(No Model.) 3 Sheets—Sheet 1.

E. B. STOCKING.

METHOD OF AND MEANS FOR MAKING SQUARE PAPER BAGS.

No. 279,109. Patented June 5, 1883.

Fig. 1.

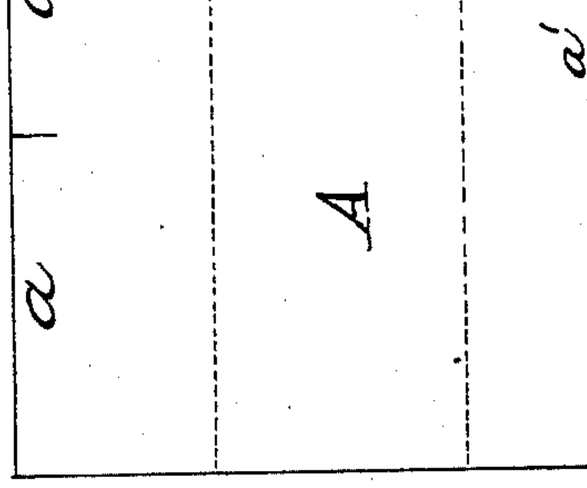


Fig. 2.

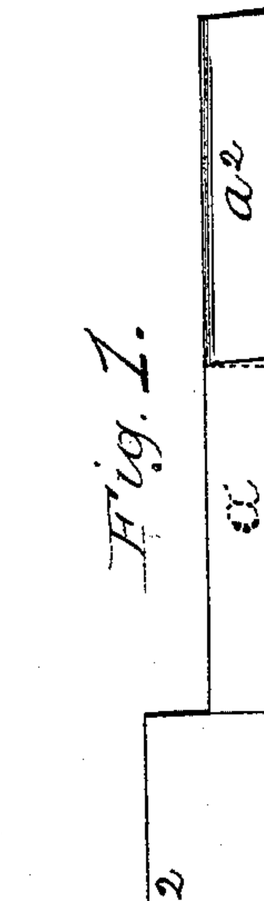


Fig. 3.

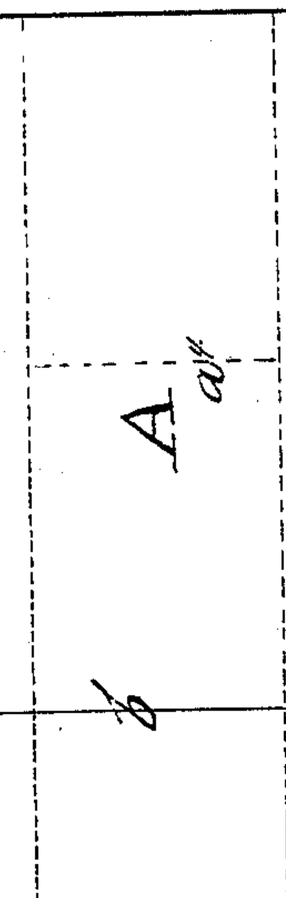


Fig. 4.

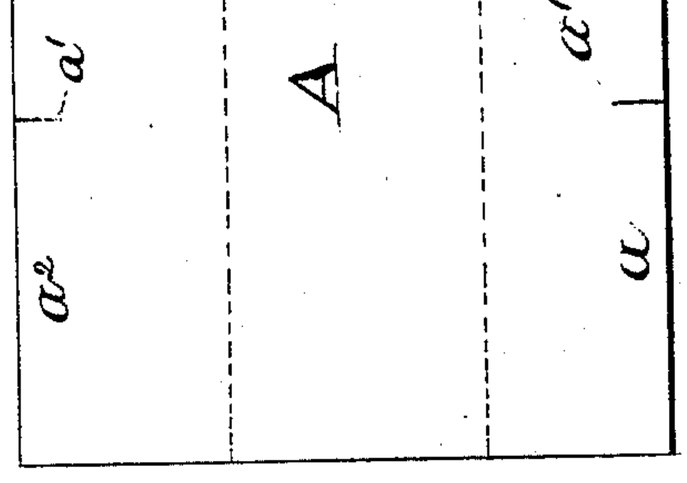


Fig. 5.

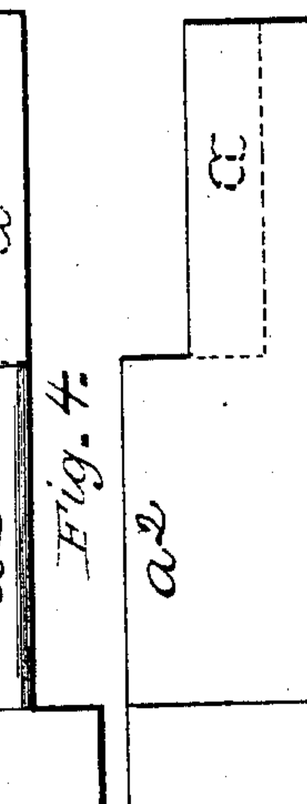


Fig. 6.

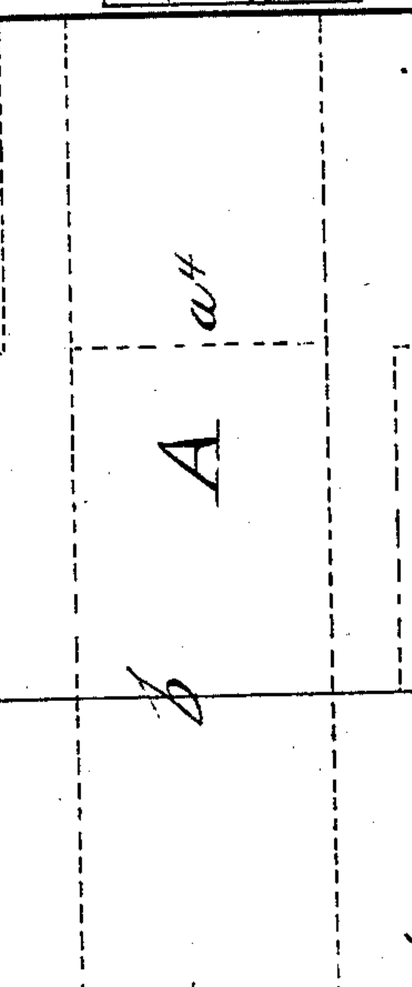


Fig. 7.

