

H. SMITHWICK.
PAPER BAG MACHINE.

APPLICATION FILED DEC. 15, 1910.

997,336.

Patented July 11, 1911.

4 SHEETS—SHEET 1.

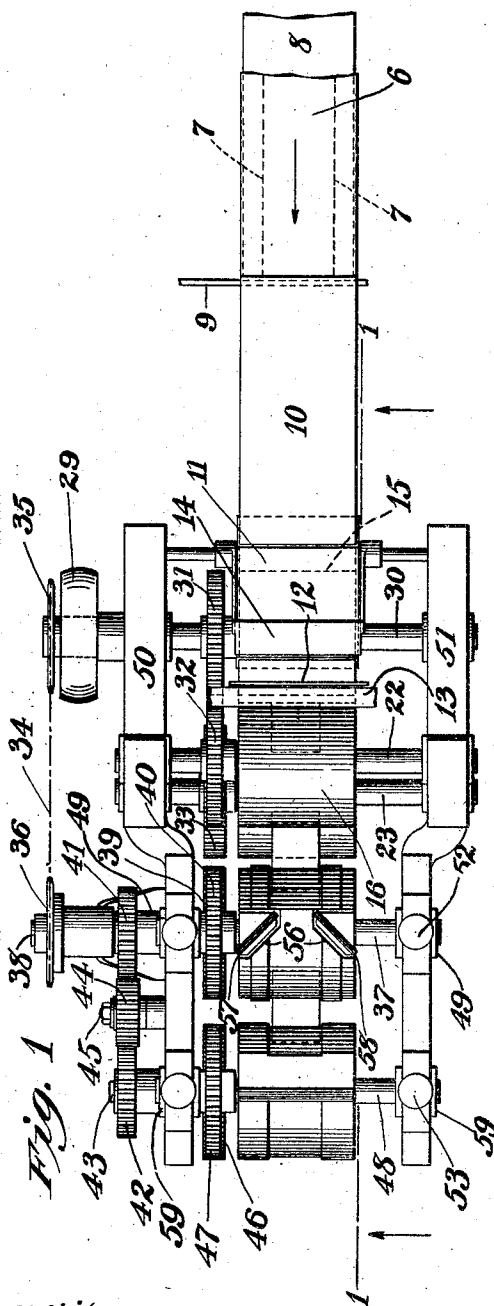


Fig. 1

