To all whom it may concern:

Be it known that I, ABRAHAM NOVICK, a citizen of the United States, and a resident of New York, borough of Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Sheet-Synchronizing Mechanisms, of which the following is a specification.

This invention relates to sheet feeding means and particularly to mechanism for successively synchronizing the sheets as they are advanced by the feeding mechanism.

The object of my improvements is to provide means of the character specified, simple in construction, positive in operation at high speed, and easily and accurately adjustable for sheets of varying sizes and contour.

With these ends in view my improvements comprise features illustrated in their preferred form in the drawings accompanying this specification, wherein—

Figure 1 is a plan view of so much of a feeding mechanism as will suffice to illustrate my improvements. Fig. 2 is a sectional side elevation on line 2—2 of Fig. 1. Figs. 3 to 6 inclusive are diagrammatic side elevations illustrating successive steps in the operation of my improvements.

Before describing the invention in detail I desire to have it understood that the invention is not limited to the particular construction and arrangement of parts which I have illustrated and shall hereinafter describe, and that various changes may be made in the mechanism shown without departing from the spirit or scope of the invention, and that the phraseology which I employ is for the purpose of description and not of limitation.

The mechanism of the present application is particularly adapted for use in connection with envelop machines for feeding successively fed forwardly, synchronized, located crosswise of the machine, and again fed forwardly in synchronism and cross register, within one second of time. When said blanks are made of thin paper, it has been observed that the sudden positive stopping thereof, as by pins 10, tends to upset or crush the edge of the blank at the points of contact with those pins, thereby injuriously affecting the accuracy of location of the blank, relatively to the mechanism which thereafter operates on the blank for making the envelop. The result is inaccurately folded envelopes.

One of the objects of my improvements is to eliminate this tendency to mutilate and misplace the blank.

The several parts of my improved mechanism may be supported in the usual side frames, one of which, 8, is shown. Supported on cross rod 9 fixed in said side frames is table 11, over which pass a plurality of feed belts, as 12 and 13. Said belts are supported on the usual pulleys as 14, and on similar pulleys, not shown, at the left hand or entrance end of the machine. Said pulleys may be driven by some convenient means, not shown, in clockwise direction. Said pulleys, as 14, are provided with locating collars having set screws as 15 whereby they may be adjusted crosswise of the machine on their shaft 16, thereby adjusting belts 12 and 13 to accommodate different widths of blanks. Situated just above said pulleys, supported by fixed shaft 17 and adjustable lengthwise thereof, are retaining blades 18 and 19. Said blades are efficient for preventing upward buckling of the sheet as it is advanced by belts 12 and 13. If desired, said blades may each be provided with one or more pockets as 20 for the retention of rolls or balls as 21 in engagement with the top of the blank.

For positively stopping the blank in definitive position, both lengthwise and crosswise of the machine, I provide a pair of pins as 10 for engagement with opposite sides of the wedge-shaped leading end 5 of said blank. Said pins are mounted for adjustment crosswise of the machine on shaft 22, which is preferably square throughout that portion of its length engaged by the socket portions 23 of said pins. Said socket portions may be secured in any desired position lengthwise said shaft by means of the...
usual set screws as 24 respectively. Said pins 10 are mounted for adjustment lengthwise of the machine in their respective sockets, as particularly illustrated in Fig. 2, wherein screw 25 is provided for such adjustment. By means of the adjustments just described, said pins may be set to contact with the opposite reentrant corners of the leading end of the blank, whereby said blank may be simultaneously positively stopped in its advancement and located crosswise of the machine.

Shaft 22 is revolutely mounted in suitable bearings in the side frames as 8 and means are provided for rotating that shaft a partial rotation and back again for removing said stop pins from engagement with the sheet and returning them for engagement with the next succeeding sheet. This means comprises gear 26 fixed on one outboard end of shaft 22, Fig. 1, in coaction with a rocking segment gear on arm 27 in engagement with said gear 26. Said rocking segment arm is pivotally mounted on stud 28 fixed in frame 8, and is provided with roll 29 pivotally mounted on a downwardly reaching portion of said arm for engagement with cam 30 fixed to gear 31 rotatably mounted on stud 32 in said side frame 8. By this means pins 10 are intermittently rocked to and fro about the axis of shaft 22. Preferably said stop pins 10 are located between the bifurcated ends 33 respectively of blades 18 and 19, and said pins preferably project downwardly into chamber 34 of table 35. Said table 35 may be supported from the side frames and its upper surface is preferably in the same horizontal plane as the upper surfaces of belts 12 and 13.