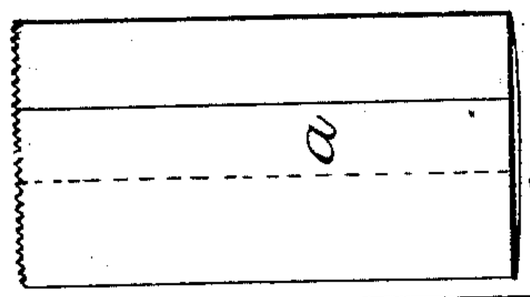
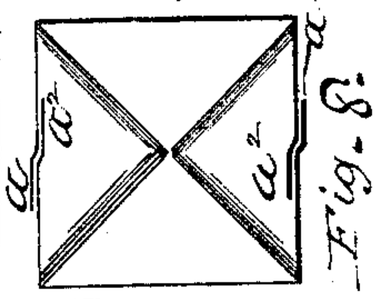


Fig. 8.



Witnesses:

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L. A. Pierce

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(No Model.) 3 Sheets—Sheet 2.

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METHOD OF AND MEANS FOR MAKING SQUARE PAPER BAGS.

No. 279,109. Patented June 5, 1883.

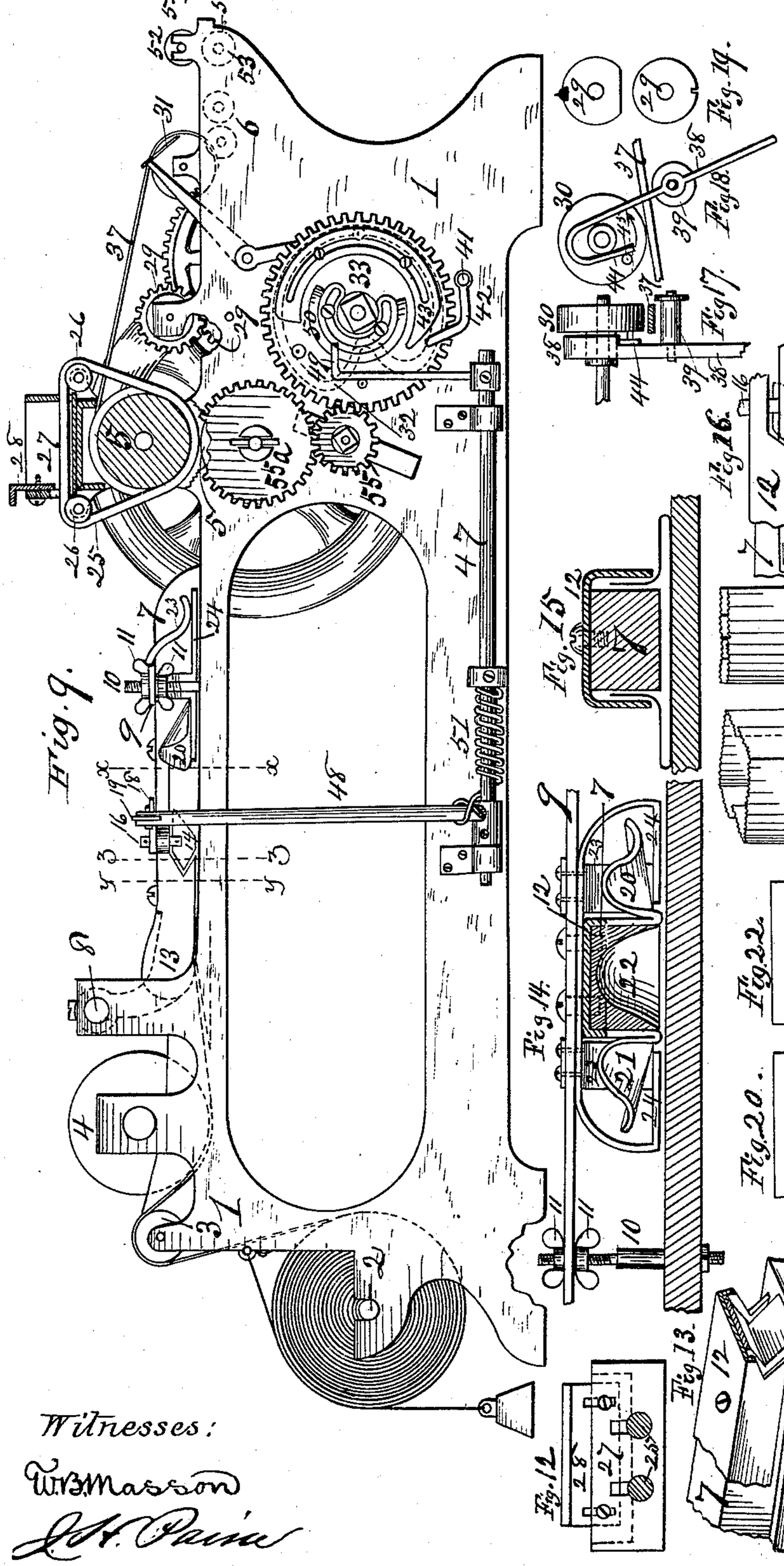

Fig. 9.

