

Jan. 30, 1945.

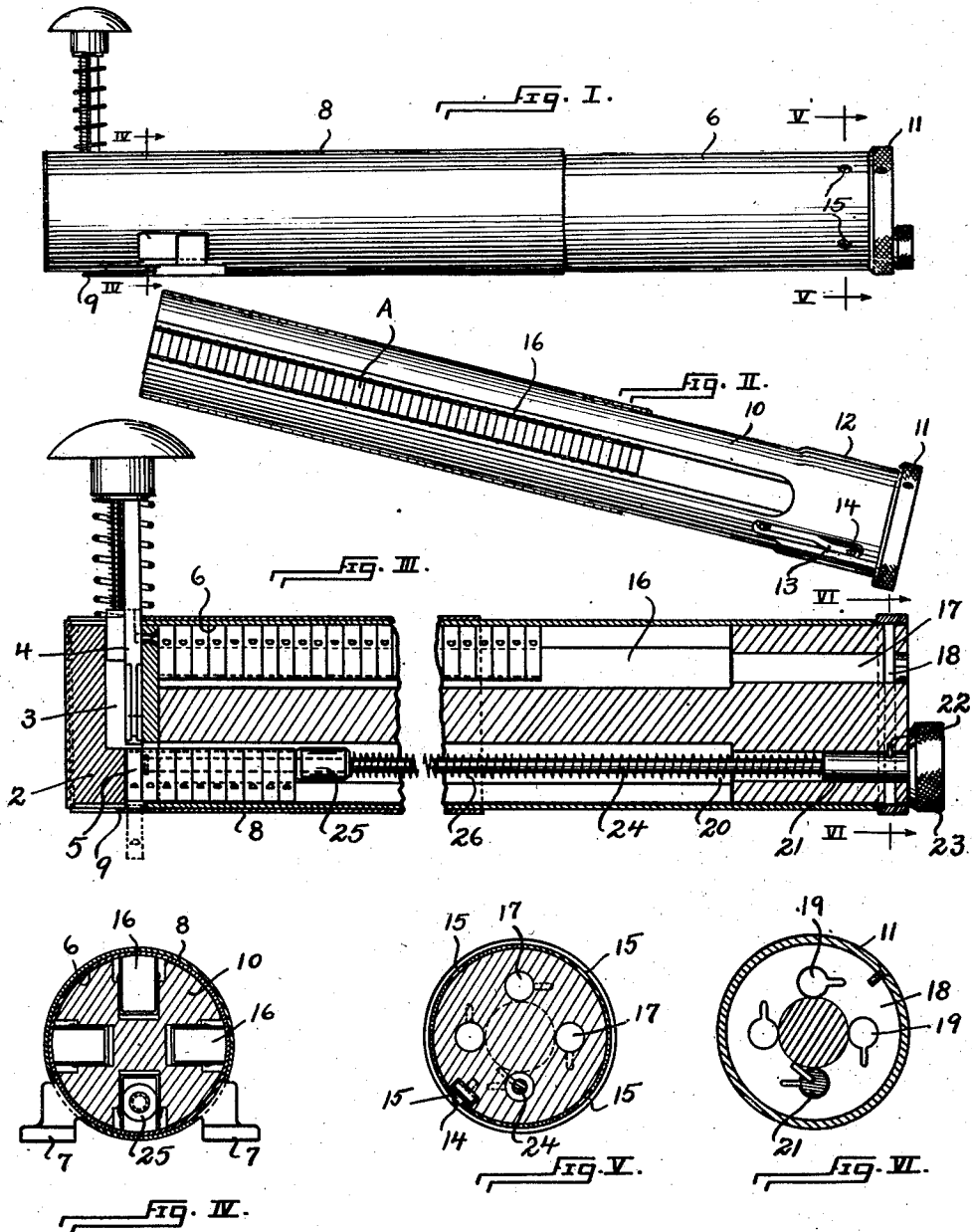
D. R. LA PLACE

2,368,552

STAPLING APPARATUS

Filed Sept. 3, 1942

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

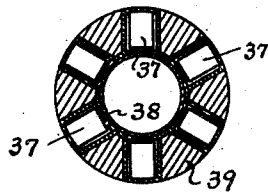
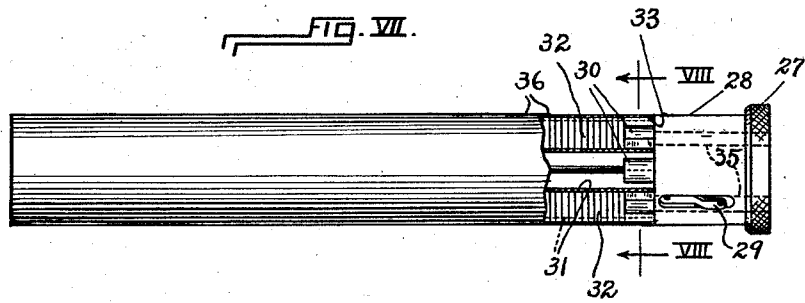


FIG. IX.