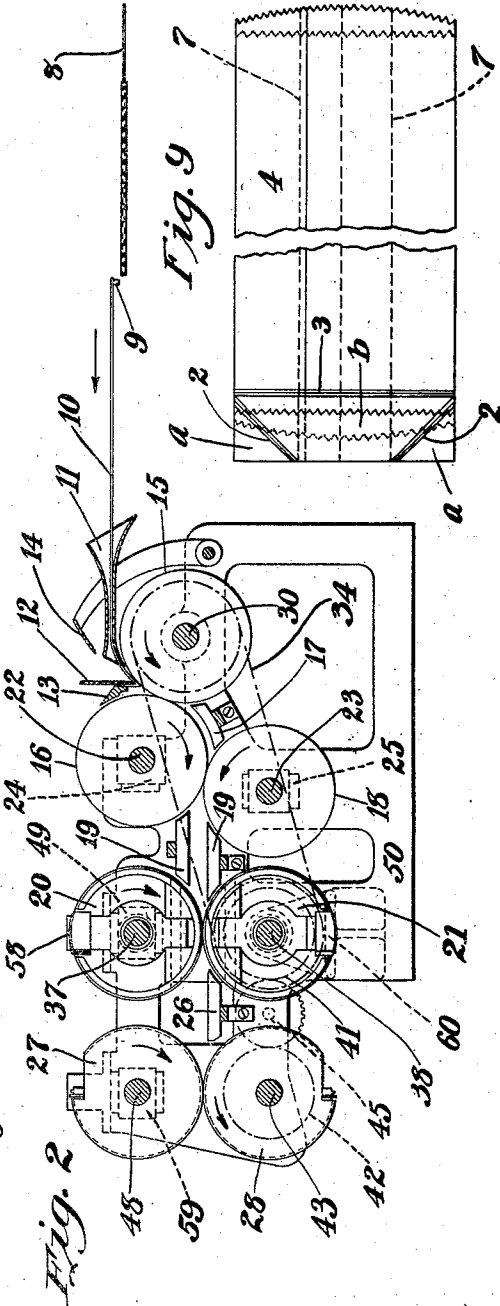


Fig. 2

Fig. 9

Witnesses:
Allan H. Gove.
Chas. W. La Rue

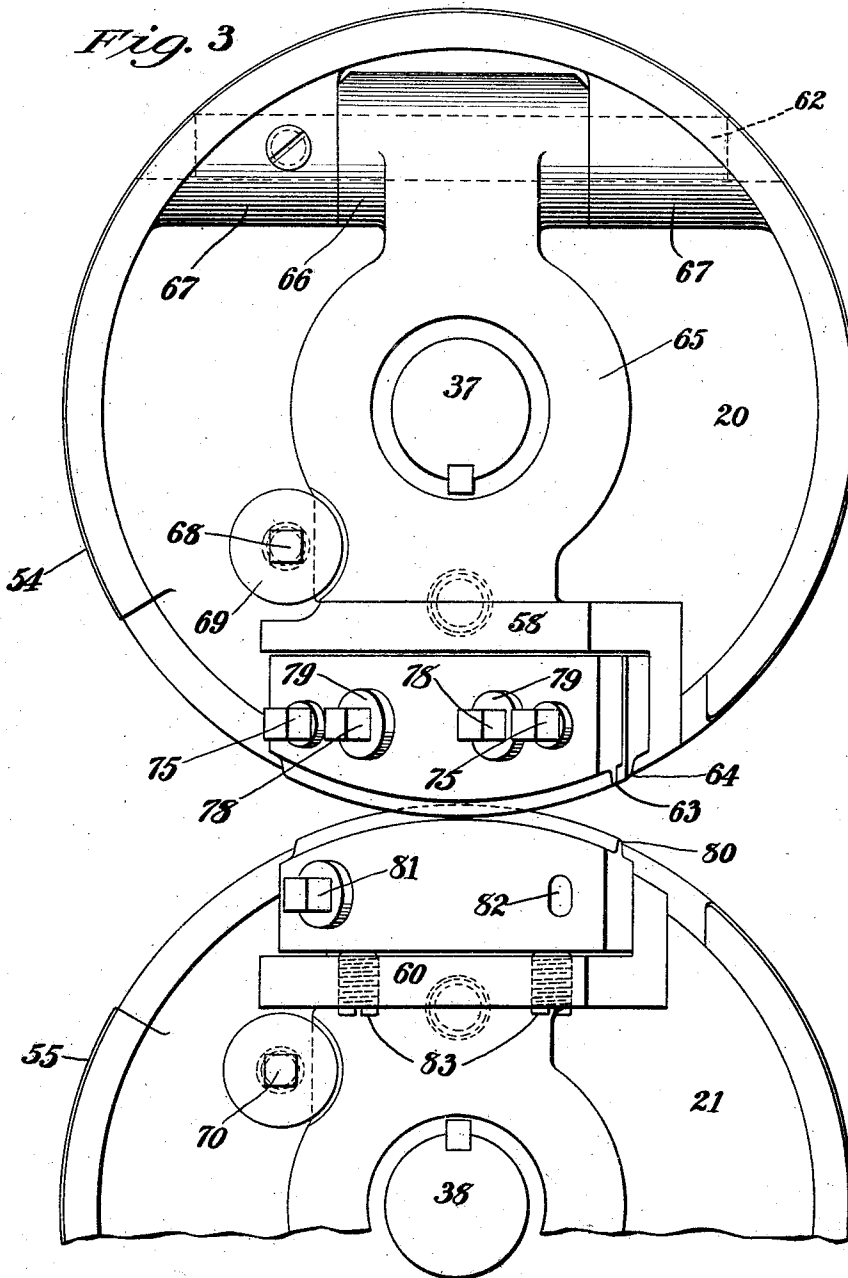
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Witnesses
