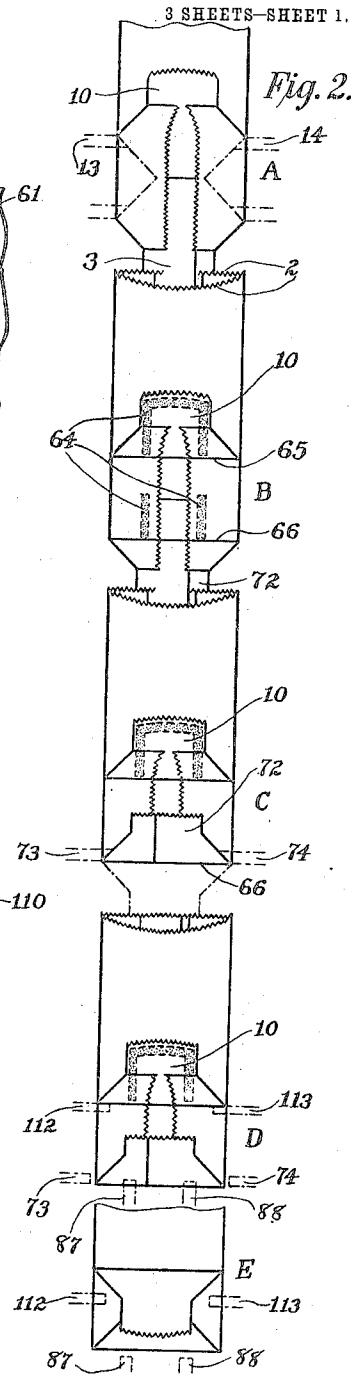
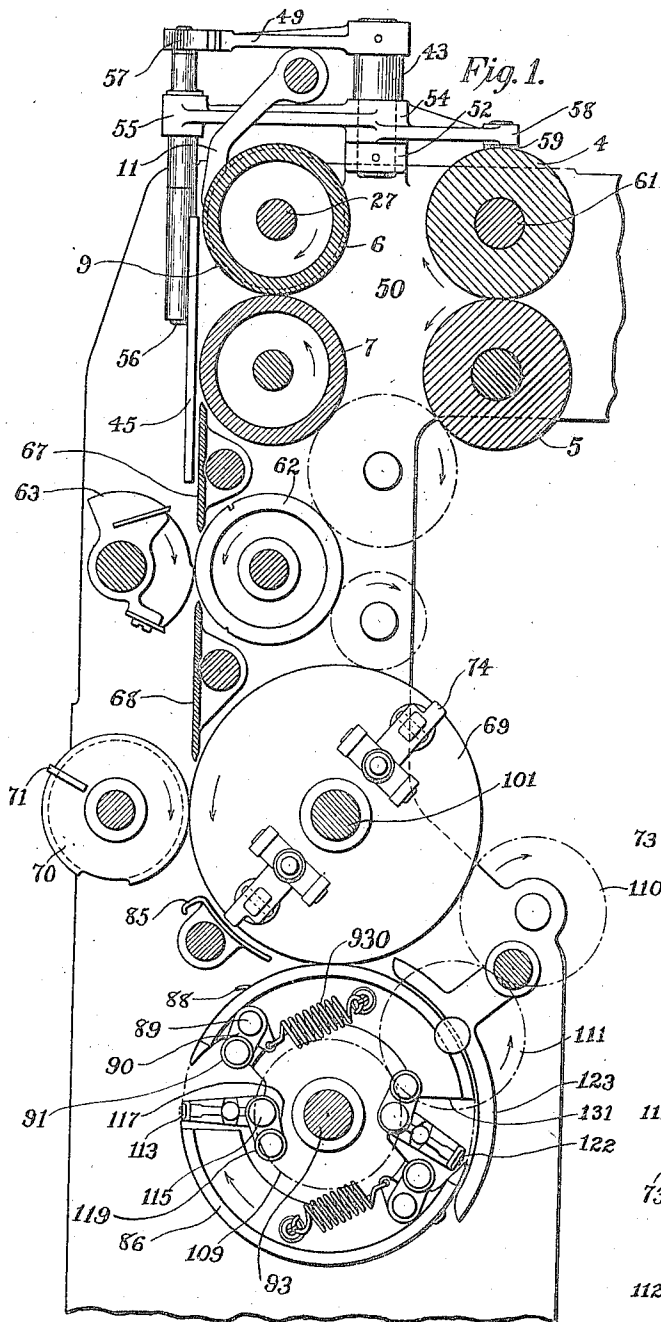


W. T. DULIN.
PAPER BAG MACHINE.
APPLICATION FILED OCT. 11, 1912.

1,057,377.

