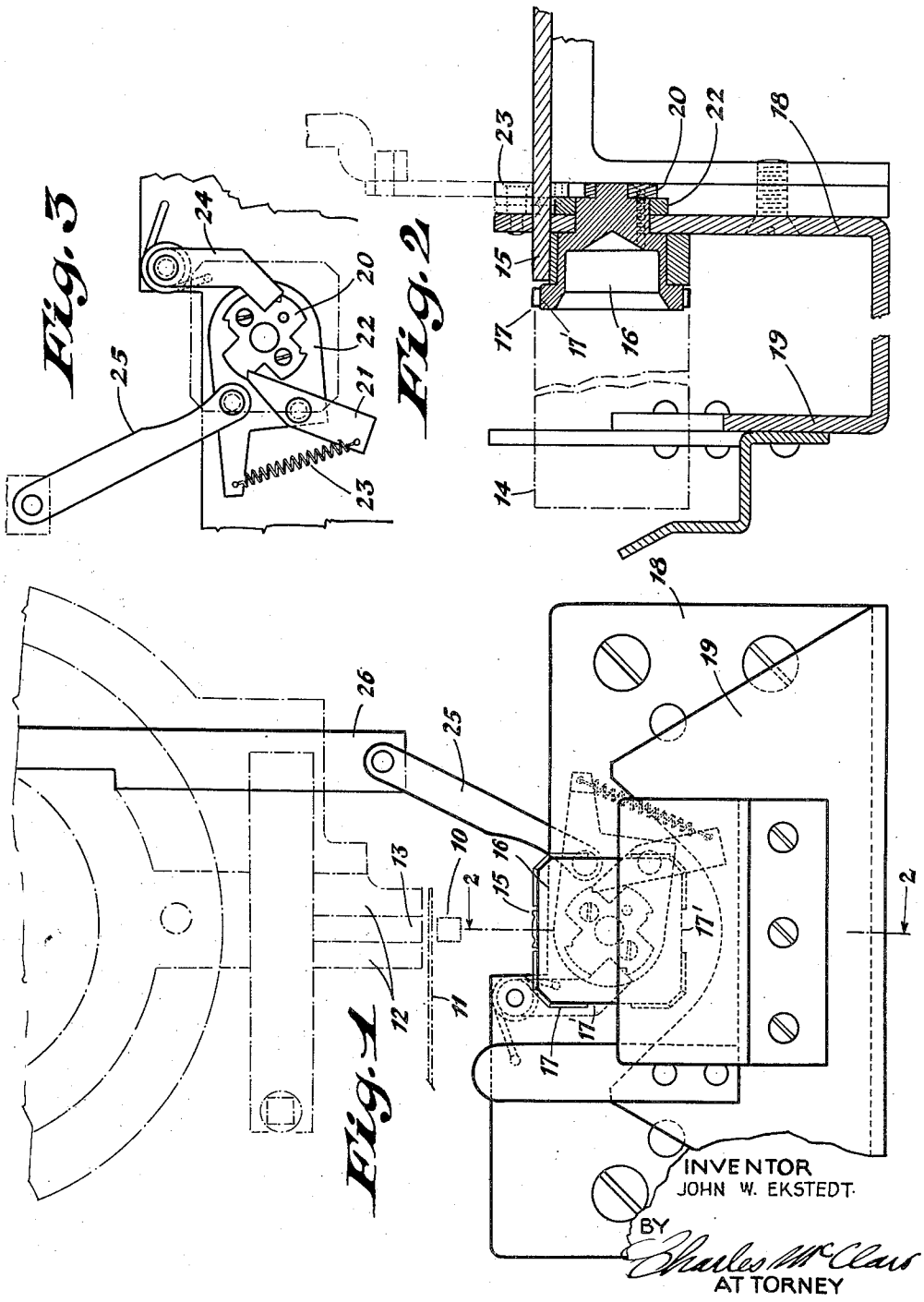
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BOX STAPLING MACHINE

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BOX STAPLING MACHINE

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My invention relates to a stapling machine for driving staples into the sides of a box or carton, and more particularly to a mechanism for successively registering the sides of the box being stapled with the staple driving mechanism in synchronism with the operation of the staple driving mechanism.