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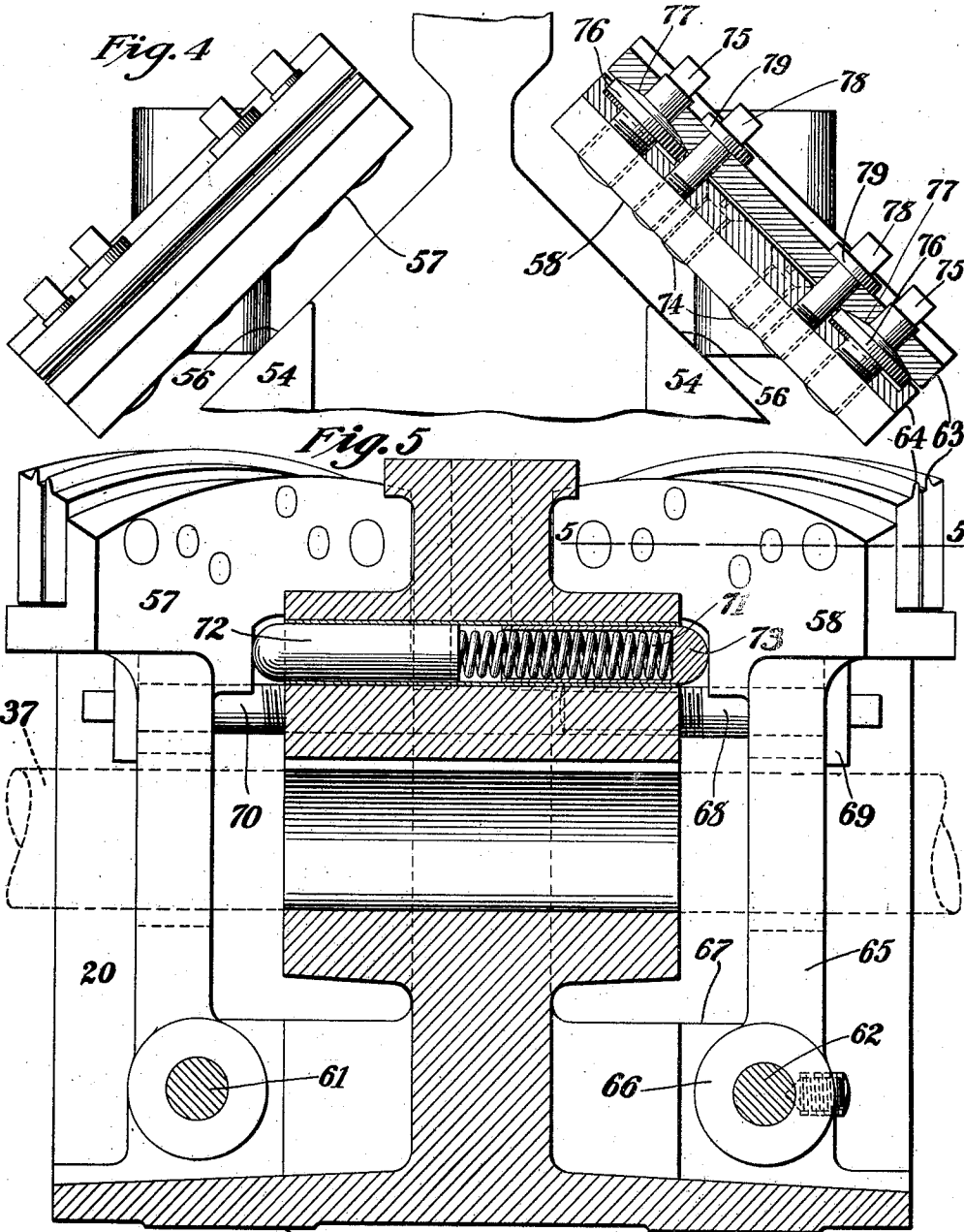
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4 SHEETS—SHEET 3.



