To all whom it may concern:

Be it known that I, WILLARD E. SWIFT, a citizen of the United States, residing at Worcester, in the county of Worcester and Commonwealth of Massachusetts, have invented a new and useful Improvement in Machines for Inclosing Flat Articles, of which the following, together with the accompanying drawings, is a specification.

The present invention relates to a machine for inclosing flat articles, and more particularly to a machine for forming an enveloping inclosure around individual paper drinking cups, whereby the same may be presented to the user in a sealed package.

The invention resides in the combination and arrangement of parts whereby the cups or other flat articles are successively taken from a supply or stack, and deposited upon a previously gummed and positioned wrapper, blank or sheet, after which the latter is folded to form an inclosure or envelop around the cup by the adhesion of its gummed surfaces.

In carrying out my invention, according to the illustrated embodiment thereof, I have been able to utilize, in part, the mechanism of an ordinary enveloping machine, making such changes in and additions thereto as are necessary to the accomplishment of the required operations. However, it is to be understood that my invention is in no sense limited to the employment of such prior art enveloping mechanisms as are herein illustrated, but is susceptible of wide variation therefrom as regards the several instrumentalities which operate upon the enveloping wrapper or blank, to gum, crease, fold and transfer the same, as well as the instrumentalities which operate upon the articles to be inclosed.

Referring to the accompanying drawings, Figure 1 is an end view of a machine embodying my invention, certain parts being broken away and others being shown in section.

Fig. 2 is a top plan view of so much of said machine as is necessary to illustrate the principles underlying my invention.

Fig. 3 is a side view of said machine, some of the well known envelop machine mechanisms therein being shown either diagrammatically or else omitted altogether.

Fig. 4 is a fragmentary side view of the plunger of my machine, and

Fig. 5 is a plan view of the product of the machine, the completed envelop or package, with the flat paper drinking cup contained therein.

Similar reference characters refer to similar parts in the different figures.

The illustrated embodiment of my invention involves ordinary envelop machine mechanisms of well known construction, for gumming and folding the blanks which are used for inclosing the paper drinking cups, and for conveying the same successively from the gumming to the folding mechanisms. The mechanisms are supported on a table, at the rear end of which the usual feed board 2, Fig. 3, for the pile of blanks 3, is provided. In the manner common to ordinary envelop machines, reciprocating gumming dies 4 and 5, above said pile of blanks, descend into contact with the uppermost blank thereof, and raise it by adhesion, said blank being removed therefrom by the usual stripping plate 6, Fig. 2, and deposited upon a horizontally reciprocating carriage 7, running on guides 8. The blank is held down on the carriage 7 by a hook or gage 9, or by any of the equivalent means commonly employed for this purpose in envelop machinery, said blank, as it rests on said carriage, as shown in Fig. 2, disclosing on its front and rear edges the moist gummed portions 10 and 11 resulting from its contact with the gumming dies 4 and 5.

Mechanism well known in envelop machines, and hence not herein illustrated in detail, is employed to supply gum to the dies 4 and 5, to effect their reciprocation, in unison, for the purpose above set forth, and to reciprocate the carriage 7, between its rear or blank receiving position and the position illustrated in Fig. 2. In this latter position the reentrant angles of the forward edge of the blank are brought against gage pins 12, 12, carried by a gage bar 13 rigidly
with the frame of the machine, said pins serving to center and accurately position the blank upon the carriage 7, so that the rectangular body portion of the blank is in exact registration with a rectangular opening 14 in said carriage of the same size, and also with a rectangular plunger 15, which at the proper time descends and forces the blank through said opening, in the manner common to envelop machines. The blank thus registered is in position to have deposited thereon the cup or other article to be inclosed, by the mechanism hereinafter particularly set forth.

15 The table 1 supports a standard 16, used to carry a cup holder 17, at one side of the forward position of the carriage 7. From near the bottom 18 of said cup holder rises a plurality of cup guiding fingers 19, 19, arranged to define a vertical space corresponding in cross section to one of the cups, as shown in Fig. 2, whereby the cups are supported in a stack, with their closed lower ends facing the plunger 15 and carriage 7. 25 The lowermost cup of the stack rests upon the turned ends 20, 20 of an equalizing bar 21, pivoted at 22 upon a slide 23 which is adapted to reciprocate in a slidable 24 of the bottom 18. The cups are stacked so that their shorter sides face downward in the holder, whereby the ends or prongs 20, 20 of the bar 21 engage the edge of the shorter side of the lowermost cup, at the open end thereof, and move said cup to the left, Fig. 1, when said slide is actuated. The bottom of the slide carries a cam roll, which is held against a cam 26 on the carriage 7 by means of a spring 27 whose force is exerted to draw the slide to the right, Fig. 1. The movement of the slide to the left, by means of the cam 26, pushes the lowermost cup through the slit 28, and for the purpose of preventing ejection of any but the lowermost cup, at each reciprocation of the slide, adjustable spring fingers 29, 29, to separate the cups, are preferably employed.