Patented Mar. 25, 1913.



Witnesses:

Arthur Frisch
Chas. W. La Rue

Inventor:
William T. Dulin

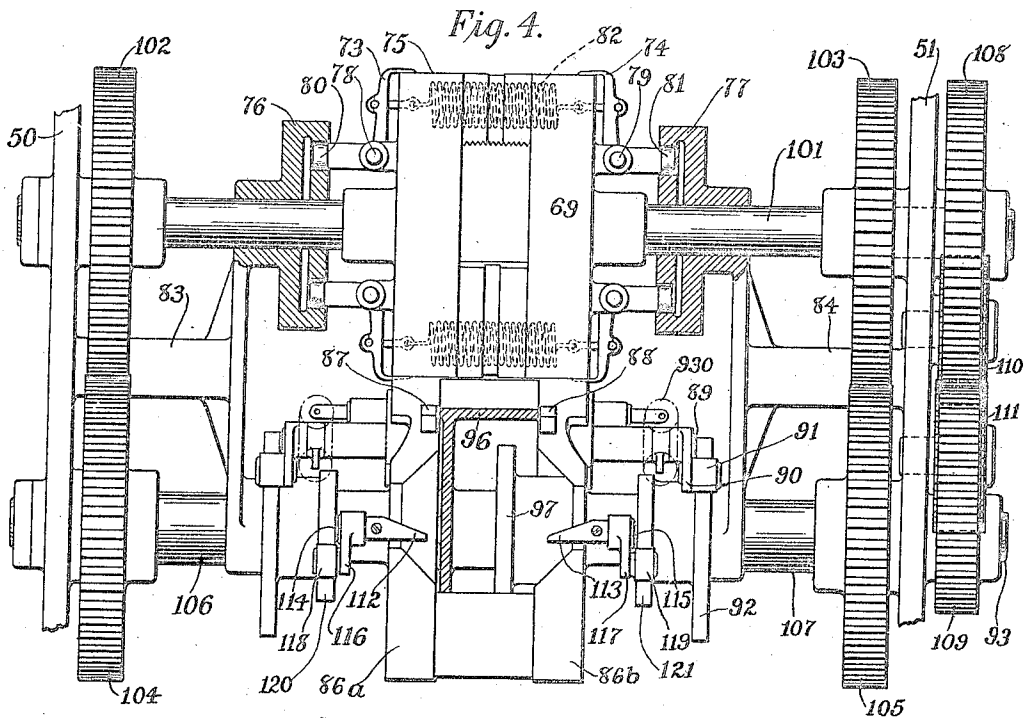
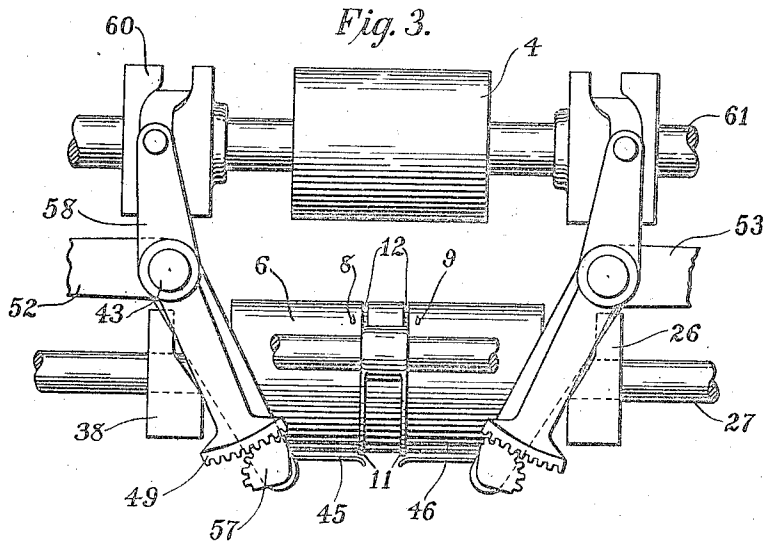
By *Wilbur McStone*
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3 SHEETS—SHEET 2.