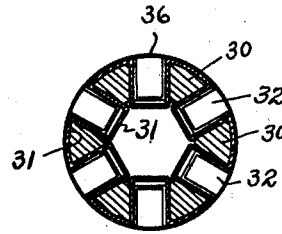


FIG. VIII.

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UNITED STATES PATENT OFFICE

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STAPLING APPARATUS

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Application September 3, 1942, Serial No. 457,167

8 Claims. (Cl. 1—49)

This invention pertains to the art of stapling and more particularly to a stapling apparatus in which preformed staples are used, and the invention pertains especially to a magazine construction for apparatus of this kind.

Preformed staples are commonly secured together in face-to-face relation, usually being bonded with an adhesive to form rows or sticks of staples. Driving mechanism is commonly provided for accommodating only a single row or stick of staples. The present invention provides a stapling tool having a magazine which will receive a number of rows of staples, the staples of which may or may not be cemented together. With the present invention the capacity of the stapling machines can be very substantially increased. The invention further contemplates that a portion of the magazine may be of inexpensive construction so that it may be readily discarded and replaced by another, the replacement units being part of an original staple package. The staples may thus be packaged in a magazine element which can be inserted as a unit into the stapling machine.

My invention may be fully understood by reference to the accompanying drawings:

Figure 1 is a side elevation of one form of stapling machine embodying my invention;

Figure 2 is a side elevation of one form of magazine member comprising a part of the machine shown in Figure 1;

Figure 3 is a longitudinal vertical section through the assembly shown in Figure 1, the view being on a scale slightly larger than Figure 1;

Figure 4 is a transverse vertical section in substantially the plane of line IV—IV of Figure 1;

Figure 5 is a transverse vertical section in the plane of line V—V of Figure 1;

Figure 6 is a transverse vertical section in the plane of line VI—VI of Figure 3;

Figure 7 is a side elevation of a modified form of magazine construction, part of the figure being in section;

Figure 8 is a transverse section through the magazine shown in Figure 7; and

Figure 9 is a view similar to Figure 8 showing a modified form of magazine.

In Figures 1 to 4 of the drawings, I have illustrated a stapling mechanism in which staples of a generally U-shaped form are employed, although the particular mechanism illustrated shows a special form of driver and a special form of staple having lugs struck up from the legs thereof, this particular form of staple being the subject matter of a copending application, Serial

No. 346,959, filed July 23, 1940 for improvements in Stapling machine and method of stapling now issued as Patent 2,308,611 of January 19, 1943.

In the drawings, 2 designates a solid metal block having a guideway 3 therein in which a driver 4 is slidable. The lower part of the guideway designated 5 forms a recess into which staples are delivered, one at a time, as will hereinafter be more fully described, to be engaged by the driver 4. The body 2 is fixed in a cylindrical shell 6 and this shell is provided at 7 with oppositely projecting feet which enables the tool or stapling device to be set upon a flat surface and these feet prevent it from rolling. The shell 6 in Figure 3 is illustrated as being surrounded by a short slidable sleeve 8 which has a tongue 9 that projects across the bottom of the staple guide 5. This sleeve is desirable, as pointed out in my copending application for a special type of staple but for ordinary staples not equipped with lugs on the legs it is not required.

Inserted in the open end of the shell 6 is a magazine or barrel designated generally as 10 and which has a knurled terminal portion 11 that is accessible at the end of the shell 6 to enable the barrel to be turned in the shell 6 or to be withdrawn from the shell 6. Extending inwardly from the knurled rim 11 is a cylindrical portion 12 which has a rotating fit inside the sleeve 8. It is shown as having a spring detent 13 thereon. This detent has a projection 14 that is adapted to yieldably enter one of several holes 15 in the shell. The detent 13 in conjunction with the holes 15 provides an indexing mechanism whereby the position of the magazine or barrel may be properly co-related to the driver.