Fig. 19.

Fig. 18.

Fig. 17.

Fig. 16.

Fig. 15.

Fig. 14.

Fig. 13.

Fig. 12.

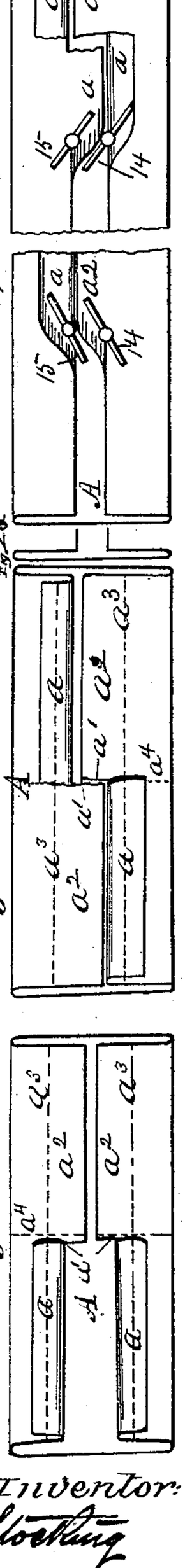

Fig. 27.

Fig. 25.

Fig. 26.

Fig. 24.

Fig. 22.

Fig. 20.

Fig. 23.

Fig. 21.

Witnesses:

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L. A. Paine

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(No Model.) 3 Sheets—Sheet 3.

E. B. STOCKING.

METHOD OF AND MEANS FOR MAKING SQUARE PAPER BAGS.

No. 279,109. Patented June 5, 1883.

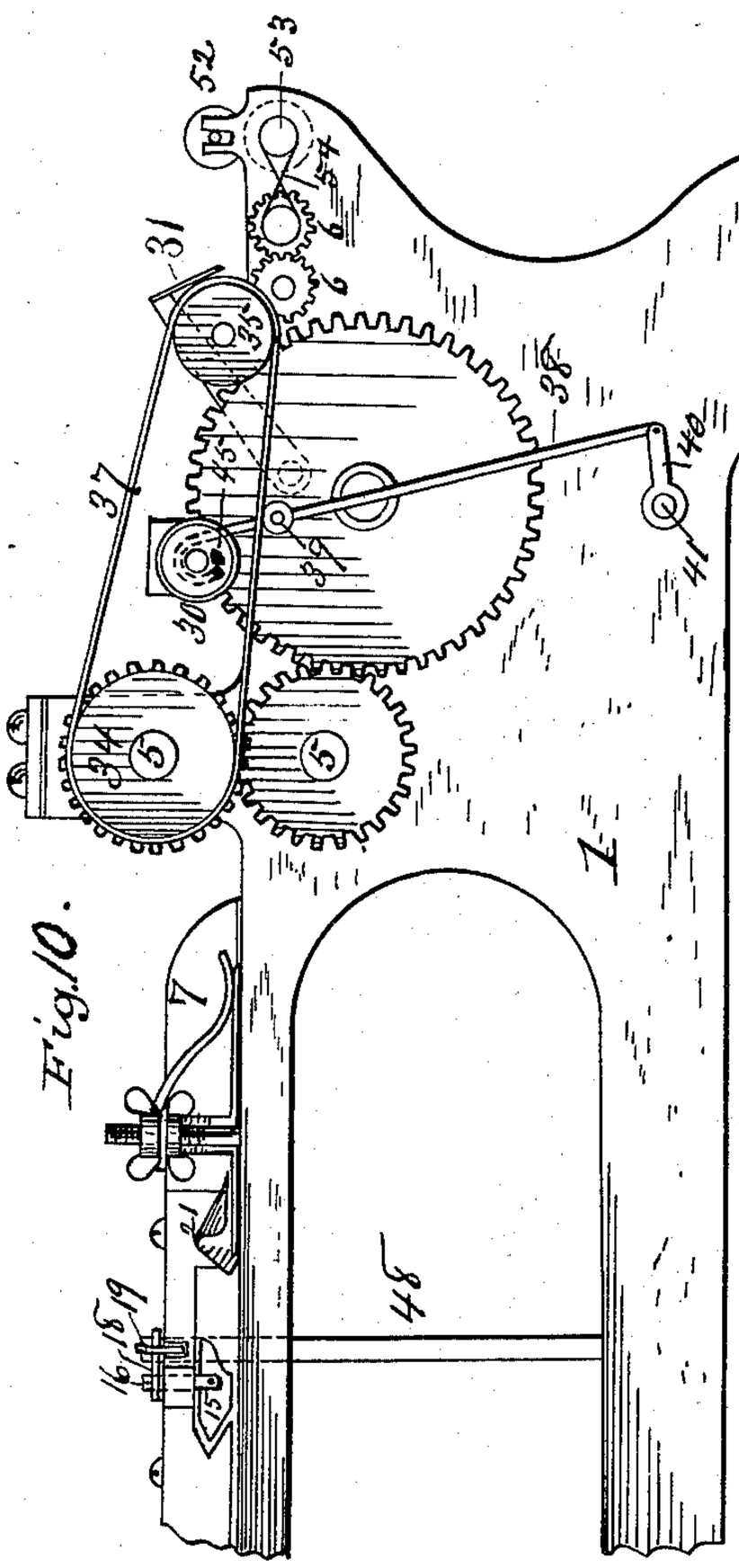

Fig. 10.