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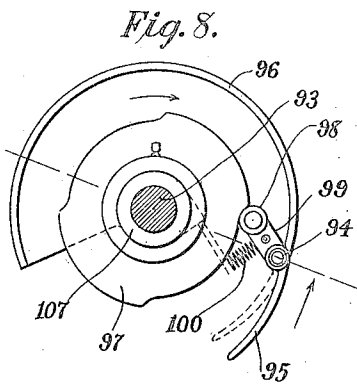
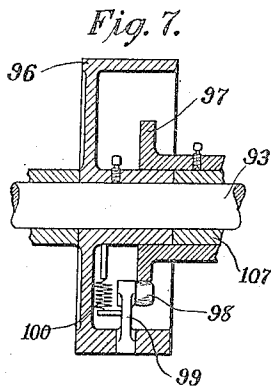
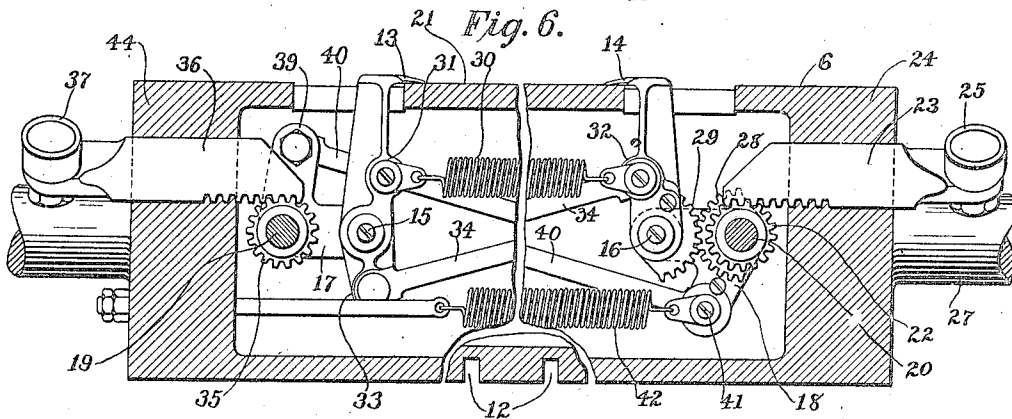
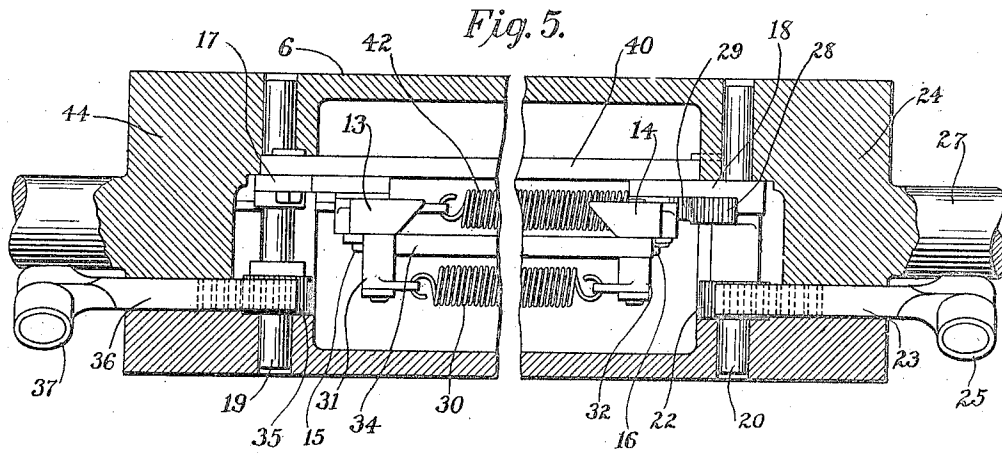
By *Wilbur M. Stone*
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

WILLIAM T. DULIN, OF PHILADELPHIA, PENNSYLVANIA.