Extending forwardly from the cylindrical portion 12 is an extension which has a number of longitudinal grooves or channels 16. The channels 16 are shaped to receive a row or stick of staples, these staples being designated generally as A. The staples constituting the row A may be cemented together or they may be detached from one another. The grooves or channels 16 are of a dimension such as to snugly receive the staples. While the individual staples are illustrated in Figures 2, 3 and 4 as being provided with small lugs projecting from the legs thereof, conventional staples may be used in place of the particular form illustrated. Where lugs are provided on the legs of the staples the outer part of the channels 16 is slightly wider than the inner part to provide clearance for these lugs. In Figures 1 to 6 of the drawings, the magazine is provided with four channels or grooves 16 to

accommodate four separate rows of staples but any number may be employed consistent with good design for the machine and subject to the size of the staples and the diameter of the magazine. Since there are four rows of staples there are four indexing holes 15 in the shell 6 of the tool.

Extending longitudinally from the end of each channel 16 to the outer end of the barrel is a hole 17. At 18 is an annular space and the outer end of each hole 17 is in the form of a key slot; these key openings being best shown in Figure 6 and being designated 19. Removably inserted in one of the openings 17-19 is a staple row feeding mechanism designated by the reference numeral 20. It has a shaft portion 21 of the same diameter as the hole 17 and it has a radial pin 22 which can pass through the key slot in the opening 19 and be received in the space 18. It has at its outer end a knurled knob 23. Extending forwardly from the shaft portion 21 is a rod 24, the length of this rod being such that it is longer than the magazine, and reaches almost to but does not extend into the staple guide 5. This rod, as best shown in Figure 4, is clear of the staples in the groove 16 along which the rod extends so that it does not contact the staples or interfere with the longitudinal movement of the row of staples. This rod acts merely as a guide for a pusher or follower 25 that is slidable along the rod. A compression spring 26 confined between the follower 25 and the part 21 of the assembly exerts a pressure on the follower, tending to urge the row of staples in the groove 16 in which the follower is pushed toward the staple guide 5. Thus, as one staple is driven out through the guide 5 the whole row is pressed forward to bring the next staple into position to be driven. The staple row feeding mechanism is always positioned in that channel 16 which is in registration with the staple guide, i. e. the bottom channel as viewed in Figures 3 and 4. When one row of staples has been exhausted the knob 23 is turned so that the pin 22 may come out through the key slot and the whole mechanism is then pulled back and removed entirely from the magazine. The magazine is then rotated to bring another channel into staple driving position, the knurled rim 11 on the barrel enabling the barrel to be grasped and turned. After the magazine has been turned the staple row feeding mechanism is inserted to feed the new row of staples.

The invention thus provides a stapling apparatus having a shell or magazine which removably receives a rotatable barrel, this barrel holding a plurality of rows of staples, each of which may be successively brought into a position to be consumed. Also, there is provided an arrangement wherein the axis of the barrel is perpendicular to the member 4 which reciprocates across the end of the barrel for removing the staples one at a time from the row which is being consumed.

The barrel or mechanism, instead of being made entirely from metal, may be made wholly or partly from wood or from a plastic so that the barrel may be thrown away after all of the staples are consumed and a new barrel used in its place. In this case, an original package of staples will comprise a barrel having channels therein with the rows of staples arranged in the channels. A paper sleeve or envelope 36 may, as shown in Figure 8, be wrapped around the barrel to retain the staples in a package of this character.

Instead of the rotatable barrel being completely discarded, the barrel may be of a composite construction in which there is one permanent part to which a removable and throw-away cylindrical holder may be attached, as shown for example in Figures 7 and 8. Referring to Figures 7 and 8, the rotatable barrel has a knurled knob 27 and a cylindrical part 28 which fits within the shell 6 and which carries an indexing detent 29 similar to the detent 13. The forward end of the part 28 has a castellated extension 30. The staple holder is shaped from sheet material, preferably metal, to provide a body 31 of generally cylindrical form in which the metal is of crenelated form providing a series of longitudinal grooves 32 for holding conventional U-shaped staples. One end of the sheet metal magazine fits frictionally into the castellated end 30 of part 28. When the sheet metal holder 31 is applied to the supporting member the parts fit together as illustrated in Figure 7 and the ends of the channels 32 properly line up with the holes 35 through which staple-row-feeding mechanism, similar to that shown in Figure 3, may be inserted. The magazine structure 31 may hold several rows of staples and can be discarded after the staples have been consumed. To provide a shipping package the periphery of the carrier 31 may be enclosed within a paper cover or sleeve 36 as shown in Figure 8, and this may, if desired, be left in place when the magazine is inserted in the chamber of the stapling tool.

