H. E. DILL & W. P. MARSH.

CRIMPING MACHINE.

APPLICATION FILED SEPT. 5, 1908.

942,890. Patented Dec. 14, 1909.

3 SHEETS—SHEET 1.

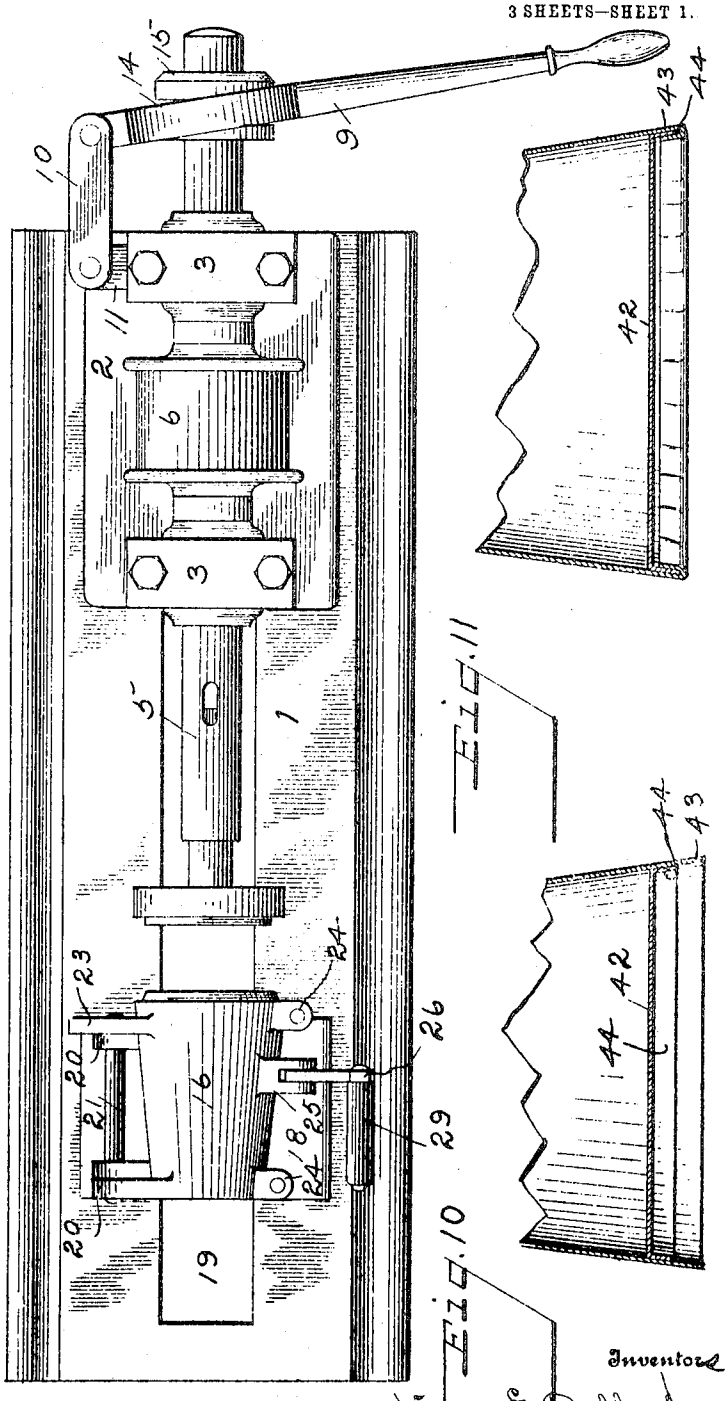

Fig. 1.

