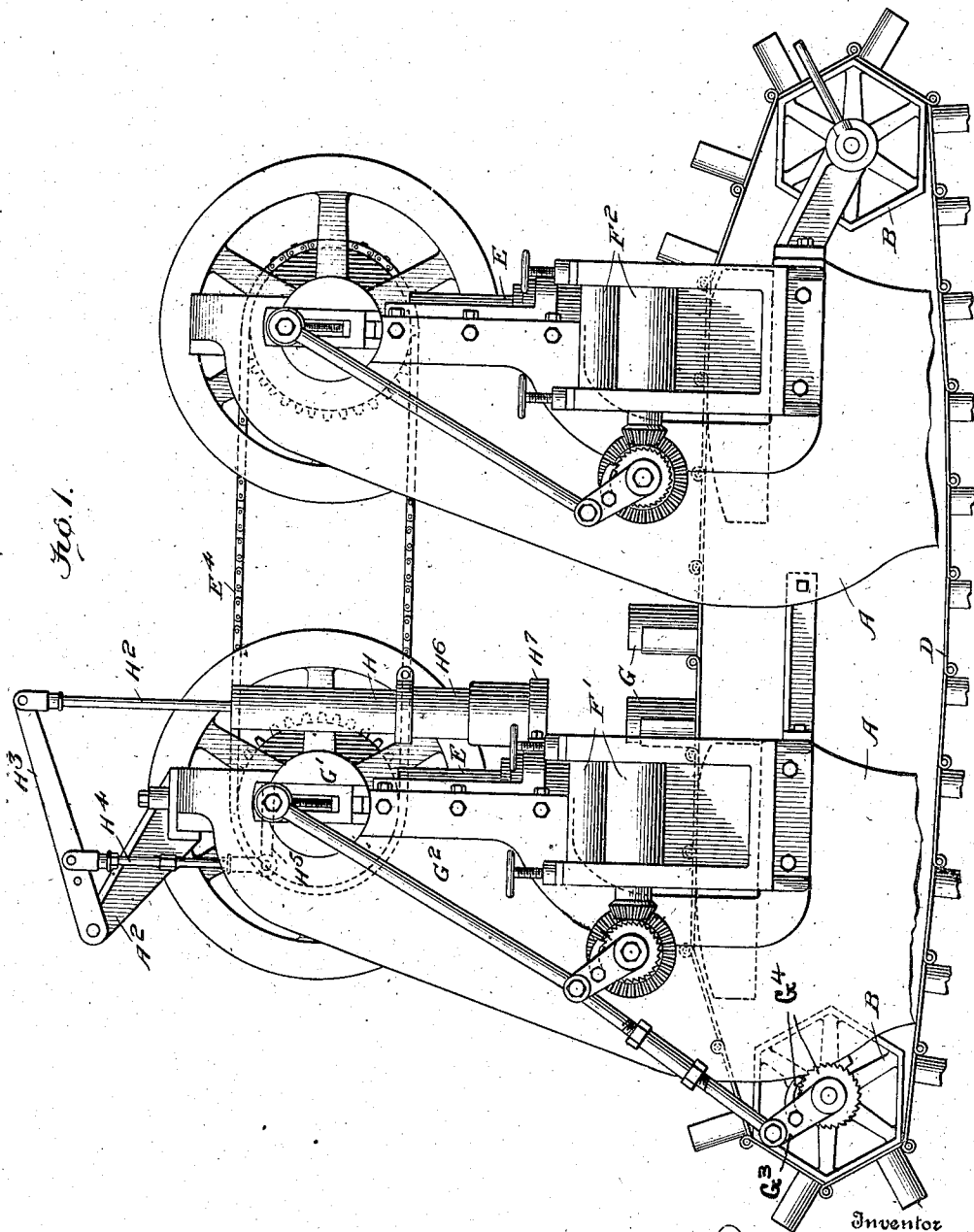


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2 SHEETS—SHEET 1.