Witnesses:
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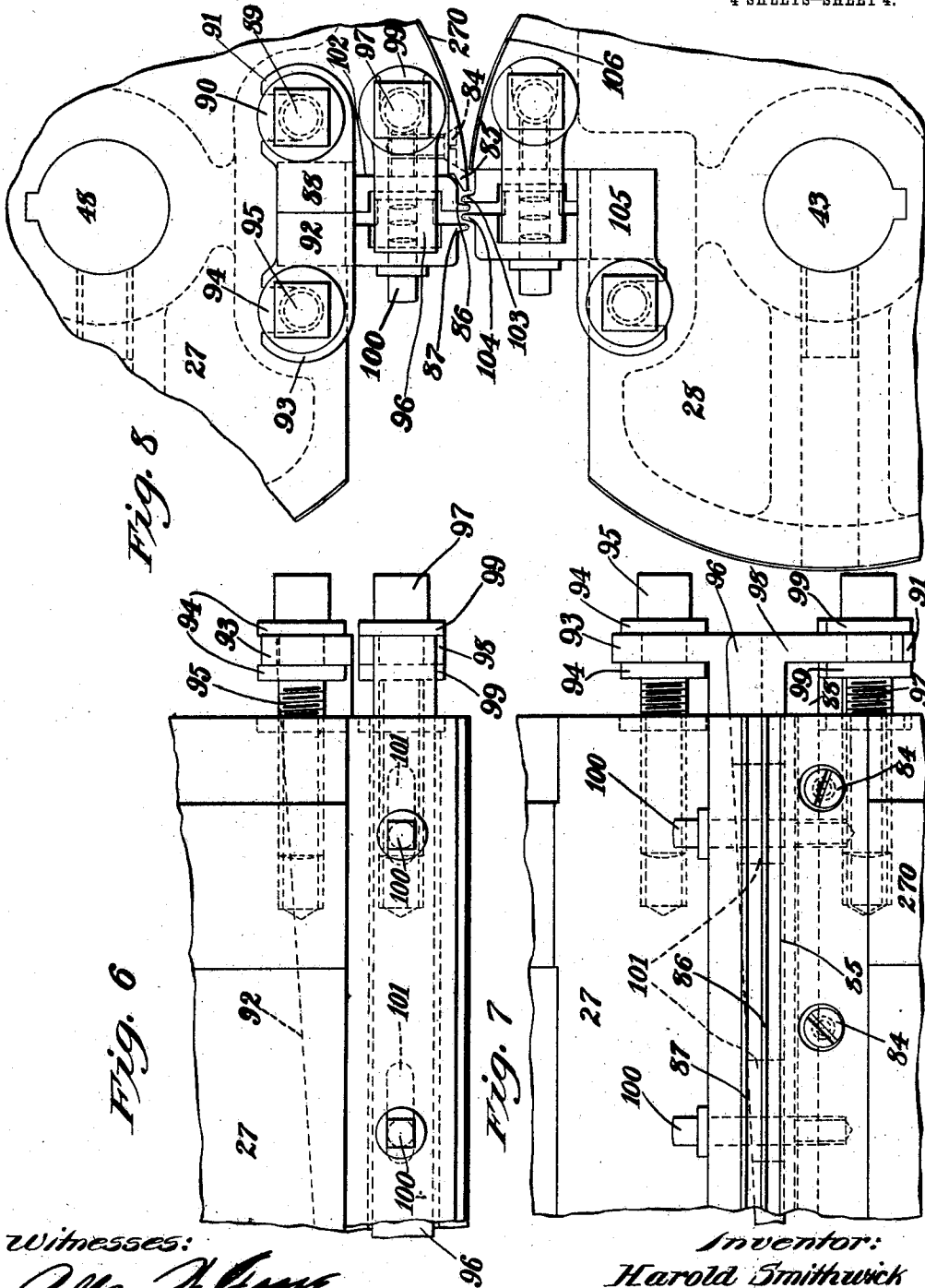
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