Fig. 11

Fig. 10

Witnesses

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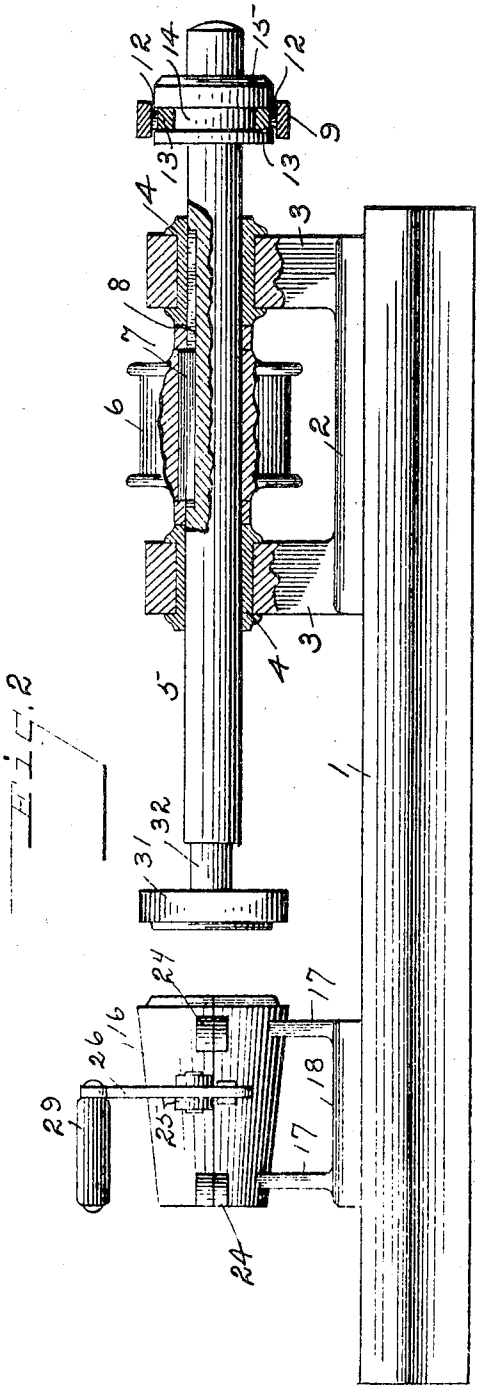

Fig. 2.

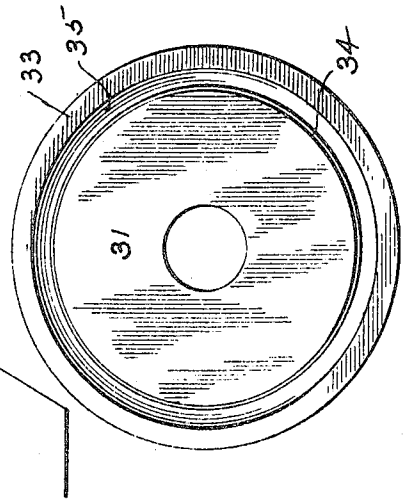

Fig. 4.

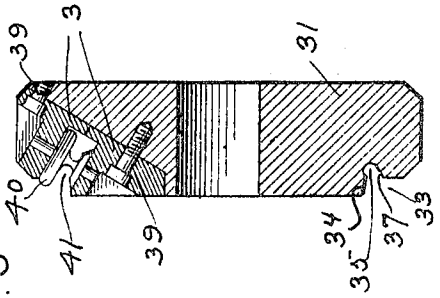

Fig. 5.

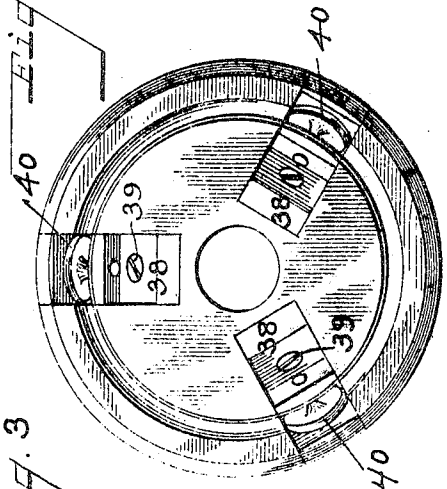

Fig. 3.

