H. R. HEYL.

MACHINE FOR MANUFACTURING PAPER BOTTLES AND OTHER CONTAINERS.

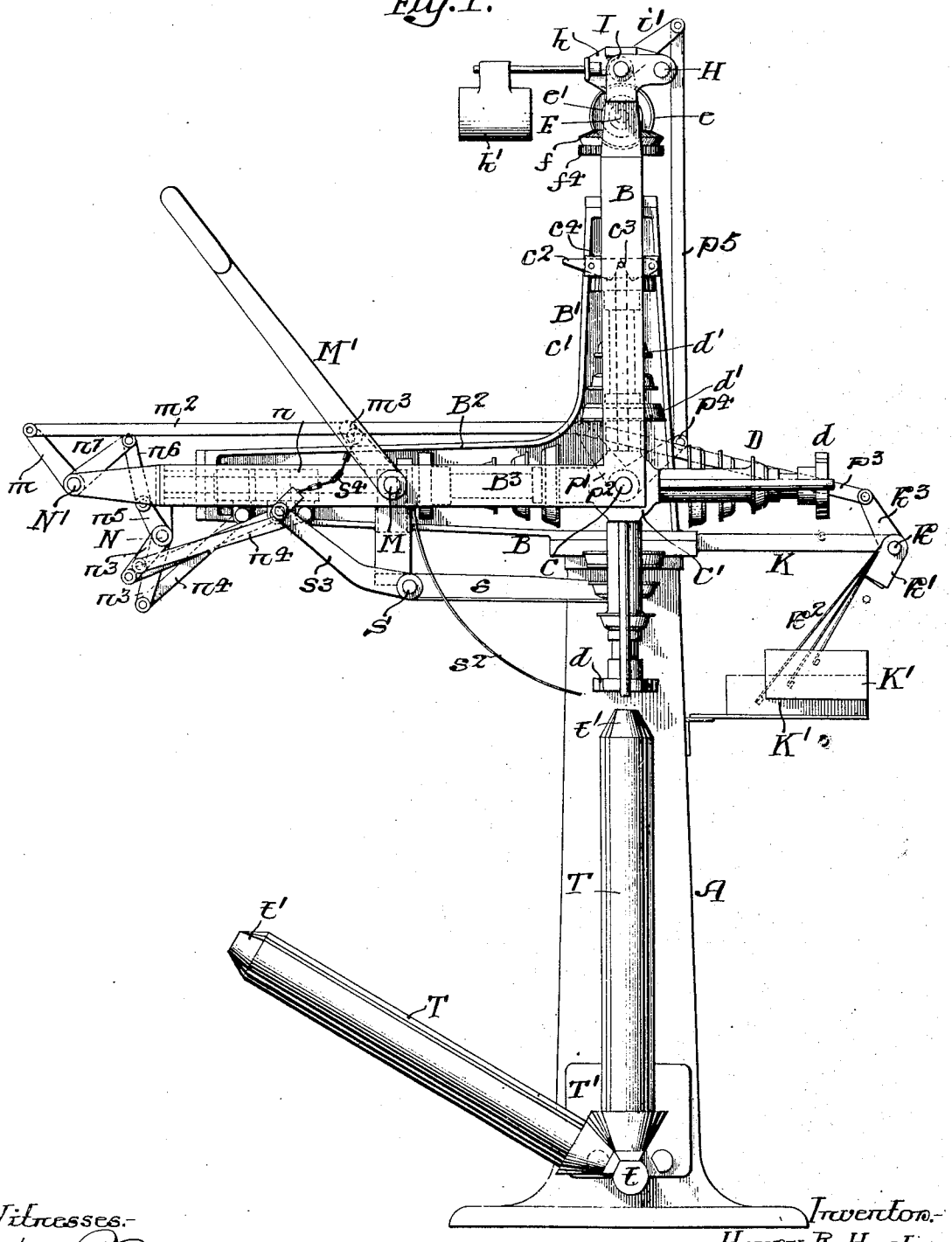
APPLICATION FILED DEC. 6, 1909.