PAPER-BAG MACHINE.

1,057,377.

Specification of Letters Patent.

Patented Mar. 25, 1913.

Application filed October 11, 1912. Serial No. 725,208.

To all whom it may concern:

Be it known that I, WILLIAM T. DULIN, a citizen of the United States, and a resident of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Paper-Bag Machines, of which the following is a specification.

This invention relates to paper bag machines and particularly to that class thereof which are provided for making from a continuous tube having an inwardly folded tuck in each side thereof, paper bags commonly known as self-opening square paper bags.

The object of my improvements is to provide a machine of the class specified simple in construction and accurate and rapid in operation.

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

Figure 1 is a side elevation, partly in section, of my improved machine. Fig. 2 is a plan view of a portion of a tucked paper tube illustrating the several steps in the operation of my improvements. Fig. 3 is a plan view of a portion of what is shown in Fig. 1. Fig. 4 is a front elevation, partly in section, of a detail of my improvements. Fig. 5 is an axial cross section of one of the diamond forming cylinders, and Fig. 6 is a similar section taken at right angles to that of Fig. 5. Figs. 7 and 8 are, respectively, a cross sectional elevation and a side elevation of one of the flap finger devices.

My improved machine is of that type of paper bag machine which employs a pair of diverging rolls for opening out the leading end of the tucked paper tube into the well known diamond form.

I have not illustrated herein any means for forming the tucked paper tube or for performing the major part of the severing of that tube into blanks of a suitable length for formation into bags. Such mechanisms are well known in the art and do not fall within the scope of the present improvements. Suffice it to say that such continuous tucked paper tube having cross cuts therein, as shown at A, Fig. 2, whereby a joining web of paper 3 is left between consecutive blanks, is fed into the machine between rolls 4, 5 and advanced to between diamond forming rolls 6, 7. Upper rolls 6

of the diamond forming rolls is provided with pins 8, 9 for engagement with flap 10 of the bag blank, and blades 11 are provided for discharging that flap from said pins 8, 9 at the proper time, as well known in the art. Said rolls 6, 7 are alike except for the presence in roll 6 of pins 8, 9, and of grooves 12 for the accommodation of blades 11. A description of one of said rolls will therefore suffice for both. In this type of paper bag machines it is customary to provide side clips for gripping the upper and lower plies of the side tucks to the diverging rolls as 6, 7 for opening out the mouth of the tubular blank into the diamond fold, and as said rolls should coact substantially in contact, to feed the bag blank therebetween, it is desirable that such side clips should retire below the surface of said rolls at the time those clips, rotating with their respective cylinders, pass the clips of the other cylinder. Various devices have been provided heretofore for causing said side clips to retract and advance relatively to the periphery of the roll in coaction with their function of gripping said side tucks to the roll. One feature of my improvements pertains particularly to mechanism for accomplishing this result. Referring now to Figs. 5 and 6 I have therein illustrated the detail construction of roll 6 of said pair of rolls 6 and 7. Said side clips 13, 14 are in the form of levers pivoted at 15, 16 on the in-reaching ends of bell levers 17, 18 pivoted at 19, 20, respectively, in said roll 6. Said clips 13, 14 are oscillated on their pivots 15, 16, respectively, for causing the blank engaging noses of those clips to coact with face 21 of said roll by the following means: Fixed to shaft 20 of bell lever 18 is gear 22 for engagement with rack 23 mounted for reciprocation in parallelism with shaft 27 in end wall 24 of roll 6. The outer end of rack 23 is provided with roll 25 for engagement with fixed cam 26 mounted coaxially with shaft 27 of roll 6. Said cam is efficient for urging roll 25 and rack 23 inwardly, and a spring which will be, presently described is efficient for urging said slide outwardly. Also fixed to shaft 20 is segment gear 28 for engagement with similar segment gear 29 fixed on pivot 16 coaxially with clip 14. Between the blank engaging noses and the pivots of clips 13, 14 are ears 31, 32, respectively, and to said ears opposite ends of spring 30 are at