HAROLD SMITHWICK, OF RUMFORD, MAINE, ASSIGNOR TO CONTINENTAL PAPER BAG COMPANY, A CORPORATION OF MAINE.

PAPER-BAG MACHINE.

997,336.

Specification of Letters Patent.

Patented July 11, 1911.

Application filed December 15, 1910. Serial No. 597,462.

To all whom it may concern:

Be it known that I, HAROLD SMITHWICK, a citizen of the United States, and a resident of Rumford, in the county of Oxford and State of Maine, 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 of that class adapted to make paper bags from a continuous paper tube having inwardly folded tucks in opposite sides thereof, and is particularly adapted for producing the type of paper bag illustrated and claimed in U. S. Patent Number 904167 granted to Howard G. Widmer, Nov. 17, 1908.

The object of the present invention is to furnish a machine of the class specified, simple in construction and rapid and accurate in action.

The preferred embodiment of my improvements is illustrated in the drawings accompanying this specification wherein—

Figure 1 is a plan view of a paper bag machine, comprising my improvements. Fig. 2 is a side sectional elevation on line 1—1 of Fig. 1. Fig. 3 is an end view of the diagonal creasing means. Fig. 4 is a plan view partially in section of a part of what is shown in Fig. 3. Fig. 5 is a sectional elevation of the same. Fig. 6 is a front elevation of a part of the transverse creasing means. Fig. 7 is a bottom plan view thereof and Fig. 8 is an end view of said transverse creasing means. Fig. 9 is a plan view of a paper bag as made in my improved machine. Figs. 1 and 2 are drawn to a much smaller scale than that of the other figures.

Before the invention of the paper bag of Widmer, Patent 904167, it was considered necessary in order to produce square bottomed paper bags, to provide them with the so called diamond folded bottom. But by means of the Widmer invention the ordinary side tucked flat bag may be made without appreciable extra expense, to have the highly desirable easy opening, square bottom attributes of the more expensive and complicated diamond folded bag. However, although the bag of said Widmer patent can be produced on comparatively simple machinery and at high speeds, the efficient production of the peculiar creases to enable and cause that bag to open as described, is not

an obvious or simple accomplishment. Those peculiar creases comprise two diagonal symmetrically disposed creases 2, 2 across the bottom corners of the bag 4 and one transverse crease 3 thereacross adjacent to the divergent ends of said diagonal creases, all as shown in Fig. 9. The particular features of the present invention reside in the novel and ingenious means provided for efficiently forming said creases in the several plies of the bag after it has been folded and pasted to close the bottom thereof.

Referring now more particularly to Figs. 1 and 2 of the drawings a continuous paper tube 6 having inwardly folded tucks 7, 7 in the opposite sides thereof is led over guide plate 8 in coaction with the end of which plate striker 9 severs said tube into blanks as 10 of predetermined length. Prior to the severing of blanks 10 from tube 6 the leading end of said blank has been fed through guide 11 and into the grip of pasting plate 12 and bar 13. As soon as the blank is severed tucker blade 14 descends and delivers the folded and pasted leading end of the blank to the grip of rolls 15, 16 which squeeze and seal the bottom and forward the bag over guide 17 into the grip of rolls 16, 18 and thence between guides 19, 19 to the diagonal creasing mechanism 20, 21. Said bag formed from blank 10 is retained in the double grip of rolls 15, 16 and 16, 18 during the entire action of creasing mechanism 20, 21 thus insuring accuracy and uniformity of result. Rolls 16 and 18 preferably have their axial shafts 22, 23 adjustably spring supported as indicated at 24, 25, all respectively so as to permit adjustment for variation in thickness of paper and for other reasons which will be more fully pointed out hereinafter. As the tube severing and bottom closing mechanism just described is of well known character elementary description and illustration thereof is deemed sufficient for the present purpose.

From diagonal creasing mechanism 20, 21 the bag is forwarded over guide 26 to the transverse creasing mechanism 27, 28 and thence discharged from the machine.

Before proceeding to the detail description of my improved creasing mechanism, I will describe the means for driving in proper direction and timing the several parts of my machine. The several shafts thereof are rev-

olubly mounted in suitable bearings in the usual side frames 50, 51. Power may be supplied to pulley 29 on shaft 30 of roll 15 from any suitable source of power not shown.

5 Gear 31 on shaft 30 drives equal gear 32 on shaft 22 and gear 32 drives equal gear 33 on shaft 23. Creasing mechanism 20, 21 is driven from main shaft 30 by chain 34 connecting sprocket 35 on shaft 30 with equal

10 sprocket 36 on shaft 38. Gear 39 on shaft 38 drives equal gear 40 on shaft 37. Creasing mechanism 27, 28 is actuated from shaft 38 as follows: Gear 41 on shaft 38 drives equal gear 42 on shaft 43 through intermediate

15 gear 44 on stud 45 outstanding from side frame 50. Gear 46 on shaft 43 drives equal gear 47 on shaft 48. Creasing mechanism shafts 37, 48 are preferably mounted in vertically slidable boxes as 49, 49 and 59, 59

