

UNITED STATES PATENT OFFICE.

CHARLES FRANCIS JENKINS, OF WASHINGTON, DISTRICT OF COLUMBIA.

PAPER-BOX MACHINERY.

972,767.

Specification of Letters Patent.

Patented Oct. 11, 1910.

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To all whom it may concern:

Be it known that I, CHARLES FRANCIS JENKINS, citizen of the United States, residing at Washington, District of Columbia, have invented certain new and useful improvements in Paper-Box Machinery, of which the following is a specification.

This invention relates to the art or process of forming, from suitable stock, and placing in boxes, closures of proper shape, and has for its principal object a construction for providing receptacles with closely-fitting closures at speeds far in excess of any of the machines heretofore invented by me for making, filling, capping and labeling single-service containers intended for boxed goods.

Heretofore all machines made for this purpose, for example, that shown in Patent No. 933,460, or in application Serial No. 440,367, or any of the others, have been reciprocating, and the weight of the moving parts, employed in cutting and drawing and inserting the closures, and especially the cradle-chain employed for picking up the open box tube, advancing it to the point where the closure is made, stopping it, shaping it, and holding it in alignment with the cap-forming and inserting plungers, and moving it or to be replaced by another, have been so heavy that the speed limit of the machine was soon reached; whereas, the present machine, having only rotary motion, will work at speeds dependent only upon the rapidity with which the empty box-tubes are gotten up to the machine, that is, a speed fast enough to handle the combined output of several of the tubewinders now obtainable in open market, and much faster than the tubes can be put into the machine by hand.

In the drawings, Figure 1 is a diagrammatic elevation of the machine; Fig. 2 a larger view of the main members; Fig. 3 a view of a part of the pocketed box-carrying wheel; Fig. 4 a sectional detail of one of the box-carrying pockets; and Fig. 5 a view of a modification of the box chute.

In all the figures like symbols refer to like parts.

In the drawings, A is a main frame; B a box-carrying wheel having pockets C therein. Around the outside of this wheel a steel rim D is mounted, having a cutting die E, and a drawing die F located immediately below it. This rim also has small holes G located therein near one edge, the purpose

of which will appear later. Located above, and somewhat to the right of the box-carrying wheel, is a second wheel H having cutting-punches I mounted thereon and so spaced as to step into the cutting dies in the rim D. Around this wheel is a loose ring J which fits freely over the cutting punches and the pins K. Located above and somewhat to the left is a third wheel L having drawing-plungers M thereon and so spaced as to step into the drawing dies on wheel B. These plungers have a slightly conical drawing end, exaggerated, for clearness, in the drawings, which prevents the lifting of the box when the plunger withdraws from the cap. This wheel M also has pins K projecting radially from the rim. These guide pins on both the wheels H and L step into the holes G in the wheel B and keep the three wheels in proper operative relation so that the drawing plungers will enter the drawing dies, and the cutting-punches will pass into the cutting-dies without striking their edges. These rolling cutters cut with surprisingly little resistance owing to the shearing action resulting from their shape and the fact that the blanking-punch does not meet the die squarely but in successive portions of the meeting surfaces.

It has been found that if the ends of the drawing-plungers be more or less rounded, especially at the edges where the face and the periphery meet, that the entering caps have little or no tendency to break down the wall of the box at the open end edges. This never happens if the tube cutting has been carefully done with cutters so sharp as to have little tendency to turn in the edge of the box-wall. Guides or other means for protecting the edges of the open end of the box are therefore unnecessary.

When the boxes N are placed in the chute O they roll down to the wheel, and into the pockets as the latter pass the end of the chute. Each box is, therefore, carried up under the blanking wheel and a disk is punched from the strip P of paper or other suitable material, drawn off a roll (not shown), and left lying in the die, resting on the drawing-die immediately above the box. Advancing, these disks come under the drawing wheel and the drawing-plungers which are of such length that they not only flange the disk into a cap but force it down through the die and into the open end.

of the box. The continued rotation of the box-wheel causes the plungers to withdraw and brings the capped box around to the finger Q which forces it out of the pocket, the finger passing in behind the box in the groove R. The paper waste has a tendency to stick on the blanking-cutters, but, as will be obvious from the size and location of the ring J, it is pushed off by the ring and is thence carried over the idler S to be disposed of in any suitable manner.

At extreme speeds the boxes rolling down a simple inclined chute sometimes fail to get into the pockets C, and to obviate this the lower end of the chute has a more abrupt incline than the main part of the chute which tends to force the box into position in the pockets. This also has had a somewhat unexpected result, namely, that it tends, by reason of the agitation of the boxes immediately above, to straighten any boxes which may not lie straight in the chute.

It is thought that the operation of the machine will now be readily understood: namely, As the box-carrying wheel rotates it picks up boxes from the chute, carrying them up under the blanking-wheel which cuts a blank or disk from the strip. The disk cut from this strip remains in the die immediately above each box and as the wheel advances each box is brought in turn under the drawing-plunger wheel and the drawing-plunger pushes the disk down through the drawing die and into the open end of the box. The further rotation of the wheel withdraws the plunger leaving the closure in the box, after which the capped boxes are thrown out of the machine. All the boxes follow these successive steps, and as none of the parts of the machine has intermittent motion, the several operations are performed smoothly and quietly and at a speed limited only by the rate at which the boxes are supplied to the machine.

Any suitable power may be employed to

rotate the wheels, for instance, by a belted pulley, gearing or other suitable translating device located on the shaft of the wheel B, for example.

What I claim, is—

1. The combination of a rotary receptacle-holder, rotary means for cutting a disk from suitable material and placing it immediately over said receptacle, and rotary means for forming said disk into a suitable closure for and inserting it into said receptacle.

2. The combination of a rotary receptacle-holder, rotary means for cutting and forming, from strip material, a suitable closure for said receptacle, means for inserting said closure, and means for stripping the waste of said material from the cutting means.

3. The combination of a rotary receptacle-holder, rotary means for cutting a disk from strip material and placing it immediately over said receptacle, rotary means for forming said disk into a suitable closure for and inserting it into said receptacle, and means for keeping the three in such synchronism that they co-act.

4. The combination of a pocketed-wheel having a rim with cutting and forming dies therein and located over the pockets, a chute for directing the receptacles into the pockets, a wheel having cutting punches thereon arranged to co-act with the cutting dies to cut disks from strip material, a perforated loose ring inclosing said cutting punches to strip the waste of the material from the cutting punches, and a wheel carrying drawing-plungers to form and insert the closures in the receptacles carried in said pocketed wheel.

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

CHARLES FRANCIS JENKINS.

Witnesses:

J. R. WHITE,

JAMES L. CRAWFORD.