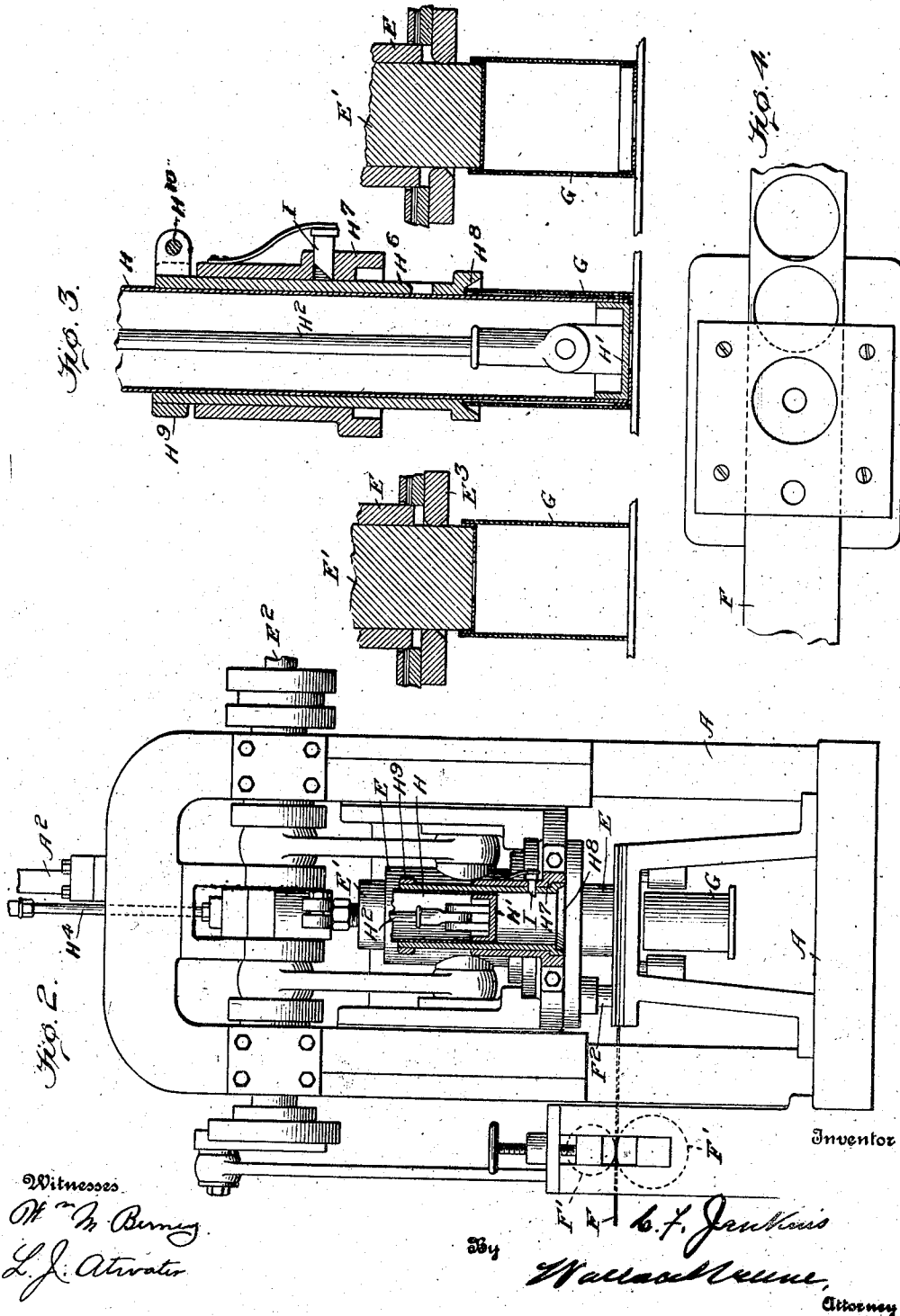
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UNITED STATES PATENT OFFICE.

CHARLES FRANCIS JENKINS, OF WASHINGTON, DISTRICT OF COLUMBIA, ASSIGNOR, BY MESNE ASSIGNMENTS, TO SINGLE SERVICE PACKAGE CORPORATION OF AMERICA, A CORPORATION OF NEW JERSEY.

MACHINE FOR MAKING PAPER BOTTLES.

933,460.

Specification of Letters Patent.

Patented Sept. 7, 1909.

Application filed November 10, 1908. Serial No. 461,964.