1,024,938.

Patented Apr. 30, 1912.

4 SHEETS—SHEET 1.

Fig. 1.



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4 SHEETS—SHEET 2.

Fig. 6.

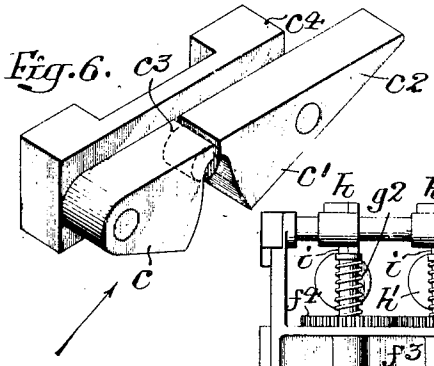
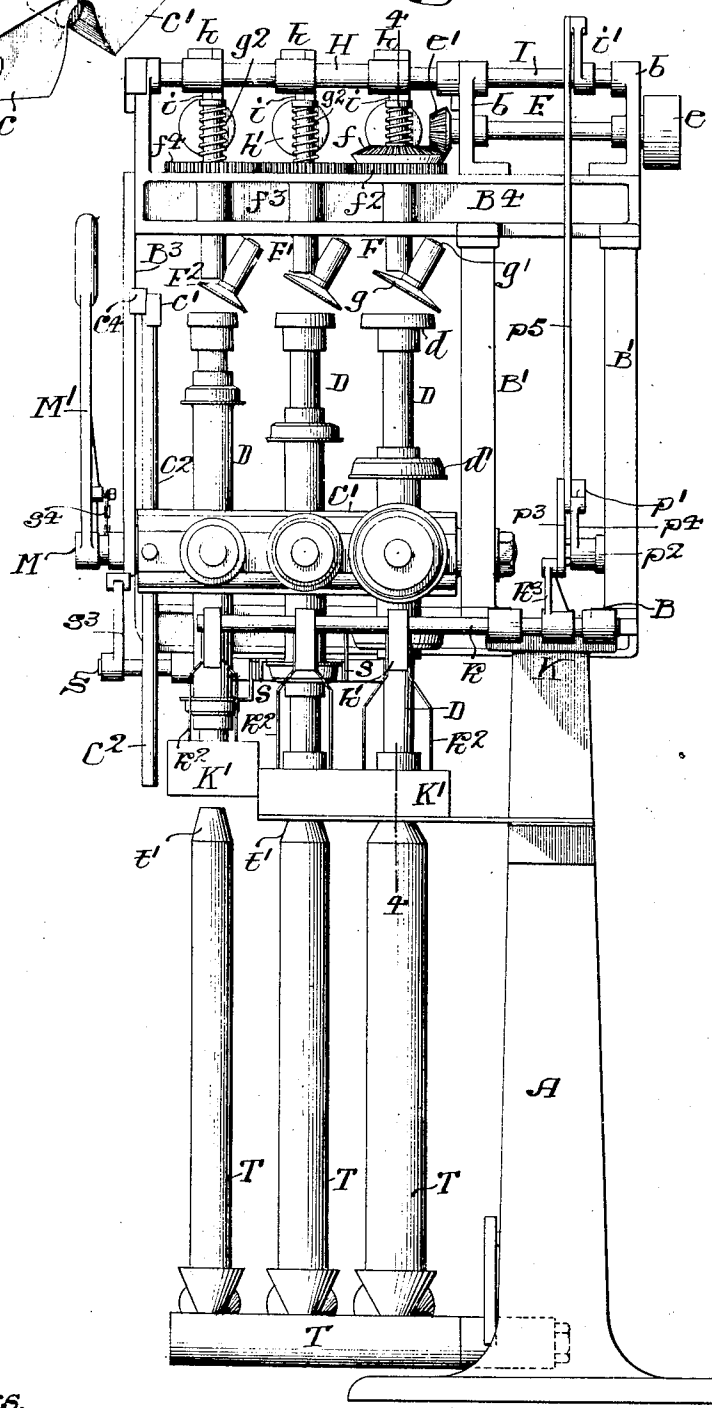


Fig. 2.



