F. J. P. KUHLMANN.

CARTON FOLDING AND GLUING MACHINE.

APPLICATION FILED FEB. 19, 1909.

956,108. Patented Apr. 26, 1910.

3 SHEETS—SHEET 1.

Fig. 1.

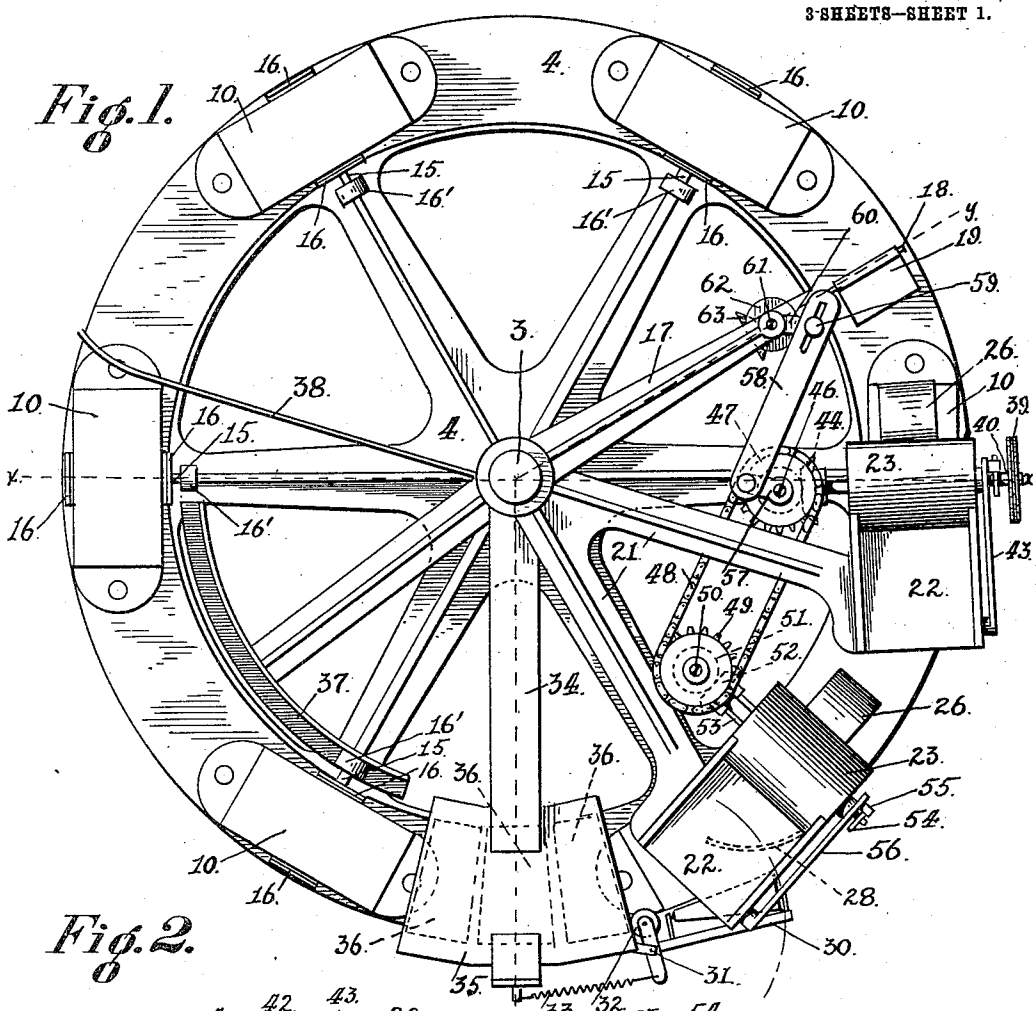
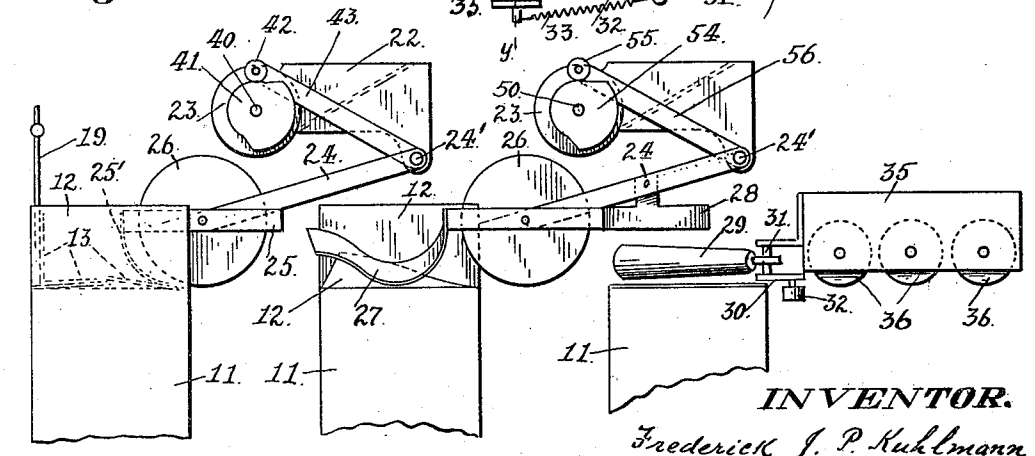


Fig. 2.