To all whom it may concern:

Be it known that I, CHARLES FRANCIS JENKINS, a citizen of the United States, residing at Washington, in the District of Columbia, have invented certain new and useful Improvements in Machines for Making Paper Bottles, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention relates to automatic machines for forming and inserting tops and bottoms in boxes, cans, or bottles, and it is especially adapted for use in forming paper receptacles such as are used for containing milk. The bodies of such bottles are usually cylindrical paper tubes having paper tops and bottoms which are both adapted to fit closely within the ends, respectively, of the tube. The bottom is permanently fixed in the tube, but in certain forms the top is removably placed in position. Since the completed and water-proofed bottle must necessarily be produced at a very low cost in order that it may be discarded after a single use, every expedient for lessening the cost is of great importance. It is desirable to have the closure or top automatically inserted in the bottle before the empty bottles are delivered to the trade, and to insert both bottom and top without turning the bottle effects a saving. Since the tube when both top and bottom are in place is much stronger than when they are not, such bottles are largely made with bottom and top both permanently secured in place, the latter being in such case provided with a relatively small opening which is closed by some sort of plug or cap. For various reasons it is found desirable to form both top and bottom as disks having a broad marginal flange which closely fits the interior of the body, but if the flange of the top extends upward from the disk, the complete bottle has an undesirable shallow open cup at its upper end. If, however, the flange extends downward, it has not been a simple matter to form and insert it automatically.

The apparatus shown for illustration is adapted to form and insert perforated top disks approximately flush with the upper end of the body and having a downwardly extending interior flange, and also to form and insert bottoms having a downwardly extending flange, all automatically, rapidly,

and without reversing the bottle. This result is attained by providing a plunger which cuts an opening in a paper strip, a plunger and die which cut from the strip a disk including the perforated part, form or draw the disk and force it into the open end of bottle body, a third plunger which forces this top downward in the body to its lower end, and a plunger and die, which cut a bottom from another strip, form or draw the same and force it also into the upper end of the bottle, thus completing the structure, in inverted position. The bottle bodies are fed forward in series, step by step, and located precisely in position, and the action of the plungers and dies is nearly simultaneous, or, in other words, while a bottom is being cut and inserted in one body, a top is being pushed downward in another, a top is being cut and inserted in a third, and a small disk is being cut from the strip to form an opening in a top.

In the accompanying drawings, Figure 1 is a side elevation of the principal parts of a machine embodying my invention. Fig. 2 is an elevation, partly in section, looking from the right, showing that part of the machine shown in the left portion of Fig. 1. Fig. 3 is a diagrammatic sectional view showing in section three alining plungers hereinafter described. Fig. 4 is a plan view showing the relative position of certain devices for forming bottle tops.

In these views, A, A represent the upper portion of the machine frame which supports upon opposite sides two wheels B for carrying a belt conveyer D made up of hinged plates adapted to advance, step by step, from left to right in Fig. 1, a series of bottle bodies placed thereon. Above the conveyer are two reciprocating plungers E, without novelty herein claimed, driven by two synchronously acting crank shafts E², connected by a belt E³, the one on the left for cutting, forming and inserting bottle tops in the upper ends of the bottles, and the one on the right in Figs. 1 and 3, in like manner cutting and inserting bottle bottoms in the same bottles successively. The strip F of stock is intermittently fed forward transversely with respect to the belt by ordinary feed rollers F' passing first below a small plunger F², actuated from the

crank shaft and which co-acts with a die below to cut out a small disk from the medial portion of the strip. The strip advances one step, bringing the aperture just
 5 formed exactly beneath the hollow plunger E which descends and cuts out a larger disk concentric with the opening previously formed, if it is desired to have the opening in the top central, and an instant later this
 10 disk is carried downward by a plunger E' within the plunger E, forced through a forming die E² (Fig. 3) into the upper end of a bottle body G which has meantime been advanced by the belt D and brought to
 15 rest below the die. This cutting, forming and inserting device has no novelty herein claimed, in construction or action. The plunger E' in rising leaves the flanged disk in the upper part of the bottle body and by
 20 means of a crank plate G² on the crank shaft, a pitman G², loose crank G³, and common pawl and ratchet devices G⁴, the belt is advanced one step, that step being an exact
 25 fraction of the distance between the axes of the two plungers E', and is thus brought to rest in registry with a plunger H having a long hollow body provided with a head
 30 H¹ to the upper side of which is hinged a plunger rod H² pivoted above to an arm H³, the opposite end of which is pivotally attached to a portion A² of the frame. This
 35 arm is swung back and forth by means of a rod H⁴, of adjustable length, pivotally connecting it with a projection H⁵ from the plunger rod of the plunger E'. The plunger
 40 H is closely encircled by a loose sleeve H⁶ which itself slides in a sleeve-like bearing H⁷ on the frame and is provided at its lower end with an internally conical annular head
 45 H⁸ to receive the upper end of the bottle body and hold the same in exact position. The sleeve H⁶ frictionally engages the plunger and the friction is adjusted by means of a sleeve-encircling band H⁹ and
 50 a screw H¹⁰. The tension being properly adjusted the sleeve moves with the plunger so long as no special resistance is offered, but the downward movement is arrested by the bottle itself, after which the continued
 55 descent of the plunger forces the flanged top down fully to the lower end of the bottle body (see Fig. 3). On the return of the plunger, the sleeve accompanies it until the head H⁸ meets the bearing H⁷, after
 60 which the plunger continues to ascend alone, this being necessary, because otherwise some means must be employed to hold the plunger at rest while other functions are performed by other parts. If no means were provided
 65 to prevent, the sleeve would descend with the first downward movement of the plunger and would reach its lowest point sooner than is desirable. For this reason a spring-actuated stop I is provided. This stop, moving in a way in the sleeve bearing H⁷, passes

