





# UNITED STATES PATENT OFFICE.

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## STAPLE FORMING AND DRIVING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 620,444, dated February 28, 1899.

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*To all whom it may concern:*

Be it known that we, BONIFACE A. GRASBERGER and BENEDICT J. GRASBERGER, of Richmond, in the county of Henrico and State of Virginia, have invented a new and Improved Staple Forming and Driving Apparatus, of which the following is a full, clear, and exact description.

This invention relates to an apparatus for forming staples of wire and for driving and clenching the same.

The apparatus is adapted particularly for use in connection with wood-veneer butter-dishes, or may of course be used in other connections.

This specification is the disclosure of one form of our invention, while the claims define the actual scope of the invention.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a vertical section of the invention on the line 1 1 of Fig. 2. Fig. 2 is an irregular section on the line 2 2 of Fig. 1, and Fig. 3 is a fragmentary rear elevation of the bending-fork and the driving-plate.

In the drawings we have shown only those parts which relate to our invention, it being understood by those skilled in the art that the apparatus may be applied to any basket-making machinery or that the organism shown may be used alone with the help of manual attendance.

On a support 4 is mounted a stand or frame composed of two side walls 5, between which run parallel front and rear walls 6 and 7, thus forming a vertically-disposed passage-way, in which are placed to operate the bending and driving devices. A rod 8 is held to reciprocate vertically and passes beneath the support 4, where connection may be made with treadle or other devices for reciprocating the rod. The upper end of the rod 8 projects above the stand or frame 5 and carries a rigid arm 9, which overhangs the walls 6 and 7 and has the staple forming or bending tool 10 rigidly attached thereto. This tool 10 is in the form of a plate lying against the rear wall 7 of the stand and having its edges in close proximity with the respective side

walls 5. The lower end of the plate 10 is provided with two downwardly-projecting fingers 11, forming a fork by which the wire is bent. The lower ends of these fingers 11 have edges for cutting the wire as the plate descends. Attached rigidly to the staple forming or bending tool 10, at the front thereof, is the driving tool or plate 12, that lies snugly against the front face of the bending-tool and projects below the fingers 11. This tool 12 lies in close proximity to the inner face of the front wall 6 of the stand or frame.

Located between the walls 5, 6, and 7, at the lower portion thereof and directly against the wall 7, is the anvil 14, on which the staples are formed. This anvil has a reduced upper portion 15, over which the fingers 11 of the forming or bending tool straddle. The reduced portion 15 is provided with a groove 16 in transverse alinement with the groove 17 in the wire-feed duct 18, which passes transversely through the right-hand wall 5, so that the wire may be pushed from the groove 17 into the groove 16 by the usual feed devices of stapling-machines. The tool 10, descending with the rod 8, engages one of the fingers 11 with the wire at the point adjacent to the feed-duct 18, so as to sever a portion of the wire from the main length of the wire. Then as the tool 10 continues to descend the severed portion of the wire has its ends bent down toward the lower portion of the anvil, thus forming a staple the arms of which lie one on each side of the reduced portion 15 of the anvil at points below the groove 16 and the main portion or body of which lies in the groove 16. When this movement has been accomplished, the tool 10 should, by predetermined timing of the mechanism, return to its raised position, as in Fig. 1.

Mounted to have slight backward-and-forward movement on the upper portion of the rear wall 7 of the stand and at the rear of said wall is an arm 19, that carries at its lower portion a cam-block 20, projecting through an opening 21 in the rear wall 7, so as to be engaged by the bending-tool 10 as the same descends, thus throwing rearward the arm 19. The fingers 11 of the bending-tool 10 straddle the cam-block 20, the block being engaged by the body of the bending tool or plate 10. The



arm 19 is kept normally forward by a spring 22, pushing against the rear face thereof. The lower end of the arm 19 carries two vertically-disposed and parallel staple-ejecting wings 23, that move, respectively, through slots 24, cut in the rear wall 7 of the stand or frame. These wings 23 are arranged to move past the respective sides of the reduced portion 15 of the anvil 14, so that as the wings move forward they engage with the arms of the staple and push the same out of the groove 16 to a position directly beneath the driving plate or tool 12 and forward of the front face of the anvil. Then as the rod 8 descends with the tools 10 and 12 the driving-tool 12 engages the staple thus pushed forward and drives the staple downward below the stand or frame and into the work.

The work to be stapled or secured is placed on a swinging clenching-arm 25, held by the support 4 and caused to move up and down in unison with the movements of the driving-tool 12 by means of a cam-lever 26, fulcrumed on the support 4 and provided with a slot 27, receiving a pin 28 on the rod 8, whereby the cam-lever is operated.

The operation of the device therefore is as follows: The wire is fed through the duct 18 into the groove 16, and as the tool 10 descends the wire is cut and the staple is formed. During this operation the action of the tool 10 should be so timed that by engagement with the cam-block 20 the wings 23 will be held backward, so as not to interfere with the emplacement of the wire in the groove 16. When the staple is formed, the tool 10 is raised past the cam-block 20, so that the spring 22 pushes the wings 23 forward and dislodges the staple from the groove 16. Then the rod 8 again descends, carrying with it the tools 10 and 12, so that the tool 12 engages the staple and drives the same home, while the tool 10 operates to form a second staple. Simultaneously with these operations the clenching-arm 25 will be raised and lowered in appropriate time, so that the driving-tool 12 will be assisted in the work of clenching the staple. It will thus be

seen that for the formation and clenching of the staple two reciprocations of the tools 10 and 12 are necessary, the first reciprocation to form the staple and the second to drive the same.

Having thus described our invention, we claim as new and desire to secure by Letters Patent—

1. In a staple forming and driving apparatus, the combination of a support having a vertically-extending passage-way therein, a pivotally-mounted clenching-arm, a cam-lever mounted below the arm to actuate the same, a vertically-reciprocating rod having connection with the lever, a staple-forming tool movable in the passage-way and in connection with the rod to be moved thereby, a staple-driving tool having connection with the staple-forming tool and movable in the passage-way, an anvil mounted in the lower portion of the passage-way and having a staple-forming tool operating therewith, a staple-ejecting plate movable past the anvil, and means for carrying and for operating said plate.

2. In a staple forming and driving apparatus, the combination with a stand having a longitudinally-disposed passage-way therein, of an anvil mounted in the lower portion of the passage-way and adapted to have the staples bent thereon, a bending-tool reciprocal in the passage-way and coacting with the anvil, a swinging arm mounted on the exterior of the stand, ejector-plates carried by the arm and extending into the passage-way of the stand to push the staple from the anvil, and a cam-block attached to the arm and extending through an opening in the stand to the interior of the passage-way, the cam-block being engaged by the bending-tool upon the movement thereof to throw the arm away from the stand.

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