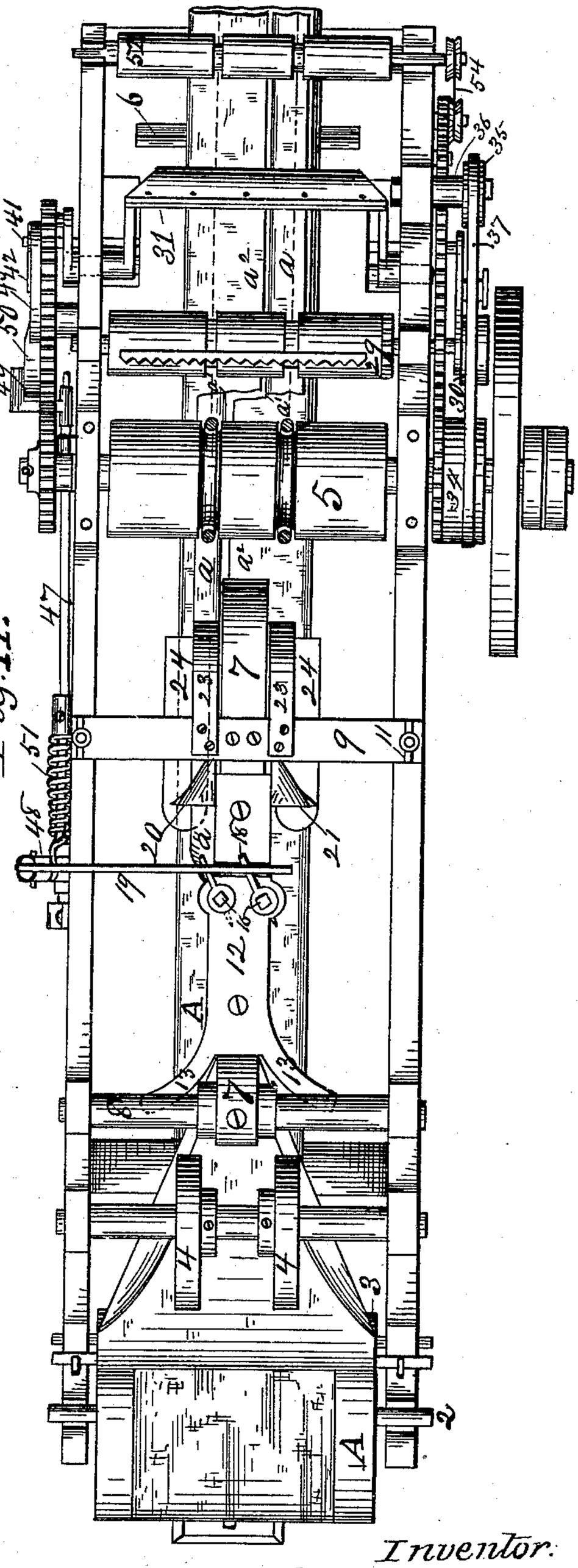

Fig. 11.

Witnesses:

W. B. Masson

L. V. Paine

Inventor:

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UNITED STATES PATENT OFFICE.

EDGAR B. STOCKING, OF WASHINGTON, D. C., ASSIGNOR TO THE UNION PAPER BAG MACHINE COMPANY, OF PHILADELPHIA, PA.

METHOD OF AND MEANS FOR MAKING SQUARE PAPER BAGS.

SPECIFICATION forming part of Letters Patent No. 279,109, dated June 5, 1883.

Application filed January 20, 1883. (No model.)

To all whom it may concern:

Be it known that I, EDGAR B. STOCKING, a citizen of the United States, residing at Washington, District of Columbia, have invented a certain new and useful Method of and Means for Making Square Paper Bags, of which the following is a specification, reference being had therein to the accompanying drawings, in which—

Figures 1 and 4 are plans of sheets or webs as they appear before and after certain steps in the manufacture of bags therefrom have been performed. Figs. 3, 6, 23, and 27 are plans, and Figs. 2, 5, and 26 end views, of incomplete tubes formed from the material during the manufacture of bags therefrom, Figs. 2 and 5 being end views of Figs. 3 and 6, respectively, and Fig. 26 an end view of Fig. 27. Fig. 7 is a side elevation, Fig. 8 an interior end view, Figs. 20 and 22 exterior end views, Fig. 24 a perspective, and Fig. 25 a plan, of the bag produced, Fig. 20 illustrating the "square" bag of this class as heretofore produced from the blank folded as shown in Fig. 21. Figs. 9, 10, and 11 are respectively a side elevation, a partial opposite side elevation, and a plan, the paste-box and its supporting cross-piece being removed, of a machine constructed in accordance with my invention and adapted to practice my method of manufacturing square bags. Figs. 12 to 19, inclusive, are details, as follows: Fig. 12, an enlarged end view of the paste-box, showing the paste-belts in section. Fig. 13 is a vertical section of the margin-guide on the line *z*, Fig. 9; Figs. 14 and 15, like sections on the lines *x* and *y*, respectively; and Fig. 16, a side elevation at about the line *z*. Figs. 17 and 18 are a side and end elevation, respectively, of the means employed to operate the rotary transverse cutters; and Fig. 19, an end elevation of said cutters.

Like letters and numerals refer to like parts in all the figures, the letters referring to the material and the numerals to the mechanism.

Heretofore this class of bags has been made by forming an incomplete tube, slitting the margins thereof, and folding the directly-opposite marginal sections of one half of the blank in opposite directions, applying paste-lines, and folding the blank centrally and transversely. The expression "incomplete tube" is used to designate a sheet or web arranged in two plies by folding it on parallel longitudinal lines, one of the plies being integral, and the remaining ply comprising the edges or margins outside of said fold-lines, which margins are not secured to each other, and, when slitted, form "marginal sections." The integral ply will hereinafter be designated as the "lower" and the divided or marginal ply as the "upper." The disposition of the marginal sections as heretofore practiced and above set forth results in two unfolded sections arranged edge to edge, and a space between the folded sections equal to the width of both, no two of the sections being in line longitudinally with each other. The bag thus produced is known as a "square bag"; but, in fact, it is not square in cross-section. It has been attempted to produce a square bag from an incomplete tube by removing the unfolded sections, the blank, when in single ply, being substantially T-shaped.