Each cup so ejected is moved by the slide into the engagement of constantly driven rolls 30, 30 adjacent the plunger 15, which are rotated by gearing 31, 32 and 33 from the main shaft 34 of the machine. The rolls 30, 30 move the cup in a horizontal plane at the level assumed by the plunger 15 when in its uppermost position. As the rolls 30, 30, must necessarily be located outside the path of the vertically reciprocating plunger the quick action of the rolls are caused to impart sufficient momentum to project the article passing between them clear of the rolls and into position beneath the plunger.

The under face of the plunger has a recess 35 slightly larger than and corresponding in shape to a cup, the walls of said recess being grooved, as at 36, to receive each cup as it leaves the rolls 30, 30. Preferably a pair of hooks 37, 37 are employed, just below the recess, to prevent endwise displacement of a cup therefrom, once it has been received within the recess and, if desired, a spring or wire 38 may also be used to prevent rebond of the cup after it has struck the opposite side of the recess.

Normally seating against the underside of the plunger 15, within the recess 35, is a secondary plunger 39, whose rod 40 is telescoped within the rod 41 of plunger 15. The plunger 39 is held retracted by springs 42, attached at their upper ends to the rod 41, and at their lower ends to pins 43 projecting from rod 40 and passing through slots 44 in rod 41, which enable relative movement between the plungers to take place. In order to insure quick movement of plunger 39, and to prevent imprisonment of air between the two plungers, each of the latter is preferably perforated as at 45.

The plunger rod 41 is attached to an arm 46, the latter having a vertically reciprocating movement in a slidable 47, which is formed on a stationary standard 48 rising from the table 1 of the machine. Pivoted on said arm is a lever 49, one end of which is adapted to strike an adjustable stud 50 on the standard 48, to rock said lever, when the plunger 15 is approaching the end of its downward movement. The other end of said lever is held yieldingly against the end of a sleeve 51 by means of a spring 52, said sleeve receiving a rod 53 whose lower end seats against the end of secondary plunger rod 40. A spring 54 acts to cushion the impact of sleeve 51 against rods 53 and 40 when the opposite end of lever 49 strikes stud 50, that is, when the plunger 15 approaches the limit of its downward movement, and when the plunger 39 is actuated to force the cup out of recess 35, and onto the top face of the blank.

In the operation of the mechanism, the cup 110 is fed to the recess 35 of the plunger 15 as above described, with the plunger in the position shown in Fig. 1, and with the plunger 39 of course retracted as shown. In addition to the support afforded by the groove 36 of said recess, the cup may be kept from sagging at the center by a pivoted skid 55, carried upon the gage bar 13 and held in operative position, as shown in Fig. 4, by a spring 56, against an adjustable stop 57, whereby the cup, when the plunger 15 is at the limit of its upward movement, is insured against dropping out of the recess.

Assuming that a gummed blank has been moved forward by the carriage 7, and rests directly beneath the plunger 15, in the manner above described, the descent of said plunger, and with it the cup already received within the recess 35, begins. Said plunger forces the blank, in the manner
common to the operation of envelop machinery, through the opening 14 of the carriage 7, and this action creases the several flaps of the blank along the desired lines of fold indicated in Fig. 2. As the plunger descends, its edge, and ultimately the bar 58 rising therefrom, make contact with the pivoted skid 55, to carry the same into the dotted line position of Fig. 4, away from the cup and out of the path of the plunger. The further descent of the plunger beyond the opening 14 carries the creased blank into the folding well or bed 59 of the machine. Just prior to the arrival thereof upon the bottom of the bed, the end of lever 49 strikes the stud 50, causing the secondary plunger 38 to push the cup out of recess 35, and against the blank, which immediately thereafter is deposited in the bed 59 by plunger 15. Thereupon after the upward movement of the plunger, the four hinged flap folders 60, 60 of the folding bed are actuated, in the manner well known in envelop machinery, to turn down successively the creased flaps, causing their gummed edges to adhere, as shown in Fig. 5, thus providing an enveloping inclosure around the cup. The package thus sealed may be then discharged in the usual manner common to envelop machinery from the folding bed 59.

It will be noted that the folding mechanism above referred to is in all respects the same as the mechanism for folding ordinary envelopes, except that the last flap folder 60 to operate turns the flap 61 completely down, whereas, in an envelop machine this flap is only partially turned down, and constitutes the open seal flap of the envelop.

The machine, therefore, is adapted also to make ordinary envelopes, merely by reducing, by a simple adjustment, the movement of this final flap folder 60, and by rendering inoperative the cup feeding mechanism.

This last may be conveniently accomplished by a stop 62, on the end of a lever 63, which is held in the position shown in Fig. 3 by means of a spring 64. A rod 65, attached to said lever, may be operated to rock the lever, thereby moving the stop into the path of the slide 28, when the latter is in advanced position, and thus preventing the spring 27 from retracting said slide. A hutch 66 may be employed to hold the rod 65 in the position described, against the force of spring 64, so that no cups are fed, and furthermore this mechanism, it will be seen, enables the supply of blanks on the feed table to be replenished at any time, without stopping the machine.