tached for urging said noses toward each other and for urging roll 25 to coaction with its cam 26. Clip 13 is provided with a downwardly reaching ear 33 which is connected with ear 32 of clip 14 by link 34. Thus when rack 23 is urged inwardly by cam 26, shaft 20 is rotated in anti-clockwise direction and clip 14 is rotated in clockwise direction, and by means of link 34 clip 13 is rotated in anti-clockwise direction; that is, clips 13, 14 are caused to retreat from each other and from bed 21. For causing said clips to retract below the surface 21 of roll 6 after they have been rotated away from one another I provide the following means: Fixed to shaft 19 of bell lever 17 is gear 35 for engagement with rack 36 mounted for reciprocation in parallelism with shaft 27 in end wall 44 of roll 6. Said rack 36 is provided with roll 37 for engagement with fixed cam 38 mounted coaxially with said shaft 27. To upreaching arm 39 of bell lever 17 is pivotally attached one end of link 40. The other end of said link is pivotally attached at 41 to the downreaching portion of bell lever 18. To said pivot 41 is attached one end of spring 42 and the other end of said spring is attached to head 44 of roll 6. Said spring 42 is therefore efficient for urging clips 13, 14 to their operative positions beyond the periphery 21 of roll 6 and for urging roll 37 to engagement with its cam 38. When rack 36 is moved inwardly in said head 44 it causes shaft 19 to rotate in clockwise direction and through link 40 causes bell arm 18 to rotate in anti-clockwise direction whereby clips 13, 14 are retracted downwardly, Fig. 6, to below face 21 of roll 6.

40 In the type of machine to which my improvements pertain it is customary to provide opposite folding wings for pressing down against the diverging rolls the opened end of the tucked paper tube, thereby completing the formation of the diamond fold, as shown at A, Fig. 2. For actuating said folding wings 45, 46 I provide the following means: Inreaching from side frames 50, 51 are brackets 52, 53, respectively. As the parts carried by said brackets are right and left duplicates of each other I will confine myself to the description of those parts mounted on bracket 52. Fixed in said bracket 52 and upstanding therefrom is shaft 54 and fixed to the upper end of that shaft is segment gear arm 49. Pivoted freely on said shaft 43 between bracket 52 and arm 49 is arm 54 having at its outboard end bearing 55 in which is rotatably mounted shaft 56 to which is fixed folding wing 45. To the upper end of said shaft is fixed segment gear 57 for engagement with the teeth of arm 49. Arm 54 has a rearwardly reaching portion 58 terminating in roll 59 for engagement 65 with cam 60 fixed to shaft 61 of roll 4.

Feed rolls 4, 5 and rolls 6, 7 have each a periphery equal to a bag blank length so that for each rotation of either of said rolls a bag blank is advanced a distance equal to its length. Therefore for each rotation of shaft 61 cam 60 oscillates shaft 56 of folding wing 45 back and forth with segment gear 57 in engagement with the teeth of arm 49, thereby causing folding wing 45 to operate upon each passing bag blank. By the means just described folding wing 45 is caused to travel in a peculiar path due to the rotation of that folding wing about the axis of shaft 56 and to the revolution of that shaft about the axis of shaft 43. This imparts to said folding wing a wiping movement which I have found highly efficient for folding down the side portions of the diamond fold.

Below roll 7 and preferably arranged on axes parallel in a plane at right angles to the common plane of the axes of rolls 6, 7, are coacting creasing roll 62 and creasing and pasting roll 63. Said roll 63 is efficient for applying paste 64, (B, Fig. 2) and, in coaction with roll 62, for forming creases 65, 66 transverse the bag blank, and on which creases the end flaps will thereafter be folded. Between rolls 7 and 62 is guide plate 67 with which and rolls 6, 7 folding wings 45, 46 coact to complete the folding of the diamond fold. A similar guide plate 68 is provided below roll 62 for directing the tubular web, having the diamond fold completed therein, to the next mechanism. That mechanism comprises rolls 69 and 70, the former of which is twice the diameter of the latter. Roll 70 is provided with cutter 71 for coaction with roll 69 for severing that portion 3 of the paper tube left unsevered in the transverse cutting of said tube, hereinbefore described. Roll 69 is provided with two pairs of side clips diametrically disposed, for engaging successive bag blank portions just rearwardly of creases 66 therein. Said crease 66, after the leading end of any given bag blank has been severed by cutter 71 from the next preceding bag blank, causes that leading end 72 to spring upwardly from the face of cylinder 69. Thereupon that leading end 72 is engaged by fixed folder 85 and turned over backwardly onto the diamond fold, (C, Fig. 2). Side clips as 73, 74 of cylinder 69 may be caused to oscillate toward and from their respective folding bed as 75 of said cylinder by means well known in the art, such as cams 76, 77. Said side clips are pivoted at 78, 79 on the ends respectively of said cylinder and are provided with outreaching arms terminating in rolls 80, 81 for engagement with said cams 76, 77, respectively. Said side clips may be urged toward one another by means of the usual spring 82. Cams 76, 77 are fixed cams and are supported concentrically with shaft 101 of cylinder 69 from brackets 83, 84 in-