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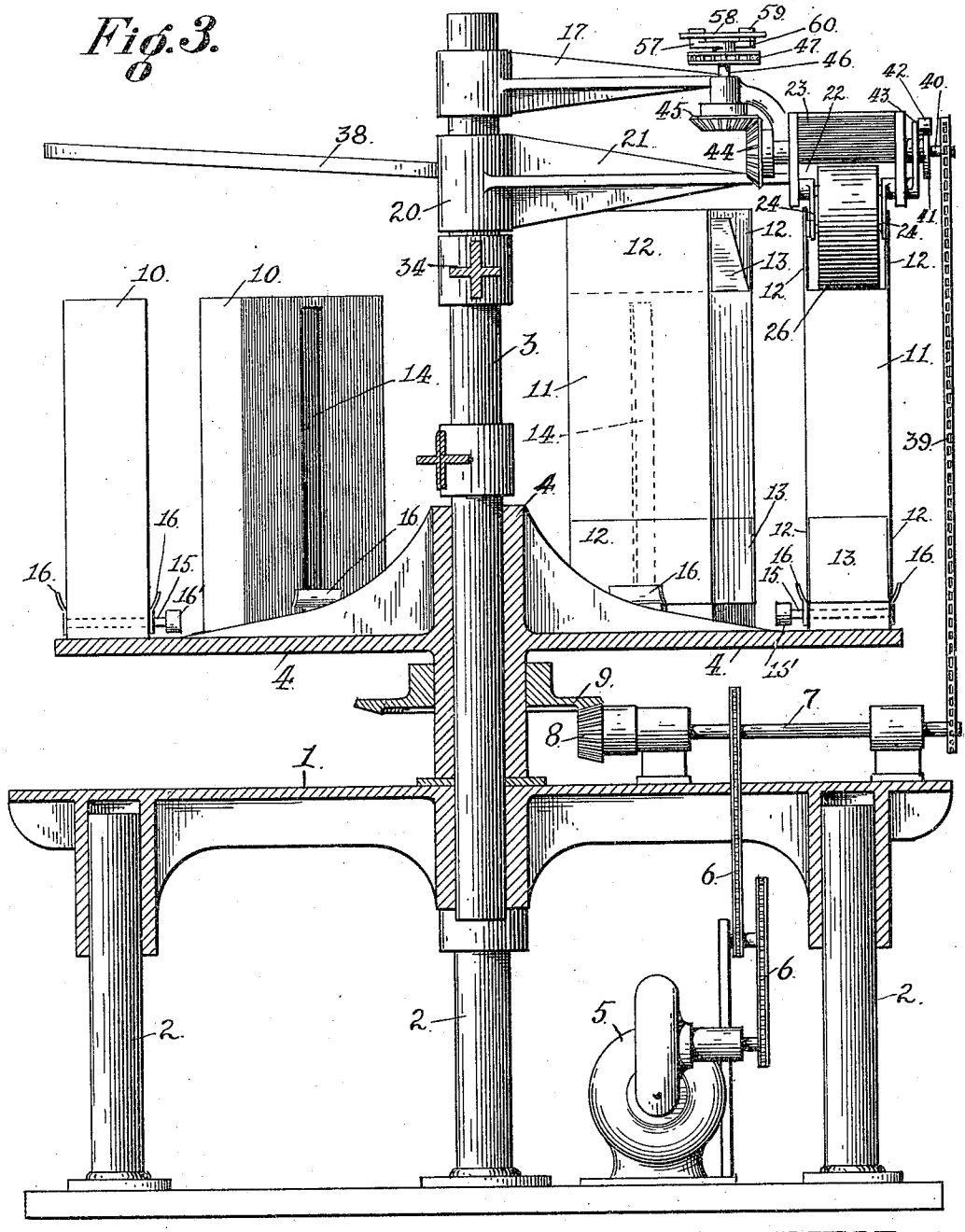
3 SHEETS—SHEET 2.

Fig. 3.