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3 SHEETS—SHEET 3.

Fig. 6.

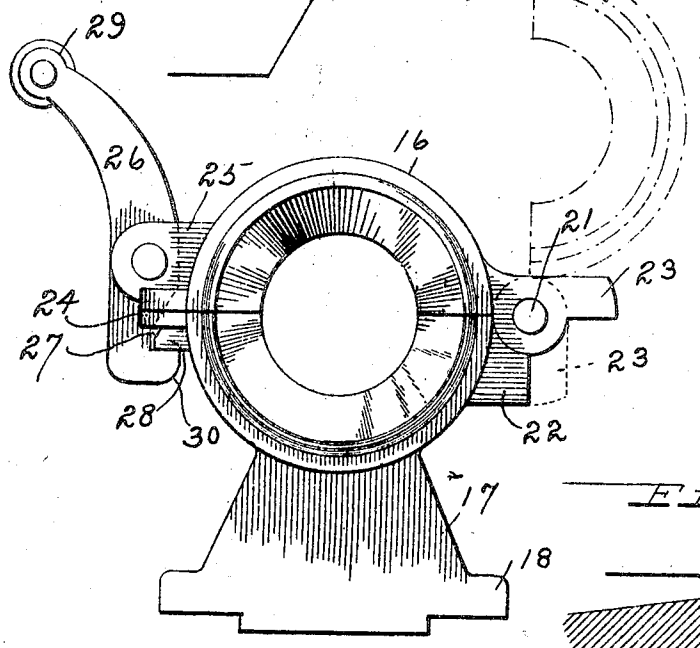


Fig. 9.

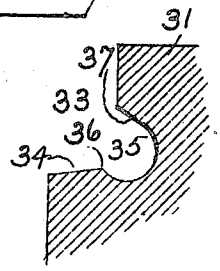


Fig. 8.

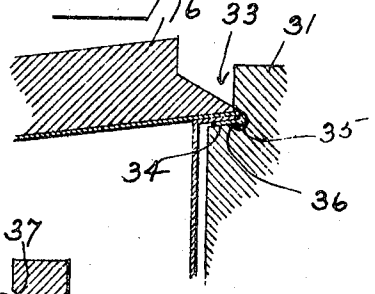
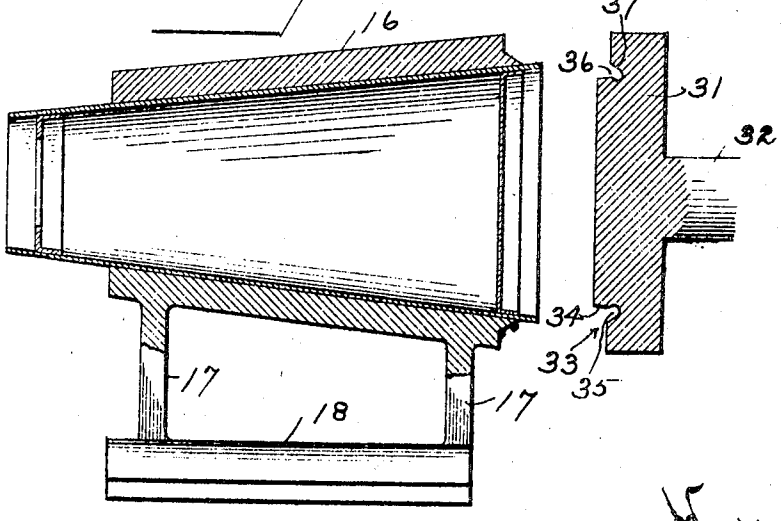


Fig. 7.



Witnesses

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UNITED STATES PATENT OFFICE.