reaching from side frames 50, 51, respectively.

For folding the rear flap 10 forwardly onto front flap 72, thus completing the bag bottom, I provide the following means: Below cylinder 69, which for this purpose may be considered a delivery cylinder, is receiving cylinder 86 of like diameter with cylinder 69 and also provided with mechanisms in duplicate. Said cylinder 86 comprises, for convenience of construction, two coaxial members 86^a and 86^b. These members are right and left duplicates and are rotated synchronously in clockwise direction, Fig. 1. Said cylinder members are provided with front clips 87, 88, respectively, for gripping the leading end of the partly folded blank to said cylinder 86, just before the sides of that leading end have been released by side clips 73, 74 (D, Fig. 2) of cylinder 69. Said front clips are mounted and actuated in the usual manner and a brief description of the mechanism of one of those clips will suffice for both. Clip 88 is fixed to shaft 89 rotatably mounted in cylinder member 86^b, and the outboard end of that shaft has fixed thereto arm 90 bearing roll 91 for engagement with fixed cam 92 supported from bracket 84. Said roll is urged to engagement with its cam by pull spring 930. Between cylinder members 86^a and 86^b and coaxial therewith, is flap folding cylinder 96. This cylinder is fixed to shaft 93 and is rotated in the same direction as cylinder 86 but at twice the speed. Pivoted at 94 near the periphery of said cylinder 96 and swinging into a pocket therein is folding tongue 95. Said tongue has a curved outer face which normally lies in concentricity with the periphery of said cylinder, see dotted position, Fig. 8, but may be swung outwardly from that position from time to time as required, by means of cam 97 in coaction with roll 98 pivoted on arm 99, fixed to shaft 94 of tongue 95. Pull spring 100 is efficient to urge roll 98 to engagement with cam 97. Cylinder members 86^a and 86^b are caused to rotate synchronously, and cylinder 96 is caused to rotate at twice the speed of said members, by the following means: Near opposite ends of shaft 101 are fixed gears 102, 103, respectively, which drive opposite equal gears 104, 105 fixed to sleeves 106, 107 of members 86^a and 86^b, respectively. Said sleeves turn freely on shaft 93 and which shaft has bearings in side frames 50, 51. Outboard frame 51 and fixed to shaft 101 is gear 108 of equal size with gear 103, while fixed to shaft 93, also outboard said frame 51, is gear 109 of one half the size of gear 108. Gear 109 is rotated from gear 108 through intermediate gears 110, 111. Tongue 95 is required to oscillate once for each of its revolutions about shaft 93 and twice for each revolution of cylinder 86 about that