Witnesses.

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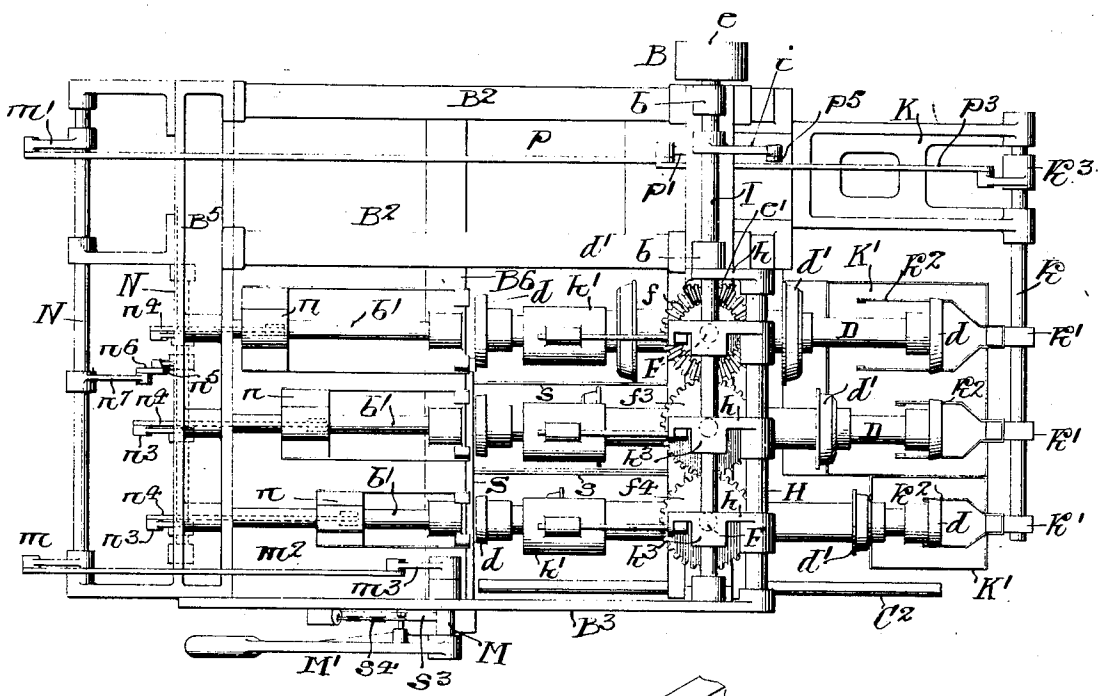
4 SHEETS—SHEET 3.

Fig. 3.



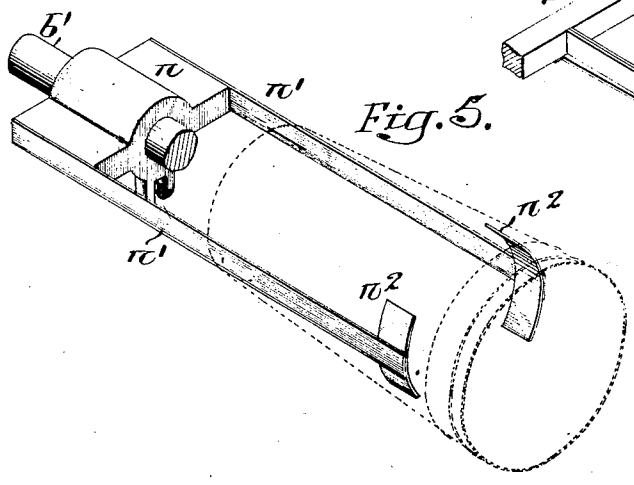


Fig. 5.