HARRY E. DILL AND WILLIAM P. MARSH, OF DAYTON, OHIO, ASSIGNORS OF ONE-THIRD TO SAID DILL, ONE-THIRD TO MALON P. WOODY, AND ONE-THIRD TO W. ALLISON SCOTT, OF INDIANAPOLIS, INDIANA.

CRIMPING-MACHINE.

942,890. Specification of Letters Patent. **Patented Dec. 14, 1909.**

Application filed September 5, 1908. Serial No. 451,791.

To all whom it may concern:

Be it known that we, HARRY E. DILL and WILLIAM P. MARSH, citizens of the United States, residing at Dayton, in the county of Montgomery and State of Ohio, have invented certain new and useful Improvements in Crimping-Machines, of which the following is a specification.

Our invention relates to paper working mechanism, and particularly to a crimping machine for folding inward upon itself, the edge of a tubular body.

The machine forming the subject matter hereof is especially adapted for securing the bottom in paper bottles in the manner shown and described in U. S. Patent No. 667,218, issued February 5 1901 to John H. Hanks.

The object of the invention is to produce a machine for performing the operation described in the aforementioned patent, which will not only be cheap in construction, but will be reliable and efficient in operation, capable of being rapidly operated by unskilled labor, whereby the paper bottle forming the subject matter of the above mentioned patent and similar structures may be produced at minimum cost, and which will be unlikely to get out of repair.

Further objects are to provide improved means for turning the fold at the bottom of the bottle inward over the flange of the bottom section automatically, and to provide efficient means for securely holding the bottle during such operation.

With the above primary and other incidental objects in view as will more fully appear from the specification, the invention consists of the means, mechanism, construction, and mode of operation, or their equivalents, hereinafter described and set forth in the claims.

Referring to the drawings Figure 1 is a plan view of the assembled machine. Fig. 2 is a side elevation, partly in section of the complete machine. Figs. 3 and 4 are face views of two forms of crimper heads or folders. Fig. 5 is a sectional view of the head shown in Fig. 3. Fig. 6 is a front view of the clamp or holder for the bottle during the crimping or folding operation. Fig. 7 is a sectional view of the gripper or holder and the crimper head with the work in place, but before being operated upon by the crimper head or folder. Fig. 8 is a detail sectional view of the holder, the crimper head and the work at the completion of the folding operation. Fig. 9 is a detail view showing the contour of the crimper head. Figs. 10 and 11 are sectional views of the lower portion of the paper bottle, before and after the crimping or folding operation respectively.

Like parts are indicated by similar characters of reference throughout the several views.

In constructing the machine there is employed a bed portion 1 which may be supported on suitable legs, or secured on a bench or table. Located on the bed 1 and adjacent to one end thereof is a head 2 having uprights 3 in which are formed bearings 4 for a longitudinally movable, revoluble shaft 5. Located on the shaft 5 between the uprights 3 is a drive pulley 6, provided with a feather or key 7 engaging the key way 8 in said shaft 5, whereby said shaft may be shifted longitudinally through said pulley and bearings, while being at the same time rapidly revolved through the medium of said pulley. The shaft 5 is reciprocated by a lever 9 pivoted to a link 10, which in turn is pivoted to a lug 11 projecting from one of the uprights 3. The operating lever 9 is provided with studs 12 which engage a bearing collar 13 located in a groove 14 in a collar 15 secured to the shaft 5.

Secured on the bed 1 in axial alinement with the shaft 5 is the gripper or holder for the work, which comprises a hollow conical body 16 divided longitudinally into an upper and a lower portion. The holder is of such diameter and angle or inclination as to conform to the shape of the bottle or other article to be operated upon. The main portion of the holder is supported upon standards 17 and a base 18 resting on the bed 1. The bed 1 is preferably formed with a central slot 19 within which the head 2 and the holder are engaged in a usual manner by clamp screws or otherwise, in order that the holder for the work and the head 2 by which the crimper or folder is carried may be adjusted to and from each other.