20 respectively spring urged to their work as diagrammatically indicated at 52, 53 for instance, all as well known in the art. The circumferential positions of rolls 20, 21, 27, 28 of the creasing mechanisms in Figs. 1 and

25 2 are such as to most clearly show their details of construction and are not timed with the shown position of bag blank 10 in process of making. Rolls 20, 21 should be set back circumferentially about 92 degrees and rolls

30 27, 28 should be set forward $111\frac{1}{2}$ degrees to cause them to be properly timed with the bottom forming mechanism.

Directing attention now more particularly to the creasing mechanisms it will be understood that for the ultimate efficiency of

35 creases 2, 2 and 3 said creases must be originally formed with such pronounced characteristics as to be able to maintain those characteristics in a large measure during subsequent handling, bundling, packaging under pressure, storing and shipping and until

40 they are needed for actual use. This obviously requires that said creases be sharply defined and of substantial depth. My improved mechanism is particularly adapted

45 for accomplishing these results positively and efficiently.

Referring particularly to Figs. 3 and 5 I will describe in detail the construction of the

50 diagonal creasing mechanism. Roll 20, fixed to shaft 37, has the usual circumferential surfaces 54, 54 for coaction with similar surfaces as 55 on roll 21 for feeding the bag therebetween. The circumferential continuity of surfaces 54, 54 is broken by pockets

55 56, 56 in which are housed diagonal creasers 57, 58. Said creasers are mounted to move toward and from each other in substantial parallelism with axial shaft 37 and coacting

60 creasers as 60 of roll 21 are similarly mounted. For permitting said creasers to move toward and from each other as described I preferably mount them pivotally

65 on shafts as 62 of creaser 58 within roll 20, as remote as may be from their creasing edges

as 63, 64 of said creaser 58. To permit the symmetrical disposal of said creasers relative to their roll shafts as for instance creaser 58 to roll shaft 37, I provide an annular portion 65 through which said shaft 37 freely

70 passes and said creaser terminates in hub 66 on shaft 62 between ears 67, 67 of roll 20. Outward movement of creaser 58 is adjustably limited by means of stop screw 68 threaded into the hub of roll 20, and having

75 head 69 thereof overhanging said creaser for engagement therewith. Creaser 57 is similarly limited in outward movement by stop screw 70. Said creasers 57, 58 are urged

80 away from each other and against their respective stop screws by means of spring 71 between plungers 72, 73 in roll 20 and bearing against the inner faces of creasers 57, 58 respectively. Stop screws as 68, 70 are also

85 efficient for adjusting said creasers in and out in substantial parallelism with axis 37, relative to their respective opposing creasers on the other roll. When the bag passes into engagement with creasers 58 and 60, blade 86

90 of creaser 60 forces the paper between blades 63, 64, drawing the paper from both directions in so doing; at the same time creaser 57 and its opposite creaser in roll 21, not shown, are operating similarly at the opposite

95 side of said bag. Outer portions *a*, *a* (Fig. 9) being free will yield inwardly under this creasing operation but middle portion *b* being continuous and in the grip of opposing sets of creasers, cannot yield and

100 if said opposing sets of creasers were fixed relative to each other said middle portion *b* must of necessity be broken and the bag destroyed. However said opposing sets of

105 creasers being yieldably mounted as described, they move inwardly toward each other at each creasing operation, more or less, as required by the thickness of the bag and the depth of crease being made. It will

110 thus be seen that the described yieldability of said diagonal creasers is required for successfully forming the requisite creases across the corners of the bottom of the bag and for forming those creases of the requisite

115 depth for their ultimate efficiency.

The several creasing blades as 63, 64 are

115 adjusted relative to their adjacent mates as follows. Referring particularly to creaser 58, blade 64 thereof is fixed thereto by countersunk screws 74, 74. Screws 75, 75

120 threaded into the head of creaser 58 have spherically faced collars 76, 76 thereof in engagement with spherically faced seats 77, 77 of the under side (Fig. 4) of blades 63

125 whereby either or both ends of said blade may be moved toward or from blade 64. Screws 78, 78 also threaded into the head of

130 creaser 58 and passing through blades 63, 64 have collars 79, 79 engaging the upper face (Fig. 4) of blade 63 for holding said blade securely in its adjusted position

against collars 76, 76 of screws 75, 75, relative to blade 64. It will be understood that the blades of creaser 57 are similarly adjusted and fixed as just described in connection with creaser 58.