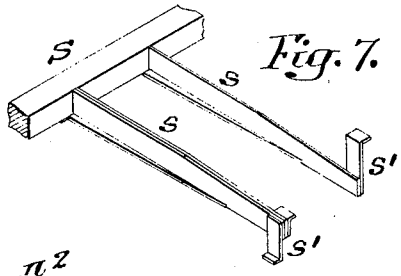


Fig. 7.

Witnesses

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4 SHEETS—SHEET 4.

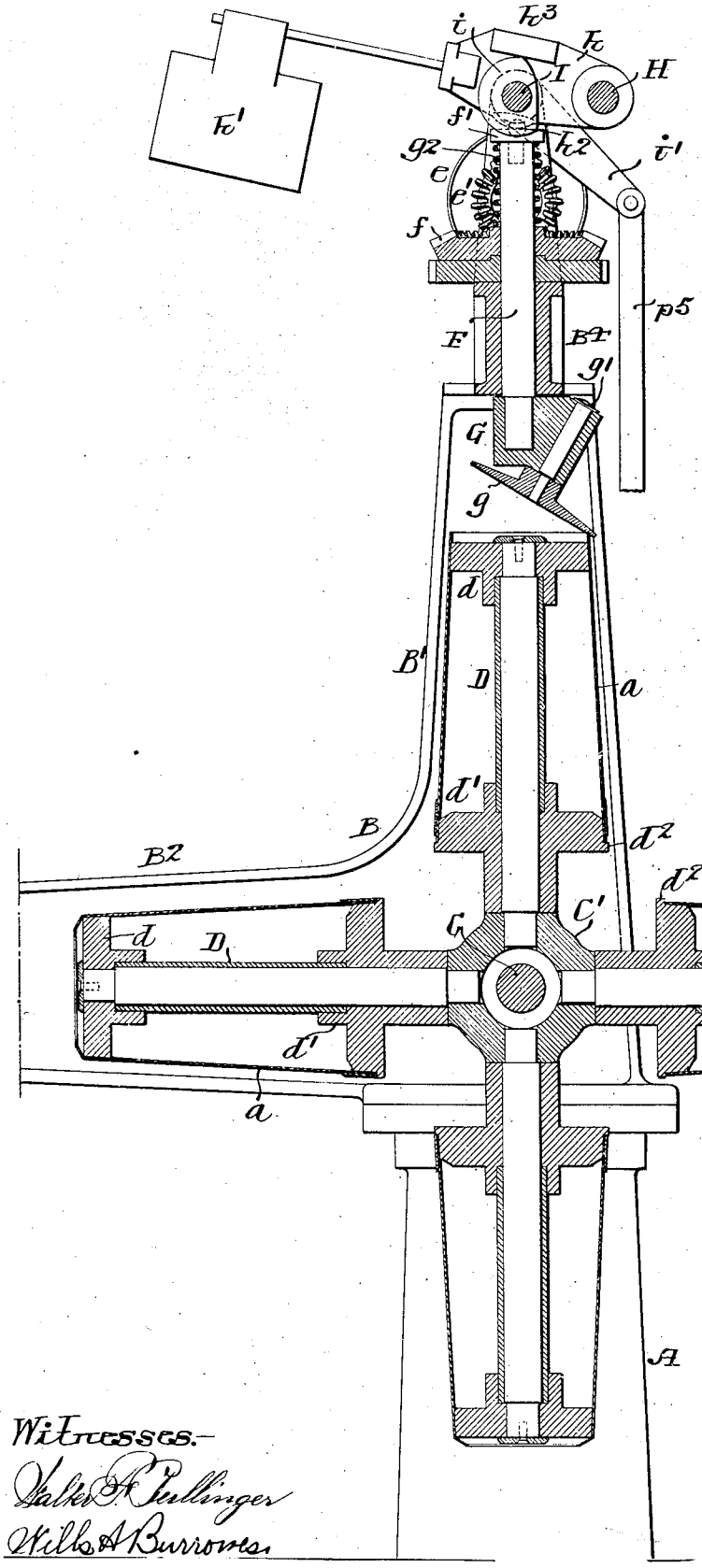

Fig. 4.