Each of the halves of the holder are provided with overlapping lugs 20 through which extends a pin 21 thereby hinging the two halves of the holder together. One of the lugs of the lower half extends into the

plane of movement of the corresponding lug of the upper half as at 22, the lug of the upper half being extended as at 23 to engage said projecting lower lug, whereby the relative movement of the parts about their hinged connection will be limited, as shown by dotted lines in Fig. 6. On the side opposite the hinge lugs each half of the holder is provided with lugs 24 registering with each other and further provided with dowel pins to insure the proper registry of the respective halves of the holder. The upper half of the holder is further provided with a lug 25 to which is pivoted a lever 26, recessed at its lower end at 27 to engage a lug 28 projecting from the lower half of the holder. The upper end of the lever 26 is curved outward and carries a handle 29, by which the lever may be disengaged from the lug 28, and the upper half of the holder turned on its hinge connection as shown by dotted lines in Fig. 6. The lower end of the lever 26 is beveled at 30 to enable it to more readily engage the lug 28. The curvature of the upper part of the lever and the weight of the handle tends to turn the lever on its pivotal connection, whereby the hooked extremity of the lever will automatically engage the lug 28 when the holder is closed.

It has been found in practice that stock of different grades requires slightly different treatment, further stock of a given grade will vary in its characteristics under varying atmospheric conditions. To provide for this two interchangeable folders or crimper heads are employed. The heads only differ in that one is provided with a plurality of rollers. Referring first to Figs. 4, 7, 8 and 9, the folder head comprises a circular portion 31 having a shank 32 adapted to engage in a socket in the end of the shaft 5. The forward peripheral edge of the head is rabbeted at 33, the central portion being slightly conical or inclined at 34 to correspond with the inclination of the sides of the bottle or other article operated upon. The angle of the peripheral rabbet is recessed at 35 a semicircular groove being formed therein, the said groove projecting inward toward the axis of the head below the surface of the projecting conical portion 34, forming a shoulder 36, which while well defined is by no means abrupt. The opposite side of the groove 35 is inclined outward, or formed flaring as at 37. The head shown in Fig. 3 is shaped as already described, and is further recessed at regular intervals, in which recesses are located bearing blocks 38 secured in place by screws 39. Journaled in the bearing blocks 39 are rollers 40 each having therein a groove 41 whereby the roller will conform to the shape of the rabbet 33 and recess or groove 35. Whereas the head of Fig. 5 presses upon the work and operates by friction only, the head of Fig. 3 possesses in addition a rolling action.

The articles to be operated upon are presented to the machine in the condition shown in Fig. 10, with the bottom 42 secured therein, and the sides 43 projecting beyond the flange 44 of the bottom 42. The work to be performed consists in folding the projecting edge of the sides inward and back upon the flange 44, as in Fig. 11. In as much as the diameter of the bottle at the lower edge in Fig. 10 is greater than the diameter of the interior of the bottle in a plane adjacent to the bottom section, due to the inclination of the sides of the vessel, the inturned portion of the sides must be reduced somewhat in circumference, which is accomplished by forming therein numerous minute crimps or plaits. By the action of the crimper head the inturned portion of the vessel sides is folded and pressed to parallelism. The forward portion of the holder 16 is reduced to a comparative sharp edge, to permit the crimper head to closely approach the holder without interference. However the holder 16 has no part whatever in the folding or crimping operation, further than a support for the article, and to prevent it rotating with the crimper head. As shown in Fig. 8 the forward portion 34 of the crimper head projects within the holder 16 at the limit of its movement, and presses outward the inturned edge against the interior of the holder. The depression back of the shoulder 36 relieves the pressure on the bended edge of the paper and prevents cutting of same. The flaring outer periphery of the depression first engages the paper and guides the edge into the groove by which it is reversed upon itself, the longitudinal movement pressing the reversed edge inward to the limit of its movement to form the overlapped edge.