The object of my invention is to produce bags of this class which are actually square in cross-section. In the incomplete tube the upper ply forms the hitherto narrower sides and the lower ply the hitherto wider sides of the bag; hence to equalize the sides relatively more material must be consumed in the upper ply, and to do this I dispose the marginal sections so as to avoid any vacant space between their adjacent or opposite edges. I abut their edges, folded or not, and arrange two or more of the opposite or adjacent sections in line longitudinally with each other. To state it broadly, I dispose diagonally-opposite marginal sections in opposite directions.

My invention therefore consists in a step in the art of making square bags from an incomplete tube, which step consists in disposing diagonally-opposite marginal sections in opposite directions. In this respect my invention is independent of and separate from any previous steps employed in forming the incomplete tube, and any subsequent steps employed in completing a bag. That portion of the material which at any time during the manufacture of the bag forms the marginal sections may be oppositely disposed in accordance with my invention at different stages in said manufacture, and I have illustrated several of such stages as being susceptible of the practice of my invention.

Referring to Sheet 1, Fig. 1, A represents

the material, which may be either in sheets or in web form, and subsequently severed, before or after the formation of an incomplete tube, on the line *b* into bag lengths. The margins are slitted at *a'*, and the sections (see Fig. 21, Sheet 2,) have heretofore been folded as follows: the two opposite sections *a a* in opposite directions and the two opposite sections a^2 a^2 in opposite directions—that is to say, left flat, no two of the sections being in line longitudinally with each other, and the sections *a a* being separated by a space equal to their width. I arrange the sections *a* a^2 on each margin in line with each other, (see Figs. 1, 2, and 3,) or the sections a^2 a^2 in line with each other, (see Figs. 4, 5, and 6,) causing their edges—folded edges in the former instance and folded and unfolded in the latter instance—to abut, thus in both instances avoiding the vacant space heretofore existing between the sections, and this avoidance results from folding diagonally-opposite marginal sections in opposite directions. In the former case all and in the latter case only two of the diagonally-opposite marginal sections are folded in opposite directions.

In Figs. 1 and 4, I have illustrated the marginal sections folded before making the incomplete tube, and in Figs. 23 and 27 after and during the formation of said tube, respectively, as some of the stages at which my invention may be employed. It will be seen that when all the marginal sections are disposed as shown in Figs. 1, 2, and 3, the material is equally distributed in the upper and lower plies of the incomplete tube—that is, the portion of the upper ply not embraced in the marginal sections is equal in area to the lower ply, and hence a bag actually square in cross-section is produced. (See Figs. 7 and 8.) If but two of the diagonally-opposite sections are folded or disposed in opposite directions, (see Figs. 4, 5, 6, and 23,) the bag produced will not be actually square, but will be nearer square than hitherto produced from an incomplete tube by reason of the avoidance of the vacant space between the margins resulting from said diagonally-opposite disposition of the same. The more near approach to an actually square bag is illustrated in Figs. 20, 21, 22, and 23. The blanks, being of equal size in single ply, will produce, when folded as heretofore, and as shown in Fig. 21, a bag the sectional outline of which is shown in Fig. 20, and when folded by my modified method will produce a bag of the outline shown in Fig. 22. In other words, a blank folded as in Fig. 21 produces a bag of a cross-section shown in Fig. 20, while a like blank folded as in Fig. 23 produces a bag of a cross-section shown in Fig. 22.

The forming of the incomplete tube, the application and location of the paste-lines, and the subsequent folding of the blanks are matters too well known to require specific description.

From the description thus far given it will be seen that a proportionate advantage toward producing a bag without excessively unequal sides is gained by practicing my invention with less than all the marginal sections. Therefore my invention consists, secondly, in folding two diagonally-opposite marginal sections in opposite directions.

My invention further consists in the means employed in practicing my method by machinery hereinafter described, and specifically set forth in the claims.

Referring to Figs. 9, 10, and 11, and the detail figures, 12 to 19, inclusive, 1 represents a suitable frame-work, in which are supported the web-shaft 2, guide-roll 3, creasers 4, feed-rolls 5, and final folding rolls 6, all of the usual construction and performing their usual functions. Between the creasers and feed-rolls, and arranged longitudinally and centrally, is a margin-guide, 7, supported at its rear end by a cross-bar, 8, to which it is pivotally secured, and near its front end is secured to a cross-bar, 9, which is supported by posts 10, provided with set-screws 11, whereby the guide may be adjusted toward or from the bed of the machine, so that the lower ply of the material may pass freely between the guide and machine-bed, and, if desired, the front end of the guide may by disconnecting arm 48 be lifted, turning the guide on cross-bar 8 away from the bed to give access to the parts and facilitate the first introduction of the material. If desired, the posts 10 and set-screws 11 may be dispensed with, and the bearing of the guide upon the bar 8 be sufficiently extended to secure it from springing laterally over the bed. A cap, 12, is secured to the top of the guide, and is provided with depending flanges, which are extended at the rear end to form wings 13—one upon each side—to receive the material forming the upper ply and assist in the formation of the incomplete tube. If desired, the guide and cap may be formed in one piece.