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by his Attorneys:
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UNITED STATES PATENT OFFICE.

HENRY R. HEYL, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR TO THE AMERICAN PAPER BOTTLE COMPANY, OF PHILADELPHIA, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

MACHINE FOR MANUFACTURING PAPER BOTTLES AND OTHER CONTAINERS.

1,024,938. Specification of Letters Patent. Patented Apr. 30, 1912.

Application filed December 6, 1909. Serial No. 531,550.

To all whom it may concern:

Be it known that I, HENRY R. HEYL, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Machines for Manufacturing Paper Bottles and other Containers, of which the following is a specification.

My invention relates to an improved machine used in the manufacture of paper bottles or other containers.

The object of the invention is to construct a machine which will partially turn down the flange at the bottom of the bottle and at the same time secure a reinforcing rim to the opposite end of the bottle. This object I attain in the following manner, reference being had to the accompanying drawings, in which:—

Figure 1, is a side view of my improved machine; Fig. 2, is a front elevation; Fig. 3, is a plan view; Fig. 4, is a section on the line 4—4, Fig. 2, drawn to an enlarged scale; and Figs. 5, 6 and 7 are perspective views illustrating details of the invention.

In the manufacture of paper bottles, the body portion is made by rolling a sheet of paper into the form of a tube, preferably conical in shape, and, in order to secure the bottom to the body portion, the bottom, as well as the body portion, is flanged so that the flange of the body portion will fit over the flange of the bottom, and, in order to allow for the nesting of the bottles so that they can be easily transported, the body portions are preferably made tapering, larger at the open end than at the bottom, and this open end is reinforced by a rim of paper secured to the body portion by pasting or other means.

This machine receives and breaks down the body portions to form the flanges and also places and secures the reinforcing rings in position, after which the several body portions are nested and taken to the assembling machine. The present machine is arranged to handle three different sizes of bottles at once, but it will be understood that the machine may be arranged as a single machine, if desired.

A is a standard supporting the frame B which is L-shaped, having a vertical portion B′ and a horizontal portion B^2. C is a shaft mounted in bearings on the frame B and on this shaft is a hub C′ carrying three sets of arms D in the present instance, and each set is made up of four arms, and on these arms are flanges d, d', the flange d' being greater in diameter than the flange d and these flanges are adapted to receive the body portions a of the paper bottles, as clearly illustrated in Fig. 4.

The body portion fits against a rim d^2 on the flange d' to always bring the bottom end of the body portion a given distance away from the flange d, so that it can be partly broken down, as illustrated. On the hub C′ are four arms C^2 by which the hub is turned, the operator grasping these arms and shifting the hub one-quarter turn after each operation. Power may be applied if desired.

The hub is held in a fixed position by means of pivoted jaws c, c', Fig. 6, which are mounted on a plate c^4 and secured to the frame B^3 forming part of the main frame B of the machine. One of the jaws c has a handle c^2 by which it can be raised and a pin c^3 limits the downward movement of the jaws. By this construction it will be seen that the arm, when moved in the direction of the arrow, Fig. 6, lifts the jaw c and the jaw will drop back of the arm and the arm will be held rigidly between the jaws. When it is wished to release the arm the finger is placed upon the handle c^2 of the jaw c', releasing the arm so that it can be moved forward, the jaw dropping back to its normal position.

The mechanism for breaking down the bottom of the body of the bottle is mounted on a beam B^4 secured to the upright members B′ of the frame B. The member B^3 is also secured to this beam.