same shaft. Therefore if cam 97 was a fixed cam that cam would be a one lobed cam but for convenience of construction that cam is fixed to the inner end of rotating sleeve 107 and is therefore only relatively still, it making one rotation to each two rotations of cylinder 96. Wherefore, said cam 97 is a two lobed cam, as shown, Fig. 8. As rear flap 10 passes from under fixed folder 85, tongue 95 is reaching the upper part of its path of travel near the vertical plane, Fig. 1, and thereupon swings outwardly, Fig. 8, hooking under flap 10 and, because of its relatively high speed of travel, said tongue folds that flap over into the pocket of cylinder 96 and then retracting to coincidence with the periphery of said cylinder folds that flap outwardly against the bag bottom. To cause said flap 10 to fold with accuracy along the line of crease 65 I provide folding blades 112, 113 pivoted at 114, 115 on the outer ends of members 86^a and 86^b, respectively. Said clips lie within peripheral pockets as 131 in members 86^a and 86^b, respectively and are provided with arms 116, 117 carrying rolls 118, 119 for engagement with fixed cams 120, 121 supported from brackets 83, 84, respectively. Said blades 112, 113 are shown in their normal operative positions in Fig. 4, and at D, Fig. 2, and blade 113 is thus shown in Fig. 1. After said flap 10 has been folded, said blades are retracted forwardly, in the direction of their travel with cylinder 86, as shown for instance at 122, Fig. 1, and at E, Fig. 2. Fixed plate 123 is provided for guiding the finished bag downwardly around cylinder 86 and after passing said plate, front clips 87, 88 are raised and the completed bag discharged.

For causing the several rotative members to rotate in proper time with each other I employ the usual gearing, particularly indicated in Fig. 1, and power may be conducted to some convenient shaft of the machine from some well known source of power not shown. It is believed that further description of such gearing is unnecessary and it is further believed that the operation of the machine will be apparent from the step by step description already made.

Those features which I believe to be new and original with me and which I desire to secure by Letters Patent are set forth particularly in the following claims:

I claim:

1. In a paper bag machine, the combination of a roll having a pair of oppositely disposed side clips for gripping a bag blank to the periphery of said roll, a pair of oppositely disposed bell levers, to one arm of each of which is pivoted one of said side clips for oscillation in the general plane of the bell lever oscillation, means for oscillating said bell levers, and means for oscillating said side clips on the bell levers.

2. In a paper bag machine, the combination of a roll having a pair of oppositely disposed side clips for gripping a bag blank to the periphery of said roll, a pair of oppositely disposed bell-levers to one arm of each of which is pivoted one of said side clips, means at one end of said roll for oscillating the adjacent side clip on its pivot, means connecting said side clip with the opposite side clip for causing that opposite side clip to oscillate synchronously with said first mentioned side clip, means at the other end of said roll for oscillating the adjacent bell-lever, and means connecting said bell-lever with the opposite bell-lever for causing that opposite bell-lever to oscillate synchronously with said first mentioned bell-lever.

3. In a paper bag machine, the combination of a roll having a pair of oppositely disposed side clips for gripping a bag blank to the periphery of said roll, a pair of oppositely disposed bell-levers to one arm of each of which is pivoted one of said side clips, a slidable member mounted in said roll, means for sliding the slidable member, means for oscillating one side clip from the slidable member, and means for operatively connecting said side clips; a second slidable member mounted in said roll, means for sliding the second slidable member, means for oscillating one bell-lever from the second slidable member, and means for operatively connecting said bell-levers.

4. In a paper bag machine, the combination of a roll having a pair of oppositely disposed side clips for gripping a bag blank to the periphery of said roll, a pair of oppositely disposed bell-levers to one arm of each of which is pivoted one of said side clips, means for oscillating said side clips including a gear fixed coaxially with one of said side clips, a gear freely mounted coaxially with the bell-lever on which said clip is pivoted and for engagement with said side clip gear, a rack slidably mounted in said roll, and means for rotating the bell-lever gear from the rack; means for oscillating said bell-levers including a gear fixed coaxially with the other bell-lever, a rack slidably mounted in said roll for engagement with said bell-lever gear, and means for sliding said rack.

5. In a paper bag machine, the combination of a roll having a pair of oppositely disposed side clips for gripping a bag blank to the periphery of said roll, a pair of oppositely disposed bell-levers to one arm of each of which is pivoted one of said side clips, means at one end of said roll for oscillating the adjacent side clip on its pivot, including a gear fixed coaxially with one of said side clips, a gear freely mounted coaxially with the bell-lever on which said clip is pivoted and for engagement with said side clip gear, another gear fixed co-

axially with said bell-lever gear, a rack slidably mounted in said roll for engagement with said other bell-lever gear, means for sliding said rack, and means connecting said side clip with the opposite side clip for causing that opposite side clip to oscillate synchronously with said first mentioned side clip; means at the other end of said roll for oscillating the adjacent bell-lever, including a gear fixed coaxially with the other bell-lever, a rack slidably mounted in said roll for engagement with said bell-lever gear, means for sliding said rack, and means connecting said bell-lever with the opposite bell-lever for causing that opposite bell-lever to oscillate synchronously with said first mentioned bell-lever.