As thus far described, it will be seen that the web A, as it passes over the guide-roll and under the creasers and along the bed of the machine, is by these elements and the wings 13 of the guide 12 formed into an incomplete tube, the margins of which are maintained in an upright position, as clearly shown in Fig. 15, and in this instance while in this position said margins are slitted and disposed as hereinbefore set forth, and by the following means: A recess is formed in the under surface of the guide and in the flanges of the cap, the rear end (in the direction of feed) of which recess is in this instance <- shaped, to agree with the outline of two knives or slitters, 14 and 15, each secured at about the center of its length to a vertical shaft, 16 17, respectively journaled in the guide and in the line of feed of the margin, and having arms 18 projecting therefrom and through a bar, 19, which reciprocates in a groove or bearing formed in this instance in and across the guide. It will be seen that the slitters, being located vertically in the line of feed of the margins, when the shafts are oscillated, are made to cross said line and to project therefrom in opposite directions. The

material, moving from rear to front in line of feed, is drawn against the points of the slitters (see Fig. 16) as they cross the line, and without a perceptible interruption in the advancement of the margins or strain upon the material slits *a'* are formed, and the advancing margin is, by the tail of each slitter, (that portion back of its shaft,) disposed so as to either remain in a flat position or be folded over onto the adjacent surface of the upper ply. In this condition the material is pressed by the feed-rolls 5. If the margin is slitted at an inward swing of the point of the slitter, the advancing margin is folded by the tail, and if slitted by an outward swing of the point the advancing margin is laid flat or unfolded by the tail. Now, it is evident that this slitting and folding may be accomplished in different directions, if desired, by the means thus far described, with any suitable mechanism to produce the movement of the slitters in desired times and directions, so that these devices may be employed in producing any form of bag-blanks requiring slitted margins. Each of the slitters may be other than > -shaped at their cutting ends, and they may be supported independently of the guide, as may the bar 19, the requisite being that the slitter shall be normally in the line of feed of the margin, and so arranged therein that it positively transfers the advancing margin from one side to the other of the slitter. The slitters need not be arranged in pairs, but may be single and arranged or located at different points along the guide, and the operating mechanism of each may be independent of the other and suitably timed in action. The slitters need not be vertical, as with a web in single ply each slitter may be flat or horizontally arranged in the line of feed to cross the same and dispose of the advancing margin; but in this latter arrangement I employ folders, as hereinafter stated. By the construction shown both slitters are operated simultaneously and parallel to each other, so that only two of the diagonally-opposite margins are disposed in opposite directions. As above stated, the margins so disposed are pressed by the feed-rolls 5; but to secure greater accuracy in the disposal of the margins in opposite directions I have provided folders or hemmers 20 21 22. (See Fig. 14.) When these folders are employed, the function of the tails of the slitters is merely to incline the advancing margins so that they shall enter a desired folder or not, so that said margin shall be folded over onto or against the ply of which it is a part, or laid flat in an unfolded condition. The front end of the recess of the guide is excavated, as at 22, to gradually bring that one of the margins which is directed therein by the tail of one of the slitters to the desired flat or unfolded position, as at a^2, (see Figs. 6, 11, 23, and 27,) and in like manner the folders 20 and 21 act upon that one of the said margins which the tail of a slitter directs therein to bring it to the desired folded position, as at *a* in said figures. When the folders and their adjuncts are dispensed with, I place the slitters near the rolls 5, so that the marginal sections are well under the action of the rolls before the slitters change their position to form succeeding sections. The adjuncts of the folders, which are not essential except to further accuracy, are ordinary spring-fingers, 23 23, and guide-plates 24 24, secured to the cross-bar 9. The folders 20 21 are either secured to or formed integral with the cap or guide. In order to fold all of the margins in opposite directions, duplicate folders are arranged opposite those shown, and between the upper and lower plies of the tube, which plies are separated for that purpose, and the semi-conical excavation 22 is omitted in the guide; or, instead, oppositely-arranged folders located at the edge of the web in single ply, preceded by a horizontally-arranged slitter, as above described, may be employed to fold successive marginal sections against opposite sides of the ply, (see Fig. 1,) which web, in such condition, is subsequently formed into an incomplete tube. (See Fig. 3.) In this case the slitters at opposite edges of the web would operate relatively in opposite directions, so as to bring diagonally-opposite marginal sections folded against the upper surface of the upper ply in succession when the incomplete tube is produced. This arrangement of the elements, being a matter of mechanical skill only, is not further described herein.

As thus far described, the material is ready to receive the paste. For this purpose the upper feed-roll, 5, is circumferentially grooved in two places to receive paste-belts 25 25, which pass over guide-pulleys 26 26 and into and along grooves formed in the bottom of the paste-box 27. The holes in the wall at the delivery side of the box are similar to key-holes, (see Fig. 12,) the slots permitting a ridge of paste to pass out with and upon each of the belts. A gage-plate adjustably secured to the box serves to regulate the depth of the ridge of paste. As the rolls 5 revolve, the belts are moved and carry the paste and deposit it upon the marginal sections and upon the usual paste-lines, *a''*. The paste-belts need not be embedded in grooves in but may ride upon the bottom of the paste-box, which may be rounded upward to dispense with the guide-pulleys 26; or the belts may be located above and away from the bottom, as desired; and other than the feed-roll may be employed as a pasting-roll, such other roll being located at any desired point, and either driven by contact of the material or positively connected to a moving part of the machine. It now remains to sever the blank from the web and fold it centrally and transversely. Two ordinary transverse cutting-rolls, 29 29, are geared together at one end, inside of the frame, the shaft of the upper one being provided with an ordinary belt-pulley, 30, located outside of the frame. A folding-blade, 31, is arranged to operate in connection with the final folding rolls 6 6, said blade being operated by means of a grooved cam, 32, upon the inside of a gear, 33. The rolls 6 feed