Between the delivery portions of belts 12 and 13, I provide intermittently operative means for advancing the sheet, comprising a plurality of lower rolls as 36 adjustably fixed to shaft 37, and a plurality of upper rolls as 38 similarly fixed to shaft 39. Said upper rolls are preferably segmental, whereby during a part of each revolution thereof, said upper and lower rolls coact respectively to feed the blank, and during another part of their revolution they fail to coact to feed the blank. Shaft 37 has fixed thereon to gear 40 meshing on one side with gear 31 and on another side with gear 41 fixed to shaft 39.

Interposed between the sheet advancing means comprising belts 12 and 13 and the positive sheet stopping means comprising pins 10, I provide means for retarding and gradually stopping the sheet, comprising a plurality of retractable blades as 42 and 43. The operative ends, as 44, of said blades are preferably located just rearwardly of the transverse vertical plane through the axis of stop pin shaft 22, and said blades, mounted on heads as 46, are preferably supported rearwardly of the transverse vertical plane through the axes of shafts 37 and 39, on shaft 45. Said shaft 45 is preferably provided with square holes in cross section within the field of traverse of said heads 46, and those heads may be provided with square holes respectively to slidably fit said shaft. Set screws as 47 may be provided to hold said heads against endwise movement on said shaft. For individually adjusting said blades 42, 43 toward and from the sheet, I provide set screws as 48 in forwardly reaching ears as 49 of heads 46. The points of said set screws impinge against the upper faces of said blades respectively a short distance from the point of positive fastening to the heads at 46.

For rocking shaft 45 to cause the operative ends 44 of blades 42 and 43 to move into and out of engagement with the sheet, I provide the following means: On one outboard end of said shaft 45 is adjustably fixed arm 50 carrying roll 51 for engagement with cam 52 fixed to gear 31. For urging roll 51 to engagement with its cam 52, I provide leaf spring 53 in engagement with arm 50. For adjusting shaft 45 circumferentially relatively to arm 50, I provide screw 54 in said arm in engagement with coacting teeth in shaft 45, and for holding said arm in fixed relation to said shaft 45, I provide binding screw 55 in said arm. By means of this device blades 42 and 43 may be adjusted to move in unison toward and from the sheet.

For advancing the sheets after they have been synchronized and transversely located, I provide the usual upper and lower feed rolls as 56 and 57 on shafts 58 and 59 respectively. Said shafts may be geared together by the usual gears 60 and 61 respectively, and gear 61 may be actuated from gear 40 through intermediate gear 62.

The operating of my improved mechanism is as follows: As illustrated at 3, Figs. 1 and 2, having been placed upon feed belts 12 and 13, and blades 42 and 43 being in contact with the upper face of table 35, said sheet is advanced by said belts onto said table 35 and into engagement with said blades. The impact of said sheet against the underside of said blades tends to lift the engaging ends 44 of those blades respectively and the sheet is gradually stopped thereby, Fig. 2. At this time stop pins 10 have been swung in clockwise direction to the position of Fig. 2. Directly thereafter shaft 45 is rocked in anti-clockwise direction, lifting blades 42 and 43 from engagement with the sheet, thereby permitting said sheet to be moved forwardly under the influence of belts 12 and 13, against stop pins 10, Fig. 3. Directly thereafter blades 42 and 43 descend, clamping the sheet against table 35, Fig. 4. Thereupon shaft 22 rotates in anti-clockwise direction, swinging stop pins 10 out of engagement with the
leading end of the blank; at the same time segmental feed rolls 38 rotate to the point of engagement with the sheet, Fig. 5. Blades 42 and 43 are then again raised from engagement with the blank, stop pins 10 continue their anti-clockwise rotation out of the path of the blank and segmental rolls 38 in connection with the rolls therebelow advance the synchronized and transversely located sheet into engagement with feed rolls 56 and 57, Fig. 6.

I claim:

1. A device of the class specified including in combination means for advancing a sheet, means for positively stopping the sheet, intermittently operative means for subsequently advancing the sheet, means for removing said positive stopping means from engagement with the sheet, and means preceding said positive stopping means for first gradually stopping said sheet, for then releasing said sheet for engagement with said positive stopping means and for then holding said sheet in a state of rest during the removal of said positive stopping means and for finally releasing said sheet synchronously with the engagement of the sheet by the intermittently operative advancing means.

2. A device of the class specified including in combination means for advancing a sheet, means for positively stopping the sheet, means for removing said positive stopping means from engagement with the sheet, means for adjusting said positive stopping means crosswise of the machine, means for gradually stopping the sheet and for thereafter releasing said sheet, means for adjusting said gradual stopping means crosswise of the machine, means for adjusting said gradual stopping means toward and from the sheet, and means for advancing the sheet after its release by said positive stopping means.