The usual stapling machine is provided with a retractable anvil around which the staple is formed from a length of staple wire, a staple driver or driving bar which drives the staple into the side of the box or carton placed on a stationary member or clincher in registry with the staple driver. After each side is stapled, the box is turned manually to present the next successive side to the staple driver. A pedal must be operated to cause the driving mechanism to actuate the staple driver each time a staple is to be driven, or if the machine is designed to operate the staple driver a predetermined number of times corresponding to the number of sides on the box to be stapled, the operator who manually handles the box or carton during the stapling operation must be fast and accurate to produce a well stapled box, since the box must be turned to present each side in succession during operation of the machine. The above method of stapling is slow, produces boxes which are not uniformly stapled, and may be dangerous to the operator.

It is, therefore, an object of my invention to provide a box stapling machine having a mechanism for intermittently rotating a box or carton of polygonal transverse cross section to be stapled to successively bring the sides of the box or carton in registry with the staple driving mechanism in synchronism with the operation of the staple driving mechanism.

In the preferred embodiment of my invention I provide mechanism mounted on the stapling machine adjacent the staple driving mechanism and clincher and comprising a rotatable mandrel fitting into the open end of the box, and an indexing mechanism, preferably of the ratchet and pawl type, operatively connected to the rotatable mandrel and actuated by the staple driving mechanism to rotate the mandrel and the box step by step to successively register the sides of the box with the staple driving mechanism and clincher. For convenience, a cradle may be provided for supporting the box or carton to be stapled.

The novel features which I believe to be characteristic of my invention are set forth with particularity in the appended claims, but the invention itself will be best understood by reference to the following description taken in connection with the accompanying drawing in which Figure 1 is an end view of a portion of a stapling machine with my invention applied thereto; Figure 2 is a vertical section taken along the line 2—2 of Figure 1 showing details of the indexing mechanism, the rotatable mandrel for registering the sides of the box with the stapling mechanism and the cradle for supporting the box or carton to be stapled; and Figure 3 is a view showing the details of the ratchet and pawl indexing mechanism operated by the stapling mechanism for intermittently rotating the mandrel.

The mechanism made in accordance with my invention is associated with the usual stapling machine partially shown in broken lines in Figure 1 and having a retractable anvil 10 over which a staple wire 11 is fed, a forming means 12 which cuts a predetermined length from the staple wire, forms it around the anvil into a staple and automatically retracts the anvil, a staple driving member or driving bar 13 vertically slidable in the frame of the stapling machine for driving the staple thru the material of the box 14, shown in dotted lines in Figure 2, against a stationary clinching member 15 rigidly attached to the frame of the stapling machine to clinch the staple to the side of the box. This mechanism is well known and may take, for example, the form shown in U. S. Patent 662,184 of November 20, 1900, to Briggs et al.

In accordance with my invention a rotatable mandrel is mounted adjacent the clincher member beneath the staple driver and shaped to fit into the open end of the box or sleeve type carton in which a flanged partition may be stapled. The mandrel is provided with as many faces as there are sides to the box to be stapled, a face registering with each side of the box and is relatively shallow to permit the spacing of said partition close to the end of the box.

The mandrel is rotatably journalled in an adapter plate, which is secured to the stapling machine and which may, if desired, have its end upturned to provide a cradle to support the free end of the box to be stapled. As best shown in Figures 1 and 2 the mandrel 16, provided with the faces 17 having central depressions 17' for clearing the clinched ends of the staples when the stapled box is taken from the mandrel, is rotatably supported in a bearing of the adapter plate or frame 18, and fits into the end of the box, which is positioned to extend over the

clinching member 15. This positive engagement of the mandrel 16 and box 14 results in the rotation of the box with the mandrel when the mandrel is rotated to successively present the sides of the box to be stapled to the staple driving mechanism. The end of the frame 18 may be provided with an upturned end 19 forming a cradle for supporting the free end of the box 14.