horizontally inward through an aperture in the wall of the sleeve, locking the same fast in raised position, and has an inwardly projecting beveled end in the path of the
 plunger. When the latter in its descent
 70 strikes this incline, the stop is forced outward until the incline lies in the wall of the sleeve, and as the latter is frictionally urged downward it in turn presses upon the incline, forcing the stop farther outward out
 75 of the sleeve's path, and descends with the further movement of the plunger until it meets the bottle body. When the plungers again rise, the rising stroke of the crank feeds the belt forward another step, and
 80 the entire operation described is repeated.

After a certain number of steps in the advance of the belt, the first bottle in the lower end of which a top was inserted comes to
 rest in exact registry with the second cutting
 85 die E and plunger E' which act, precisely like the corresponding parts already described, cutting a disk from a second stock strip fed by rollers F² as before, forming it,
 and inserting it as a flanged bottom in the
 90 upper end of the inverted bottle, after which the advance of the belt discharges the bottle ready for paraffining. As shown, the upper
 fold of the belt is supported below each set
 95 of cutting and inserting devices by a removable block resting upon the bed of the frame and of a height equal to the interior height
 of the bottle. In case it be desired to produce bottles of double capacity, for example,
 100 to hold a quart instead of a pint, these blocks are removed, allowing the belt to rest upon the bed, and the driving wheel is turned
 backward, its pawl being lifted, to transfer the stock of the belt to the lower fold, and
 105 the upper end of the rod H is moved nearer the pivot of the arm H³ so that the throw of the plunger H' may be correspondingly
 lengthened. In this case the bottle bodies fed by the belt are of course correspondingly
 110 lengthened.

What I claim is:

1. In a machine of the class described, the combination with means for feeding bottle
 bodies to position, of means for inserting
 115 closures in the upper ends of said bodies, and automatic means for forcing the inserted
 closures to the lower ends of the bodies, respectively.

2. The combination with means for advancing inverted bottle bodies step by step,
 120 of means for inserting tops in the bottles successively and advancing therein to the opposite ends, and means for inserting bottoms in the same bottles, successively during
 125 their subsequent periods of rest.

3. The combination with means for inserting a closure in one end of an open bottle
 body, of a plunger arranged to advance the
 closure in the body to the opposite end there-
 130 of, and a device carried by the plunger and

adapted to hold the end of the bottle in accurate adjustment while the plunger enters the same.

4. The combination with means for supporting a bottle body having a top in its bottom end, of a plunger arranged to advance said top to the opposite end of the body, and a bottle adjusting device frictionally held upon the plunger and carried thereby in position for engaging and adjusting the end of the body prior to the entry of the plunger therein.

5. The combination with means for supporting a bottle body having a top in its bottom end, of a plunger arranged for pushing said top to the opposite end of the body, a sleeve inclosing and frictionally engaging the plunger and having an end adapted for adjusting the bottle body as it is frictionally advancing with the plunger, and means for arresting the retreating movement of the sleeve before the retreating movement of the plunger is completed.

6. The combination with an endless belt arranged to advance a series of inverted bottle bodies step by step, of means for insert-

ing perforated tops in the upper end of each body during one of its periods of rest, means for pushing the inserted tops in succession to the opposite ends of the body during subsequent periods of rest, and means for inserting bottoms in the bodies in succession during later periods of rest.

7. The combination with an endless belt adapted to advance a series of bottle bodies step by step, of means for supporting the upper fold of the belt at different heights according to the heights of bodies to be used, means for inserting bottle tops in said bodies in succession during successive periods of rest, a plunger arranged to advance each top to the opposite end of its body during a period of rest subsequent to its insertion, and means for varying the throw of the plunger for bodies of different heights.

In testimony whereof I affix my signature in presence of two witnesses.

CHARLES FRANCIS JENKINS.

Witnesses:

WALLACE GREENE,

CHAS. W. BLACKWOOD.