6. In a paper bag machine, the combination of a pair of oppositely disposed folding wings, a pair of oppositely disposed pivotally mounted arms, in the free end of each of which one of said folding wings is pivotally mounted, the axis of said folding wings being parallel to the axes of said arms, means for oscillating said arms, and means for oscillating said wings relatively to said arms respectively during the oscillation of said arms.

7. In a paper bag machine, the combination of a pair of oppositely disposed folding wings, a pair of oppositely disposed pivotally mounted arms, in the free end of each of which one of said folding wings is pivotally mounted, means for oscillating said arms, and means for oscillating said wings relatively to said arms respectively during the oscillation of said arms comprising, a gear segment fixed relatively to the pivot of each arm and coaxially therewith, and a gear fixed to each folding wing and coaxial therewith for engagement with said gear segments respectively.

8. In a paper bag machine, means for folding the rear flap of the bag bottom including in combination, a rotating receiving cylinder having means thereon for gripping a bag blank, said receiving cylinder comprising oppositely disposed coaxial members each having a peripheral pocket, a flap folding cylinder between said receiving cylinder members and coaxial therewith, means for rotating said flap folding cylinder in the direction of rotation of said receiving cylinder but at a greater speed, and means on the flap folding cylinder for engaging the rear flap and folding it inwardly, relatively to said receiving cylinder, onto the bag bottom.

9. In a paper bag machine, means for folding the rear flap of the bag bottom including in combination, a rotating receiving cylinder having means thereon for gripping a bag blank, said receiving cylinder comprising oppositely disposed coaxial members each having a peripheral pocket, a

folding blade pivotally mounted in each pocket and projecting into conformity with the periphery of said cylinder, and means for oscillating said folding blades lengthwise the periphery of said cylinder; a flap folding cylinder between said receiving cylinder members and coaxial therewith, means for rotating said flap folding cylinder in the direction of rotation of said receiving cylinder but at a greater speed, and means on the flap folding cylinder for engaging the rear flap and folding it inwardly, relatively to said receiving cylinder, onto the bag bottom.

10. In a paper bag machine, means for folding the rear flap of the bag bottom including in combination, a rotating receiving cylinder having means thereon for gripping a bag blank, said receiving cylinder comprising oppositely disposed coaxial members each having a peripheral pocket, a folding blade pivotally mounted in each pocket and projecting into conformity with the periphery of said cylinder, and means for oscillating said folding blades lengthwise the periphery of said cylinder; a flap folding cylinder between said receiving cylinder members and coaxial therewith, means for rotating said flap folding cylinder in the direction of rotation of said receiving cylinder but at a greater speed, a folding tongue pivotally mounted in said flap folding cylinder for oscillation into conformity with the periphery of said cylinder and outwardly therefrom, and means for so oscillating said tongue for coaction

with the folding blades of the receiving cylinder for folding the rear flap of the bag bottom.

11. In a paper bag machine, means for folding the rear flap of the bag bottom including in combination, a delivery cylinder, a receiving cylinder, means on each cylinder for gripping a bag blank thereto, said receiving cylinder comprising oppositely disposed coaxial members each having a peripheral pocket, a folding blade pivotally mounted in each pocket and projecting into conformity with the periphery of said cylinder, and means for oscillating said folding blades lengthwise the periphery of said cylinder; a flap folding cylinder between said receiving cylinder members and coaxial therewith, means for rotating said flap folding cylinder in the direction of rotation of said receiving cylinder but at a greater speed, a folding tongue pivotally mounted in said flap folding cylinder for oscillation into conformity with the periphery of said cylinder and outwardly therefrom, and means for so oscillating said tongue for coaction with the folding blades of the receiving cylinder for folding the rear flap of the bag bottom.

Signed at New York, N. Y., this 9 day of October, 1912, before two subscribing witnesses.

WILLIAM T. DULIN.

Witnesses:

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