I claim,

1. In a machine of the class described, the combination with a folding bed and a series of hinged flap folders inclosing the folding bed, of a reciprocating carriage having an opening corresponding with said folding bed, a recessed reciprocating plunger having grooves in the side walls of the recess for holding a flat article, a stack for flat articles at one side of said plunger when in its highest position, a pair of revolving feed rolls between said stack and said plunger, and reciprocating means for feeding articles from said stack into engagement with said rolls.

2. In a machine of the class described, the combination with an envelop folding mechanism, comprising a folding bed and a reciprocating plunger for forcing a blank upon said folding bed, said plunger having a recess on its under side provided with grooves in its side walls, of a pair of feed rolls for feeding an article into said grooves.

3. In a machine of the class described, the combination with an envelop feeding mechanism and a reciprocating plunger, of a vertical stack for holding a series of flat articles; at one side of the plunger, a pair of rotating rolls between the stack and the plunger, means for moving an article from the stack into the bite of said rolls, and means for retaining the article on the under side of the plunger during its downward motion.

4. In a machine of the class described, a folding mechanism, means for actuating the folding mechanism, means for carrying an envelop blank into the folding mechanism, a stack for flat articles at one side of the folding mechanism, a pair of rotating rolls between the stack and the folding mechanism, means for moving an article from the stack into the bite of the rolls, and means for delivering the article from said rolls upon the envelop blank prior to the action of the folding mechanism.

5. In a machine of the class described, a vertically reciprocating plunger, a vertical stack for flat articles at one side of the plunger, means for withdrawing an article from the stack, and means for imparting a momentum to the article to project it beneath the plunger.

6. In a machine of the class described, a folding mechanism, a reciprocating carriage for moving a blank over the folding mechanism, a vertically reciprocating plunger for moving a blank from the carriage to the folding mechanism, a stack at one side of the plunger, a reciprocating slide for removing an article from the stack and carrying a cam roll, a cam carried by the carriage and engaging said cam roll to move the slide, and a spring to hold the cam roll against the cam.

7. In a machine of the class described, a reciprocating carriage for moving an envelop blank, a folding mechanism, a vertical stack, a reciprocating slide for engaging an article in the stack, and means for actuating...
ating said slide to withdraw an article from
the stack controlled by the movement of the
carriage.

8. In a machine of the class described,
the combination with an envelop folding
mechanism, comprising a folding bed and a
reciprocating plunger for forcing a blank
upon said folding bed, said plunger having
a recess upon its under side, means for hold-
ing a flat article in said recess and a pair of
rotating rolls for forcibly projecting a flat
article into said recess, and means for pre-
venting the recoil of said article in said
recess.

9. In a machine of the class described, a
folding bed, means for moving an envelop
blank over the folding bed, means for forc-
ing the blank upon the folding bed, com-
prising a plunger having a recess on its un-
der side, means for retaining a flat article
in said recess, and a secondary plunger for
forcing an article held in said recess against
the envelop blank at the end of the move-
ment of said plunger.

10. In a machine of the class described,
a gumming mechanism, a folding mecha-
nism, a reciprocating carriage for moving
an envelop blank from the gumming to the
folding mechanism, a recessed plunger for
forcing the blank from the carriage to the
folding mechanism, reciprocating means for
withdrawing an article from said stack, and
a cam carried by said reciprocating carriage
for actuating said withdrawing means.

11. In a machine of the class described,
a vertically reciprocating plunger, a stack
at one side of the plunger for articles to be
inclosed, a reciprocating carriage for carry-
ing an envelop blank beneath the plunger, a
reciprocating slide for withdrawing an
article from the stack, means for actuating
said slide to withdraw an article from the
stack, and means for locking said slide in an
inoperative position, at will.

12. In a machine of the class described,
a folding bed, a reciprocating plunger for
moving an envelop blank upon said bed, said
plunger having a recess open on its under
side, means for placing flat articles in said
recess, a skid pivoted upon the fixed frame-
work of the machine, with its free end ex-
tending across the open side of said recess,
and a spring applied to hold said skid in its
normal position, but allowing the skid to be
deflected as the plunger descends.

13. In a machine of the class described,
the combination with a folding mechanism,
of a carrying plunger for carrying an in-
closure into the envelop blank, a secondary
plunger for forcing the inclosure out of the
carrying plunger, a stack for the inclosures,
and mechanism for transferring the in-
closures individually from the stack to the
carrying plunger.

14. In a machine of the class described,
in combination, a folding bed, means for
moving an envelop blank over and above
said bed, a stack for a series of flat articles,
means for withdrawing the lowermost ar-
ticle from the stack, means for projecting
the withdrawn article over the blank, a
plunger for forcing the blank upon the fold-
ing bed, and means for folding the blank,
operating in the order named.

Dated this 25th day of August 1916.

WILLARD E. SWIFT.

Witnesses:

Penelope Comberbach,
Nellie Whalen.