Instead of being constructed as shown in Figure 8, the cross section of the carrier may be of the form illustrated in Figure 9 in which the channels for receiving the rows of staples are turned inwardly instead of outwardly. In this construction, 37 designates the staple receiving channels, and 38 is a hollow core which may be either of metal or paper and which may be permanently or removably placed within the carrier and which will hold the staple against radial displacement. This carrier may be temporarily fitted to a permanent part 39, similar to the member 28 of Figure 7. The core 38 serves to keep the staples in their respective channels.

While I have illustrated and described certain particular forms of magazines or barrels, it will be understood that this is merely by way of illustration and that various changes and modifications may be made within the construction and the arrangement of parts in the invention and under the scope of the following claims, and that the invention is adapted to various types of stapling machines other than the one specifically shown.

I claim as my invention:

1. In a stapling apparatus, a cylindrical staple holder having an annular series of longitudinally extending staple receiving channels therein, each of said channels being shaped to receive a row of substantially U-shaped staples with the legs thereof pointed toward the periphery of the holder, and means for confining rows of staples in the channels.

2. Stapling apparatus comprising, a cylindrical staple holder having an annular series of longitudinally extending outwardly opening staple receiving channels therein of a width and depth equal to the width and depth of the staples to be received therein, a stapling machine having a chamber for receiving said holder, said holder being rotatable in said chamber, and means for feeding staples from the holder to the stapling machine.

3. A staple package comprising a holder of cylindrical form having an annular series of longitudinally extending outwardly opening staple receiving channels therein, rows of staples in the channels of said holder with the legs thereof pointing toward the periphery of the holder, and means for restraining the staples in said channel against displacement in a radial direction.

4. Stapling apparatus comprising a stapling mechanism having a chamber, a rotatable barrel in the chamber having a series of longitudinally extending outwardly opening staple holding channels therein each adapted to receive a row of staples therein with the legs of the staples pointing outwardly, means at one end of the chamber providing a staple guide from which staples are dispensed one at a time, means for indexing the barrel in the chamber whereby the channels may be successively aligned with said guide, and feeding means guided in one end of the barrel for engaging the row of staples which is in alignment with said guide for urging said row of staples toward the guide.

5. Stapling apparatus comprising a stapling mechanism having a chamber, a rotatable barrel in the chamber having a series of longitudinally extending outwardly opening staple holding channels therein each adapted to receive a row of staples therein with the legs of the staples pointing outwardly, means at one end of the chamber providing a staple guide from which staples are dispensed one at a time, means for indexing the barrel in the chamber whereby the channels may be successively aligned with said guide, and feeding means for engaging the row of staples which is in alignment with said guide for urging said row of staples toward the guide, said means being removably entered through the end of the barrel.

6. A stapling machine comprising a body having a guide therein, a driver slidably mounted in the guide, a shell providing a cylindrical chamber the longitudinal axis of which is at right angles to the plane of the driver, and a rotatable barrel in said chamber having an annular series of longitudinally extending staple receiving channels therein, said barrel being axially removable from the shell at the end remote from the guide.

7. A stapling machine comprising a body having a guide therein, a driver slidably mounted in the guide, a shell providing a cylindrical chamber the longitudinal axis of which is at right angles to the plane of the driver, a rotatable barrel in said chamber having an annular series of longitudinally extending staple receiving channels therein, and indexing means for releasably holding the barrel in one position in which one of the channels is pushed to deliver the staples to said guide, said barrel being axially removable from the shell at the end remote from the guide.

8. A stapling machine comprising a body having a guide therein, a driver slidably mounted in the guide, a shell providing a cylindrical chamber the longitudinal axis of which is at right angles to the plane of the driver, a rotatable barrel in said chamber having an annular series of longitudinally extending staple receiving channels therein, indexing means for releasably holding the barrel in one position in which one of the channels is positioned to deliver staples to said guide, and means entered into the channel which is so positioned for moving the row of staples therein toward the driver, said barrel being axially removable from the shell at the end remote from the guide.

DESMOND R. LA PLACE.