The mandrel is rotated by means of an indexing mechanism of the intermittent type comprising a ratchet wheel fastened to the mandrel and a pawl, which is actuated by the staple driving mechanism so that the mandrel is rotated thru a sufficient arc to present the next succeeding side of the box to the staple driver after each staple is driven into place. As best shown in Figures 2 and 3 the indexing mechanism comprises a ratchet wheel 20 fastened to the rotatable mandrel 16 and having in this case four arms or teeth and a driving pawl 21 pivotally supported on a rocker plate 22, which is in turn rotatably supported on the mandrel 16, the pawl 21 being resiliently engaged with the ratchet wheel 20 by means of the spring 23 connected to the pawl 21 and the plate 22. A spring urged locking pawl 24 prevents reverse rotation of the mandrel and ratchet wheel after the mandrel has been rotated to bring the next successive side of the box to be stapled in registry with the staple driver and the clinching member.

This ratchet and pawl mechanism is operated with a step by step motion by means of a link 25 connected to the rocker plate 22 and actuated by a plunger or reciprocating bar 26, which is connected to be operated from or moved up and down in synchronism with the staple driving mechanism. The reciprocating plunger 26 may be slidably mounted upon the frame of the conventional wire stitcher, and, as will be obvious to those skilled in the art, may be connected in any suitable manner to the reciprocating mechanism of the stapling head. Referring to the front end view of my device as shown in Figure 1, as the driving bar 13 moves down to drive a staple the plunger 26 also moves down with link 25 causing the plate 22 to be rotated in a clockwise direction. The pawl 21, which is urged into engagement with the ratchet wheel 20 at all times, slips over the ratchet wheel 20 to engage the next succeeding tooth and when the plunger 26 returns to its upper position after the staple has been driven, the plate 22 carrying the pawl 21 rotates the ratchet wheel 20 and mandrel 16 in a counter-clockwise direction to bring the next succeeding side of the box to be stapled into registry with the staple driver and clinching member, the locking pawl 24 engaging the next succeeding tooth to lock the pawl against clockwise movement.

I have thus provided a simple and effective means for quickly and accurately registering the successive sides of a box to be stapled with the staple driving mechanism in synchronism with the operation of the staple driving mechanism, thereby saving time, producing uniformly stapled boxes and eliminating the hazards to the operator which accompany the usual manual rotation of the box to be stapled.

While I have indicated the preferred embodiments of my invention of which I am now aware and have also indicated only one specific application for which my invention may be employed, it will be apparent that my invention is by no means limited to the exact forms illustrated or the use indicated, but that many variations may be made in the particular structure used and the purpose for which it is employed, without departing from the scope of my invention as set forth in the appended claims.

What I claim as new is,—

1. A stapling machine having a staple driving mechanism and a clinching member cooperating therewith, a cradle mounted on said machine for slidably supporting on one end a box to be stapled, a rotatable mandrel fixed in spaced relation with said cradle for engaging the other end of the box and intermittent gearing associated with said mandrel and actuated by the staple driving mechanism for rotating the mandrel step by step to rotate the box in the cradle and successively bring the sides of the box at said other end in registry with the staple driving mechanism and said clinching member.

2. A stapling machine having a staple driving mechanism and a cooperating clinching member, a cradle mounted on said stapling machine for slidably supporting the outer end of a box to be stapled, means to support the other end of said box in stapling relationship with said staple driving mechanism, said means comprising a rotatable mandrel for engaging the box to be stapled inwardly from its said other end, a ratchet connected to said mandrel, a pawl cooperating with said ratchet, and connections between said pawl and the staple driving mechanism for rotating said mandrel to bring the successive sides of the box at said other end over the clinching member and in registry with the staple driving mechanism after each staple is driven.

3. A stapling machine for inwardly positioning and fastening a partition in the end of a sleeve type carton comprising a reciprocating staple driving mechanism and a stationary clinching member, a bearing fixed to said clinching member, a multi-faced mandrel for internally engaging said carton at one end with one face in alignment with the surface of said clinching member journaled in said bearing for rotation about a fixed axis, said clinching member being of less width than said one face and centrally positioned with respect to said one face.

4. A stapling machine comprising a reciprocating staple driving mechanism in cooperative relation with a stationary clinching member, a plate with two upwardly extending flanges, one flange being secured in fixed spaced relation with said clinching member, a mandrel journaled in said one flange in cooperative relationship with said clinching member, the other flange being recessed in axial alignment with said mandrel.

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