3. A device of the class specified including in combination means for advancing a sheet, a plurality of stop blades for gradually stopping the sheet, means for removing said positive stopping means from engagement with the sheet, intermittently operative means for advancing the sheet, means for causing said stop blades to first gradually stop the sheet, to then release the sheet for engagement with the positive stopping means, to then reengage the sheet and hold it in a state of rest during the removal of the positive stopping means from engagement with the sheet, and finally to release said sheet synchronously with the engagement of the sheet by the intermittently operative advancing means, and means for maintaining the sheet in an approximately constant path of travel during the operation of the several recited instrumentalities.

4. A device of the class specified including in combination means for advancing a sheet, a plurality of stop blades for gradually stopping the sheet, means for positively stopping the sheet, means for removing said positive stopping means from engagement with the sheet, intermittently operative means for advancing the sheet, means for adjusting said stop blades crosswise of the machine, means for adjusting said stop blades independently toward and from the sheet, and means for causing said stop blades to first gradually stop the sheet, to then release the sheet for engagement with the positive stopping means, to then reengage the sheet and hold it in a state of rest during the removal of the positive stopping means from engagement with the sheet, and finally to release said sheet synchronously with the engagement of the sheet by the intermittently operative advancing means.

5. A device of the class specified including in combination continuously operative means for advancing a sheet, a plurality of stop blades for gradually stopping the sheet, means for adjusting said stop blades crosswise of the machine, means for adjusting said stop blades in unison toward and from the sheet, means for adjusting said stop blades independently toward and from the sheet, means for positively stopping the sheet, means for removing said positive stopping means from engagement with the sheet, means for adjusting said positive stopping means crosswise of the machine, means for adjusting said positive stopping means lengthwise of the machine, intermittently operative means for advancing the sheet, means for causing said stop blades to first gradually stop the sheet, to then release the sheet for engagement with the positive stopping means, to then reengage the sheet and hold it in a state of rest during the removal of the positive stopping means from engagement with the sheet, and finally to release said sheet synchronously with the engagement of the sheet by the intermittently operative advancing means, and means for maintaining the sheet in an approximately constant path of travel during the operation of the several recited instrumentalities.

6. A device of the class specified including in combination means for advancing a sheet having a wedge shaped leading end, means for engagement with said wedge shaped leading end for simultaneously positively stopping the advancement of the sheet and for locating said sheet crosswise of the machine, intermittently operative means for advancing the sheet, means for removing said positive stopping means from engagement with the sheet, and means for positively stopping the sheet, means for removing said positive stopping means from engagement with the sheet.
ment with the sheet, and means preceding said positive stopping means for first gradually stopping said sheet, for then releasing said sheet for engagement with said positive stopping means and for then holding said sheet in a state of rest during the removal of said positive stopping means and for finally releasing said sheet synchronously with the engagement of the sheet by the intermittently operative advancing means.

7. A device of the class specified including in combination means for advancing a sheet, means for positively stopping the sheet, means for subsequently advancing the sheet, stationary means adjacent said positive stopping means for supporting the sheet, oscillatable means for pressing the sheet to engagement with said stationary supporting means, means for operating said oscillatable means to coaction with said stationary supporting means for at one time gradually stopping the sheet and at another time clamping the sheet at rest, and means for removing said positive stopping means from the path of the sheet.

8. A device of the class specified including in combination means for advancing a sheet having a wedge shaped leading end, means for engagement with said wedge shaped leading end for simultaneously positively stopping the advancement of the sheet and for locating said sheet crosswise of the machine, means for removing said positive stopping means from engagement with the sheet, means for adjusting said positive stopping means crosswise of the machine, means for adjusting said positive stopping means lengthwise of the machine, means for gradually stopping the sheet and for thereafter releasing said sheet, means for adjusting said gradual stopping means crosswise of the machine, means for adjusting said gradual stopping means toward and from the sheet, and means for advancing the sheet after its release by said positive stopping means.

9. A device of the class specified including in combination means for advancing a sheet having a wedge shaped leading end, means for engagement with said wedge shaped leading end for simultaneously positively stopping the advancement of the sheet and for locating said sheet crosswise of the machine, means for removing said positive stopping means from engagement with the sheet, intermittently operative means for advancing the sheet, a plurality of stop blades for gradually stopping the sheet, means for causing said stop blades to first gradually stop the sheet, to then release the sheet for engagement with the positive stopping means, to then reengage the sheet and hold it in a state of rest during the removal of the positive stopping means from engagement with the sheet, and finally to release said sheet synchronously with the engagement of the sheet by the intermittently operative advancing means, and means for maintaining the sheet in an approximately constant path of travel during the operation of the several recited instrumentalities.

Signed at New York, in the county of New York and State of New York, this 15th day of Sept., 1913, before two subscribing witnesses.

ABRAHAM NOVICK.

Witnesses:
Ferdinand L. Schmidt,
Wilbur M. Stone.