E is a shaft mounted in bearings b on the beam B^4. This shaft has a pulley e at one end to receive the driven belt and the other end has a beveled pinion e' which meshes with the bevel wheel f on a vertical spindle F adapted to bearings in the beam B^4. This shaft carries a head G, and diagonally mounted in this head is a stud g' carrying a disk g which is of such a size as to bear against the edge of the body portion a of the bottle, illustrated in Fig. 4, so that as the shaft revolves this disk travels around the edge of the bottle. The shaft is weighted so

as to press the disk onto the projecting edge, and this edge will consequently break down as the disk is carried around, making the initial bend for the flange of the body portion of the bottle.

Mounted on a bar H are levers h having adjustable weights h' and these weights bear directly upon each spindle F. In the present instance the cap f' on the end of the spindle has a socket and there is a socket on each lever, and balls h^2 are mounted in the sockets, but this construction may be modified without departing from the essential features of the invention.

A spring g^2 is mounted between the bevel gear wheel f and the cap f' of the spindle and will raise the spindle when it is released from the weighted lever h. This construction is duplicated on the other spindles. The spindles F' and F^2 are driven from the spindle F by a train of gears f^2, f^3 and f^4, Fig. 2.

In order to release the spindles from the weights, I provide a rock shaft I mounted in bearings b and on this rock shaft are cams i which are arranged to bear upon projections h^3 on the levers H, so that on turning the rock shaft all the levers can be raised and the spring g^2 will bring all the spindles back to their normal position, when the hub C' can be turned and another set of bottle bodies can be moved into position to have their flanges broken down. When the bottle bodies are placed on the arms D the rings a' are also placed loosely on the body portions, as shown in Fig. 4, and these rings are driven into place on this machine and secured to the body portions, forming the reinforcing rim and also the stop, so that one bottle can be nested in the other without sticking.

The paste is applied to the body portions after they are placed upon the arms, and the paste does not become dry during the time the ends of the body portions are broken down, so that when the rings are forced into their permanent position the paste unites the two firmly together.

On a bracket K projecting from the frame B is a rock shaft k on which are mounted the arms k', and these arms have fingers k^2 which dip into the paste pots K' secured to a bracket mounted on the standards A. As the shaft k is rocked it brings the fingers in contact with that portion of the body of the bottle over which the ring a will be forced. It is only necessary to tip the body portion with paste, as there is no tendency to dislodge the ring after it has been driven into place.

On the arm B^2 of the frame B is a cross-head B^5 and a cross bar B^6 in which are mounted rods b'. The cross-head and cross bar are connected to the frame B^3. This construction gives rigidity to the structure.

Adapted to slide on the rods b' are sleeves n, Fig. 5, and these sleeves have arms n' with curved sections n^2 at their outer ends, which are shaped to bear upon the body portion back of the rings a'. As the sleeves n are moved forward on the rods b' the rings a' will be forced into position and the paste previously applied to the body portions will firmly unite the rings to the body portions. These pushers are moved forward and retracted by a lever mechanism consisting of a rock shaft N having arms n^3 connected by rods n^4 to the respective sleeves n. This rock shaft has an arm n^5 connected by a link n^6 to an arm n^7 on a rock shaft N' and on this rock shaft are two arms m and m'. The arm m is connected by a rod m^2 to an arm m^3 on a shaft M having an operating lever M' so that on the movement of the operating lever M' in one direction the sleeves will be moved forward and on the reverse movement of the lever the sleeves will be retracted. The arm m' on the shaft N' is connected by a rod p to an arm p' pivoted at p^2 to the standard B' of the frame B, and this arm in turn is connected by a rod p^3 to the arm k^3 on the rock shaft k, so that when the lever M' is moved forward the paste fingers are raised from the paste receptacles and deposit paste upon the bottle body.