Referring now particularly to Fig. 3 blade 80 of creaser 60 is secured in position on said creaser by collar head screws as 81 passing through slots as 82 in said blade and threaded into the head of said creaser. Said slots as 82 are provided to allow of vertical adjustment of said blade 80 relative to opposing blades 63, 64 of creaser 58. Said vertical adjustment may be made at either or both ends of blades 80 by means of push screws 83, 83 threaded into the head of creaser 60 under blade 80 and bearing thereagainst. It will thus be seen that creaser blades 63, 64 and 80 are universally adjustable in their relations to each other by the means just described. The necessity for such adjustability is first, to allow for the various thicknesses of paper from which the bags may be made and also to allow for the variable stiffness of said paper. Second, to be able to crease the bag lightly upwardly from the bottom where there are eight thicknesses of paper and then to make said crease deeper at its upper end where there are only four thicknesses. A further necessity for depth and definition at the upper ends of the diagonal creases is to provide an efficient dam against material poured into the bag from getting into the corners and thus preventing the bottom from opening properly.

Another requisite attribute of both the diagonal and transverse creases is hardness to enable said creases to maintain their integrity until the bag is put into actual use. This attribute is partially attained by the efficient relative setting of the opposing creasers but I have found that a much higher efficiency may be added by setting rolls 15, 16, 18 or 16, 18 only to so grip the advancing bag as to cause a material tension thereon as the bag is engaged by the diagonal creasers. If the bag is not retarded at all while the creases are being made, said creases even though formed of requisite depth are soft and may be easily destroyed in bundling and packing. Rolls 16, 18 are therefore adjustably mounted so that they may be arranged to hold the bag sufficiently tight to make the creases as hard as possible without breaking the paper. The requisite retardation for the transverse creasing is attained by gripping the bag between faces as 54, 55 of rolls 20, 21 respectively while said transverse creasing is being done.

Referring now particularly to Figs. 6, 7 and 8 the transverse creasers are mounted and adjusted as follows. Upper roll 27 is provided with three creasing members.

First, creasing edge 85 fixed in said roll 27 and having its face coincident with periphery 270 of the roll. Said edge 85 might be integral with the roll but for convenience and strength it is made of steel and held in place by screws 84. Creasing blades 86 and 87 are adjustably mounted in roll 27. Said blades are independently movable radially said roll and blade 87 is also movable toward and from blade 86. Radial movement of blade 86 may be had by means of wedge 88 thereunder moved by screw 89 threaded into the end of roll 27 and having collars as 90 in engagement with yoke head 91 of said wedge. Blade 87 may be moved radially independent of blade 86 by means of wedge 92 having yoke head 93 in engagement with collars 94 of screw 95 threaded into the end of roll 27. For adjusting blade 87 toward and from blade 86 wedge 96 therebetween is moved lengthwise said blades by means of screw 97 threaded into the end of roll 27 and having yoke head 98 thereof in engagement with collars 99 of said screw. Said wedge 96 is slotted at 101, 101 for the passage of screws 100, 100 for binding blades 86, 87 and wedge 96 tightly against face 102 of roll 27. Creasing blades 103, 104 of roll 28 are mounted and adjusted in every way similar to the mounting and adjusting means of blades 86, 87 of roll 27 just described, except that blades 103, 104 are moved radially in unison by the one wedge 105 instead of independently by two wedges as are blades 86, 87. Blade 87 is preferably set radially to coincide with periphery 270 or roll 27 while blade 86 projects therebeyond. This edge 85 and blade 87 have the functions of the roll periphery while blade 86 is definitely a creaser in coaction with blades 103, 104, which project beyond the periphery 106 or roll 28. Edge 85 and blade 87 are highly useful in the creasing operation as they hold the paper up to be operated upon by creasers 103, 104. Edge 85 is also useful in coaction with tension surfaces 54, 55 of rolls 20, 21 respectively to produce a hard transverse crease in the bag.

