool is as follows: After placing a supply of staples on staple-supply-arm 7 in the manner hereinbefore described, the operator rests the bottom of the tool on the box parts to be stapled, positioning the groove 29 over the binding wire *c*, as shown in Fig. 1, and shifting the tool along the binding wire until notch 30 is opposite the desired staple-driving point. The parts of the tool are then in the position shown in Fig. 7. Knob 20 of latch 16 is then pressed downward forcing latch 16 into engagement with latch pin 18, as shown in Fig. 4. Handle 3 is then raised carrying driver 4 upward above the supply of staples on staple-supply-arm 7, as shown in Fig. 5, whereupon staple-feed-block 8, through the action of spring 11, forces a staple into staple-guide 6. As handle 3 continues to rise, trip-screw 23 engages trip-pin 22 and forces latch 16 out of engagement with latch pin 18, whereupon, driver 4 drops downward until it rests on the head of the staple which has been fed in beneath it, and latch 16, through the action of spring 17, is raised sufficiently to permit cutaway portion 24 of knob 20 to snap over hardened plate 25 of handle 3, as shown in Fig. 6, and hold latch 16 in raised position during subsequent staple-driving blows of the handle 3. Handle 3 is then driven downward causing hammer 2 to strike driver-back 19 and force the driver 4 and the staple toward the work. Handle 3 is then raised and lowered a sufficient number of times to drive the staple

out of staple-guide 6 into the work, the staple being guided and supported at all times by the staple-guide 6 which forces the staple legs into a parallel relationship and
 5 over the binding wire held in the groove 29. When the staple is completely driven, the tool is moved to position for driving the next staple. Knob 20 is again pressed down forcing latch 16 into engagement with latch
 10 pin 18 to raise the driver and permit a staple to be fed beneath it when handle 3 is raised.

While the illustrative tool is designed primarily for use in repairing crippled or defective box blanks, it may be used to advantage for other purposes, for instance, when
 15 a few sample boxes, or boxes of odd sizes, are required, they may be made more economically by using the tool of the invention than by setting up a box blank machine to
 20 make the small number of such boxes required.

Obviously, the invention is not limited to the particular embodiment thereof shown for illustration but may be otherwise embodied as will appear to those skilled in the
 25 art.

Having described the invention, I claim:

1. A stapling tool comprising means to hold a supply of staples, a staple-guide to
 30 receive and support a staple during a staple-driving operation, means to feed a staple to the staple-guide, a staple-driver, a hammer to impart driving force to the driver, means normally held in inoperative position for
 35 connecting said hammer and driver, and means for causing said last-mentioned means to assume an operative position to cause said driver to be lifted with said hammer so that
 40 a staple may be fed beneath the driver into the staple-guide.

2. A stapling tool comprising means to hold a supply of staples, a staple-guide to receive and support a staple during a staple-driving operation, means to feed a staple to
 45 the staple-guide, a staple-driver, a hammer to impart driving force to the driver, means normally held in inoperative position for connecting said hammer and driver, and manually operable means for causing said
 50 last-mentioned means to assume an operative position to cause said driver to be lifted with said hammer so that a staple may be fed beneath the driver into the staple-guide.

3. A hand-operated stapling tool comprising, in combination, the staple-guide 6, the
 55 driver 4 operable in the guide 6, the staple-supply-arm 7, the staple feed block 8 to feed staples to the guide 6, the hammer 2 to impart driving force to the driver, and the
 60 latch 16 to raise the driver, all constructed, arranged and operable substantially as and for the purpose described.

4. A stapling tool comprising means to hold a supply of staples, a staple-guide to receive and support a staple during a staple-driving operation, a staple-driver operable
 65 in said guide, means to feed a staple to the staple-guide whenever said guide is not occupied by said driver, a hammer to impart driving force to the driver, means normally
 70 held in inoperative position for connecting said hammer and driver, and controllable means for causing said last-mentioned means to assume an operative position to cause said
 75 driver to be lifted with said hammer so that a staple may be fed beneath said driver into the staple-guide.

In testimony whereof, I have signed my name to this specification.

CHARLES J. WESTIN.