An arm p^4 is connected by a rod p^5 to an arm i' on the shaft I, so that when the sleeves n are drawn back the cams i raise the weighted lever h and allow the heads G to be retracted.

In order to discharge the body portions after their ends have been broken down and the rings placed in position, I provide a rocker bar S having arms s provided with projection s' which engage the larger end of the body portion and force it from the disks d, d'. On the rocker bar is an arm s^3 which is loosely connected to the operating lever M' by a chain s^4, so that the discharge device will not operate during the first part of the movement of the lever.

When the arms D are in their lowest position—the body portions drop from the arms directly onto posts T carried by a head T' pivotally mounted at t to a bracket on the standard A. The posts are tapered at t' so as to insure the body portions dropping onto the posts. There are two sets of posts T, one arranged at an angle to the other, so that when the body portions accumulate on one set of posts then can be shifted to bring the other set of posts in line and throw the other set of posts out of line, after which the body portions can be taken off over the latter posts.

s^2, s^2 are curved guards to prevent the accidental displacement of the body portions, as they travel from the horizontal to the vertical position.

By the above construction it will be seen

that I provide a machine which will partly break down the bottoms of the body portions of a paper bottle, so that when these body portions are placed in the assembling machine the flange will be readily and properly formed. Further, by the same machine I assemble and secure in position the reinforcing rims which also act as stops to prevent the bottles adhering one to the other when nested for shipment.

The operator is located in front of the machine and applies to each of the arms D the body of proper size with the ring partly in position. The hub is then turned so as to bring the arms with the body portions of the bottles directly under the disks q, and these disks are rolled over the bottom edge of the body portion, breaking down this edge and forming the preliminary flange. At the same time another set of body portions is in horizontal position and the rings a' are forced, by the sleeves n and their arms, tightly in position at the upper end of the body portions, the rings being secured to the body portions by the paste previously applied. As the hub is given a quarter turn these last mentioned bodies are moved to the discharge position and drop onto the posts T.

It will be understood that while I have shown the machine in the present instance arranged to receive bottles which will contain a quart, a pint and a half-pint, respectively, the machine may be made to break down and reinforce one size of bottle without departing from the essential features of the invention.

I claim:—

1. The combination in a machine for breaking down the flanges of paper tubes, of a form, a rotated shaft, a disk carried thereby and arranged at an angle to the shaft, means for rotating the shaft, means for exerting pressure upon the shaft to force the disk toward the form as the shaft is rotated, and means for raising the disk.

2. The combination of a hub, means for rotating said hub, a series of forms projecting from the hub, a shaft, a bearing carried by said shaft, a stem mounted in the bearing, a disk carried by the stem, means for rotating said shaft, means for exerting pressure upon the shaft to force the disk toward the form, and means for raising the disk.

3. The combination of a frame, a hub mounted in bearings on said frame, a series of arms on said hub, forms on each arm to receive a cylinder of paper or other material, means for breaking down the projecting end of the cylinder, and means for applying a reinforcing band to the cylinder.

4. The combination of a frame, a hub mounted on the said frame having a series of arms, forms on the arms for receiving a paper cylinder, a rotating means for breaking down the end of the paper cylinder when the form is in one position, means for applying paste to a portion of the cylinder, and means for applying a reinforcing ring to one cylinder while the breaking down mechanism is acting upon another cylinder.

5. The combination of a frame, a hub having a series of arms projecting therefrom, a form on each arm for receiving a paper cylinder, a rotating shaft, a disk carried thereby for breaking down the end of the cylinder when the hub is moved so as to bring a cylinder in line with said mechanism, means for forcing a reinforcing ring onto the cylinder, and means for discharging the cylinder after the end has been broken down and the ring applied.