the material at substantially the same rate of speed as do the feed-rolls 5. A belt-pulley, 34, is located on the shaft of the upper feed-roll, and a belt-pulley, 35, is supported by a stud, 36, in line with the pulley 34. (See Fig. 11.) A belt, 37, connects the two pulleys, and passes beneath but not in contact with the pulley 30 unless put in contact therewith by means about to be described, which produces an intermittent rotation of the pulley 30 and the cutting-rollers connected therewith. The upper roller has a portion of its periphery removed, (see Fig. 19,) to permit the passage of material between the cutter-rolls when they are at rest. It will be noticed that the lower cutter-roll is complete, so as to serve as a bridge in closing the slot in the bed of the machine through which it projects, while the upper roll, being cut away for a portion of its periphery only, acts to feed before the cutting is done, so as to prevent undue slack in the blank, and as soon as the cutting is accomplished the remaining periphery of the upper roll continues the feed until the leading end of the material is advanced beyond the slot over the final folding rolls. Thus by locating the cutter opposite the removed or plain portion of its periphery an active feeding-surface is provided, by which the tendency of the leading end of the blank to catch upon the edges of the slots in the bed of the machine through which the cutting-rollers and the folding-blade operate is avoided. The pulley 30 may be upon the shaft of either roll by locating the pulley 35 accordingly. A reciprocating rod, 38, provided with a friction-roll, 39, is pivotally connected to one arm, 40, of the rock-shaft 41, the other arm, 42, of which is arranged to project beneath and to be operated by a cam, 43, adjustably secured to the face of gear 33. The opposite end of the rod 38 is curved to embrace the shaft of the upper cutter-roller, 29, and is provided with an escapement, 44, (see Figs. 17 and 18,) which, when the rod is elevated, permits the passage of a pin, 45, projecting from the inner face of the pulley 30, and prevents the rotation of said pulley at all other times. Now, it will be seen that the belt 37 has the same surface speed as the feed-rolls 5, and when in contact with the pulley 30 it gives the same rate of speed to the cutters 29 when they are operated thereby, thus insuring a clean cut, as the knife moves at the same speed as the material. The rod 38 is elevated once during each rotation of the gear 33, and the folding-blade is also operated once during each revolution of said gear, so that provision is made for the severance of a blank from the web and the folding of the severed blank during each revolution of the gear 33. The rod 38, after being elevated, is thrown down by belt 37 as soon as the arm 42 is released by cam 43; or it may be thrown down by means of a spring attached to the arm 40 or arm 42; or the said latter arm may be positively operated by a grooved cam instead of the face-cam 43.

The means for operating the slitters in addition to those already described consist of a rock-shaft, 47, one arm, 48, of which is pivotally connected to the bar 19, the other arm, 49, of which is operated by a face-cam, 50, adjustably secured to the gear 33. A coiled spring, 51, secured to the shaft by an adjustable collar to vary its tension, operates the arms and shaft in one direction—that is to say, keeps the arm 49 in contact with the cam 50 during one half a revolution of the gear 33, and in contact with said gear during the remainder of its revolution. As each blank is folded at about the middle of its length, substantially one half of the blank must necessarily pass beyond the rolls 6. To secure accuracy in the final fold I provide tension-rollers 52 53, the latter connected by a cross-belt, 54, to the front, in line of feed-delivery roll 6, while the former, 52, is supported in loose bearings upon the latter. By this means roll 53 is positively driven, and by frictional contact drives roll 52; but the belt 54 is kept under such slight tension as to permit a reversal in the direction of the rotation of roll 53, so that as the blade 31 forces the blank into the rolls 6 a reversal in the direction of the movement of the front or leading half of the blank takes place, and it reverses the direction of the rotation of the rolls 52 53, or it may be of only the roll 52, in either case producing sufficient resistance to the withdrawal of the front half of the blank to retain it in a straight and smooth condition. An additional pair of tension-rolls may be arranged between the cutters and the final folding rolls to insure the feed of long blanks, if desired.

The gear 33 may be connected by changeable gear to the feed-rolls, as shown, or to any other rolls or gear having the same surface speed as the feed-rolls.

It now remains to adapt the machine to make bags of different sizes. The creasers are changed, as usual. The means employed to slit and fold the margins are of such a nature and so located as to operate upon tubes of varying widths without change, the margins being substantially the same in bags of all sizes; hence the time in the operation of the slitters, the transverse cutters, and of the folding-blade is all that remains to be regulated to produce bags of different lengths. As before stated, the folding-blade 31 operates once at each revolution of the gear 33; so, also, with the cams 43 and 50. Hence to increase or decrease the rapidity of the action of the blade or cams relatively to the amount of material fed by the rolls 5 requires only the change of the gear 55^a, which indirectly connects the gear 33 with the lower feed-roll for one larger or smaller. The change produces a like change in the time of the operation of the three elements—the slitters, cutters, and folding-blade—with relation to the feed. The relative time of operation of the slitters and transverse cutters is determined by the cams being adjustably secured to the gear 33. Thus by changing the position

of the cam 43 circumferentially the transverse cutters are operated sooner or later in the revolution of gear 33 and in the passage of the material through the machine, and hence blanks of different lengths are produced. So, also, changing the position of the cam 50 about the center of the gear 33 determines the time of the operation of the slitters relatively to the time of the operation of the transverse cutters and to the feed of the material, so that it shall be severed at the alternating points where it is slitted, leaving the remaining slits in the margins at or about the middle of the blanks lengthwise. As shown, the delivery-rolls are positively driven by gearing connecting them with the feed-rolls.

The mechanism herein shown and described is susceptible of various modifications in details, and I therefore, so far as the method of manufacture is concerned, do not wish to be understood as limiting myself to said mechanism.

Postively-driven transverse cutters of a diameter required for certain-sized bag may be substituted for the transverse cutters herein shown.

Other pasting mechanism may be employed, and any mechanism which operates to dispose two or more diagonally-opposite marginal sections of an incomplete tube in opposite directions I deem as comprehended by my invention, in that it would practice the method herein set forth and claimed by me.