From the above description it will be apparent that there is thus produced a machine of the character described, which possesses the particular features of advantage before enumerated as desirable, but which obviously is susceptible of modification in its form, proportion, detail construction, and arrangement of parts, without departing from the principle involved or sacrificing any of its advantages.

Having thus described our invention, we claim:

1. In a machine as described, the combination of the main frame of a longitudinal movable revoluble shaft, means for reciprocating said shaft, and means for rotating said shaft during its reciprocatory movement, crimper head carried by said shaft comprising a disk having a peripheral rabbet, said rabbet having two plane faces and a semi-circular groove connecting the faces

of said rabbet and extending below the plane of both faces thereof, substantially as specified.

2. In a machine as described, the combination of the means for holding the article to be operated upon, of a revoluble crimper head comprising a disk, a portion of reduced diameter projecting from the forward face of said disk having a slightly tapered periphery, a grooved depression in said disk forming with said tapered portion a peripheral shoulder, a means for moving said crimper head to and from the work, substantially as specified.

3. In a machine as described, the combination of means for holding the article to be operated upon, a revoluble crimper head comprising a disk having a peripheral rabbet at the forward edge thereof, said rabbet having two plane faces and a grooved depression joining the two faces of said rabbet, the outer periphery of said grooved depression being inclined to the axis of rotation, while the inner periphery of said grooved depression extends below the periphery of said annular rabbet and forms therewith a shoulder, substantially as specified.

4. In a machine as described, the combination of the main frame, a longitudinal moving revoluble crimper head carried on said frame, a holder for the article to be operated upon comprising a hollow body the interior of which is shaped to conform to the contour of the article, said hollow body being divided longitudinally into halves, hinged connections between the respective halves, a hook shaped lever pivoted to the one of said halves, a projecting boss on the other half with which the said hook shaped lever engages, substantially as specified.

5. In a machine as described, the combination with a revoluble longitudinal movable crimper head, of a holder for the work to be operated upon, comprising a hollow body, the interior of which is shaped to conform to the contour of the article, said hollow body being longitudinally divided into two corresponding halves, hinged lugs on the respective halves of said holder, a hinge rod projecting through the hinge lug of the respective halves of the holder, one of the lugs of the upper half of said holder being projected beyond the pivotal point, a projection on the lower half of said holder extending into the path of travel of said projecting lug and adapted to limit the movement thereof, substantially as specified.

6. In a machine as described, the combination of a revoluble longitudinally movable crimper head with a holder for the work to be operated upon, comprising a hollow body the interior of which conforms to the contour of the article, said body being longitudinally divided into halves, the respective halves being hinged together, a curved lever pivoted to the upper half of said holder, said lever having a hooked shaped recess, a lug on the lower half of said holder with which said hook shaped recess engages, a handle on said curved lever, the curvature of said lever and weight of the handle being such that the holder will automatically engage the lug when the respective halves of the holder are moved about their hinged connections to their closed positions, substantially as specified.

7. In a machine as described, the combination of a holder with the article to be operated upon comprising a hollow conical shaped body one end of which is reduced to a comparatively sharp edge, a crimper head, an annular portion projecting therefrom, the periphery of which is inclined to correspond with the inclination of the interior of said hollow body, an annular groove forming with said annular projecting portion a shoulder, the opposite side of said groove being formed flaring or inclined outwardly, and means to cause said head to approach said holder, substantially as specified.

8. In a machine as described, the combination of the main frame, means supported on said frame for holding the article to be operated upon, a revoluble crimper head, an annular depression in said crimper head, a plurality of rollers arranged radially in said crimper head, each roller having a groove therein registering the said annular depressions, substantially as specified.

In testimony whereof, we have hereunto set our hands this 2d day of September, A. D. 1908.

HARRY E. DILL.
WILLIAM P. MARSH.

Witnesses:
HARRY F. NOLAN,
F. L. WALKER.