6. The combination of a frame, a hub having a series of arms projecting therefrom, a form on each arm for receiving a paper cylinder, a rotating shaft, a disk carried thereby for breaking down the end of the cylinder when the hub is moved so as to bring a cylinder in line with said mechanism, means for forcing a ring onto the cylinder, means for discharging the cylinder after the end has been broken down and the ring applied, with a pivoted receiver consisting of two posts placed at an angle one to the other, so that one post will receive and nest the cylinders while the other post is out of line to allow for the removal of the nested number of cylinders.

7. The combination of a frame, a hub, a series of arms projecting from the hub and carrying forms to receive paper cylinders, means for applying paste to said cylinders, a rotating shaft, a disk arranged at an angle in respect to the shaft and rotating with the said shaft, means for causing the disk to press upon the end of the cylinders carried by the forms in order to break down the end, a reciprocating means, arms carried thereby and arranged to engage a reinforcing ring, lever mechanism for moving the said arms forward to force the rings tightly onto the cylinders, and an arm for removing the cylinders from the forms.

8. The combination of a tapered form having a shoulder upon which the paper tube rests, the small end of the paper tube extending beyond the form, a vertical shaft, a head on said shaft carrying a bearing arranged at an angle in respect to the line of the shaft, a stud in the bearing, a disk mounted on the stud and adapted to bear upon the end of the conical tube, a weighted lever arranged to press upon the shaft, a cam shaft, a cam thereon for raising the lever, a spring for retracting the shaft when the weight is raised, and means for driving the shaft.

9. The combination of a series of forms having disks of different diameters to fit

different diameters of paper tubes, each form having a shoulder to receive the end of the paper tube, a series of vertically arranged shafts, means for driving said shafts, a bearing mounted on the lower end of each shaft and each bearing carrying a stud arranged at an angle with respect to the center line of its shaft, a disk carried by each stud pressing upon the end of the paper tube, a weighted arm for each shaft, a cam shaft, a series of cams thereon engaging the arms, means for turning the cam shaft so as to raise the weighted arms, and springs acting to lift the shafts.

10. The combination of a form for receiving a paper tube, a rod, a sleeve on said rod, arms on the sleeve arranged to push a ring onto the tube, a rock shaft, an arm on the rock shaft, a rod connecting the said arm with the sleeve, an operating lever, means connecting the operating lever with the said rock shaft, a rocker bar, a discharge device actuated by the rocker bar having arms arranged to engage a form, and means for actuating the rocker bar from the operating lever.

11. The combination of a hub, a series of arms carried by the hub, means for breaking down the end of a paper tube carried by one of the forms, means for placing a ring in position on a paper tube carried by another form, a lever for actuating said means, a rocker bar having arms for discharging the paper tubes from the forms, and a loose connection between the operating lever and the said arms, so that the discharge means will only act through the latter part of the movement of the operating lever.

12. The combination in a machine for breaking down tapered tubes and placing reinforcing rings thereon, of a frame, a hub, arms on the hub, forms carried by the arms for receiving conical paper tubes, a rotating shaft, a disk carried thereby and acting to break down one end of the paper tube, a sleeve carrying arms for forcing a ring upon the outside of the paper tube, means for reciprocating the said sleeve, means for applying paste to a portion of the tube on which the ring is to be forced, a discharge arm for removing the paper tubes from the forms, and means for connecting the several elements so that they will work in unison.

13. The combination in a machine for breaking down the ends of paper tubes and placing reinforcing rings thereon, of a frame, a rotating hub having four arms, forms on said arms to receive a tapered paper tube, means for applying paste to a portion of the paper tube on one form, means for breaking down a paper tube on another form, means for forcing a ring in position over a tube on another form, means for discharging the tube from the fourth form, and means for actuating the several mechanisms in unison so that on turning the hub one-fourth of a revolution and actuating the mechanism the paste is applied at one point, the tube is broken down to another point, the ring is applied at another point and the tube is discharged from the machine at the fourth point.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

HENRY R. HEYL.

Witnesses:
WM. E. SHUPE,
WM. A. BARR.