The operation of my improved machine will be readily understood from the foregoing description and I will now direct attention only to some peculiar features thereof.

Suitable tuck paper tubing being supplied to the machine and operated upon as described to form a blank and then to close the leading end of said blank to form the bag bottom, said bottom end is delivered to the bite of diagonal creasers 57, 58 above and coacting creasers as 60 below. The pressing of the paper between the creaser blades as 63, 64 by blade 80 draws the bag crosswise thereof and as the bag is unyieldable, opposite creasers as 57, 58 yield inwardly on their pivots thus relieving an

otherwise breaking strain on the paper. Also there is a simultaneous drawing forward, in the direction of its travel, of the bag, and as said bag is still in the grip of rolls 16, 18 it is retarded in that forward movement which results in the diagonal creases being formed in the bag under tension, whereby said creases are made hard and definitive and able to withstand handling and packaging without being obliterated. The diagonally creased bag now passes onwardly into the grip of the transverse creasers in rolls 27, 28. The pressing of the paper between the several blades of said creasers draws the bag forwardly, in the direction of its travel, and as said bag is still in the grip of surfaces 54, 55 of rolls 20, 21 respectively said bag is retarded in that forward movement, which results in the formation of the transverse creases under tension whereby said creases are made hard and definitive and of commercial utility.

I claim:

1. A paper bag machine including in combination, means for forming diagonal creases across the corners of the bag bottom, comprising opposite rotary members each having pivotally mounted creasing blades therein yieldable lengthwise said rotary members.

2. A paper bag machine including in combination, means for forming diagonal creases across the corners of the bag bottom, comprising opposite rotary members each having pivotally mounted creasing blades therein yieldable lengthwise said rotary members and means for applying retarding tension to the bag during the operation of said creasers.

3. A paper bag machine including in combination, a member having therein two creasing members, each creasing member comprising a plurality of creasing blades relatively adjustable both in parallelism and in angular relation to each other.

4. A paper bag machine including in combination, a member having therein two creasing members relatively yieldably mounted, each creasing member comprising a plurality of creasing blades relatively adjustable both in parallelism and in angular relation to each other.

5. A paper bag machine including in combination, a rotary member having two creasing members pivotally mounted therein for movement toward and from each other, on axes independent of each other and independent of the axis of the rotary member.

6. A paper bag machine including in combination, a rotary member having pivotally mounted therein for movement to and from each other, on axes independent of

each other and independent of the axis of the revoluble member two creasing members, each creasing member comprising a plurality of creasing blades relatively adjustable and means for adjusting said creasing members relatively.

7. A paper bag machine including in combination, a rotary member having pivotally mounted therein for movement to and from each other, two creasing members, each creasing member comprising a plurality of creasing blades relatively adjustable both in parallelism and in angular relation to each other and means for adjusting said creasing members relatively.

8. A paper bag machine including in combination, two oppositely disposed rotary members each having pivotally mounted therein on axes independent of each other and independent of the axis of its rotary member two creasing members and each creasing member comprising a plurality of creasing blades relatively adjustable.

9. A paper bag machine including in combination, two oppositely disposed rotary members each having pivotally mounted therein two creasing members, each creasing member comprising a plurality of creasing blades relatively adjustable both in parallelism and in angular relation to each other.

10. A paper bag machine including in combination, means for forming diagonal creases across the corners of the bag bottom, comprising opposite rotary members each having creasers therein yieldable lengthwise said rotary members, means for applying retarding tension to the bag during the operation of said creasers, means for forming a transverse crease across the bag, comprising opposite rotary members, each having creasers therein and means for applying retarding tension to the bag during the operation of said creasers.

11. A paper bag machine including in combination, means for severing a blank from a continuous tucked paper tube, means for folding over and pasting down the leading end of said blank to close the bottom of the bag, means for forming diagonal creases across the corners of the bag bottom, comprising opposite rotary members each having creasers therein yieldable lengthwise said rotary members and means for applying retarding tension to the bag during the operation of said creasers.

Signed this 10th day of December, 1910, at New York, N. Y. before two subscribing witnesses.

HAROLD SMITHWICK.

Witnesses:

THEO. HAWLEY,
MAX HOCHFELDT.