Having described my invention and its operation, what I claim is—

1. A step in the art of making square bags from an incomplete tube, which step consists in disposing diagonally-opposite marginal sections thereof in opposite directions, substantially as and for the purpose set forth.

2. The method herein set forth of making square bags, which consists in forming an incomplete tube with its diagonally-opposite marginal sections disposed in opposite directions, and folding the tube transversely, substantially as shown and described.

3. In a bag-machine, a slitter pivotally supported lengthwise in the line of feed of the margin, and adapted to be swung across said line, substantially as specified.

4. In a bag-machine, a slitter pivotally supported lengthwise in the line of feed, extended beyond its pivot, and adapted to be swung across said line, substantially as specified.

5. In a paper-bag machine, the combination of a guide for maintaining the margins in an upright position, and slitters pivoted lengthwise in the line of feed and adapted to be swung across the same, substantially as specified.

6. In a paper-bag machine, the combination of a guide, and a slitter pivotally supported lengthwise in line of feed and extended beyond its pivot, with feed-rolls, substantially as specified.

7. The combination of a rear (in line of feed) cross-bar and a margin-guide pivotally secured thereto, substantially as specified.

8. A slitter supported pivotally at or about the center of its length, whereby its tail portion acts to direct the passing margin, substantially as specified.

9. The combination of a rear (in line of feed) cross-bar, a margin-guide pivotally secured thereto, a front cross-bar, and adjusting-screws, substantially as specified.

10. The combination of a margin-guide, a slitter pivoted therein by a vertical shaft in the line of feed, and means, substantially as specified, for oscillating said shaft.

11. The combinatien of a guide, slitters supported in line of feed by vertical shafts, arms secured to the shafts, and a reciprocating bar adapted to operate the arms, substantially as specified.

12. The combination of a margin-guide, a slitter secured centrally to a shaft in the line of feed, and folders on each side of said line, substantially as specified.

13. The combination of a guide-roll, creasers, a margin-guide having wings, and slitters secured to and projecting from vertical shafts located in the line of feed of the margins, substantially as specified.

14. The combination of a margin-guide, and slitters arranged vertically in the line of feed of the margins, and adapted by projection to direct the margins, with feed-rolls, substantially as specified.

15. The combination of a grooved roll, a paste-box having holes in opposite walls, and a belt passing about the roll and through the holes, substantially as specified.

16. The combination of a roll, a paste-box having holes in opposite walls, those upon the delivery-wall being elongated, an adjustable plate, and a belt, substantially as specified.

17. A paste-box having a grooved bottom, and holes in opposite walls in line with the groove, substantially as specified.

18. The combination of a paste-box having a grooved bottom, and holes in opposite walls in line with the groove, a belt, and a roll, substantially as specified.

19. The combination of a roll having a portion of its periphery removed to form a plane surface, and a longitudinal blade located opposite the said plane surface, with a complete roll positively geared thereto, substantially as specified.

20. The combination of a cutter-roll having a plane surface opposite its knife, a complete companion roll positively geared thereto, a pulley, secured to a shaft of one of said rolls, and a belt arranged in proximity to said pulley, and means, substantially as specified, for forcing said belt against said pulley, substantially as shown and described.

21. The combination of a pair of cutting-rolls, each geared to the other, one of which has a plane surface, and one of which has a pulley, with a belt arranged in proximity to said pulley and operated by a moving portion of the machine having a desired speed, a cam indirectly operated by the same moving portion, a crank-shaft, and a lever constructed

and arranged to force the belt against the pulley intermittently, substantially as specified.

22. The combination of cutting-rolls, a pulley secured to the shaft of one of them, and having a pin projecting from its side, a lever provided with an escapement, a belt arranged adjacent to said pulley, and means, substantially as shown and described, for reciprocating the lever, substantially as specified.

23. The combination of a folding-blade, folding-rolls, and tension-rolls located in advance in line of feed of the folding-rolls, and driven, the one positively and the other by frictional contact, substantially as specified.

24. The combination of a folding-blade, folding-rolls, and tension-rolls located in advance in line of feed of the folding-rolls, the upper tension-roll running in loose bearings and upon the lower tension-roll, which is positively driven by one of the folding-rolls, substantially as specified.

25. The combination of a gear having a fixed cam, a folding-blade operated thereby, two independent adjustable cams secured to said gear, and transverse cutting and margin-slitting mechanisms operated each by one of said independent cams through the medium of rock-shafts, substantially as shown and described.

26. The combination of a margin-guide, slitters pivoted in the line of feed of the margins, arms secured to the shafts of the slitters and pivotally connected to a reciprocating bar, and a rock-shaft one arm of which is connected to said bar, and the other arm of which is operated by a cam adjustably secured to a gear indirectly connected to the gear of the feed-rolls or their described equivalent, substantially as specified.

27. The combination of the cross-bar 8, guide 7, having cap 12, provided with wings 13, cross-bar 9, posts 10, and set-screws 11, substantially as specified.

28. The combination of the guide 12, slitters 14 15, shafts 16 17, arms 18, and bar 19, with rock-shaft 47, having arms 48 49, spring 51, and cam 50, substantially as specified.

29. The combination of roll 5, belts 25, guide-rolls 26, and paste-box 27, provided with gage-plate 28, substantially as shown and described.

30. The combination of the cutting-rolls 29, pulley 30, having pin 45, belt 37, lever 38, provided with escapement 44, and roller 39, with rock-shaft 41, having the arms 40 and 42, and with gear 33, having the cam 43, substantially as specified.

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

EDGAR B. STOCKING.

Witnesses:

I. H. PAINE,

M. P. CALLAN.