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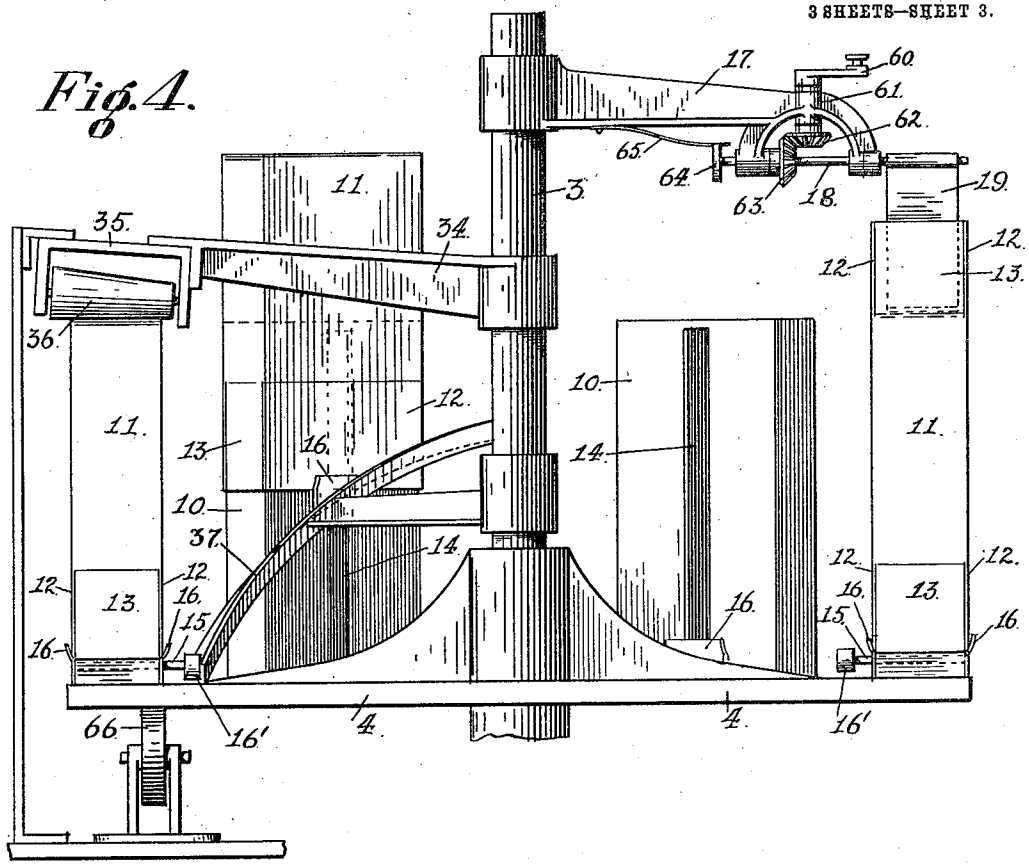
3 SHEETS—SHEET 3.

Fig. 4.



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UNITED STATES PATENT OFFICE.

FREDERICK J. P. KUHLMANN, OF SAN FRANCISCO, CALIFORNIA, ASSIGNOR OF ONE-HALF TO C. E. GROSJEAN, OF SAN FRANCISCO, CALIFORNIA.

CARTON FOLDING AND GLUING MACHINE.

956,108. Specification of Letters Patent. Patented Apr. 26, 1910.

Application filed February 19, 1909. Serial No. 478,868.

To all whom it may concern:

Be it known that I, FREDERICK J. P. KUHLMANN, a citizen of the United States, residing in the city and county of San Francisco and State of California, have invented certain new and useful Improvements in Carton Folding and Gluing Machines, of which the following is a specification.

My invention relates to the class of machines for folding and gluing cartons, with especial relation to closing their ends.

The machine embodying my improvements belongs to the rotary type in which the necessary operations are performed successively upon a continuously rotating series of subjects, supplied at a given point and discharged at another, whereby time and labor are economized.

The object of my invention is to provide a simple and effective machine of this rotary type, adapted to fold and glue the end flaps of cartons in continuous succession, and to automatically discharge them.

To this end, my invention consists in the novel machine, and in the combination, construction, and arrangement of its parts, all as hereinafter fully described.

Referring to the accompanying drawings, for a more complete understanding of my invention:—Figure 1 is a plan of my machine. Fig. 2 is a view showing the details of the folding, gluing and pressing devices, each being shown in side elevation, as if in a continuous plane. Fig. 3 is a vertical section of my machine, on the line *x*—*x* of Fig. 1. Fig. 4 is a vertical section of the upper portion of the machine taken on the line *y*—*y* of Fig. 1.

1 is a table, supported adjustably on legs 2, Fig. 3, to vary its height, when required. In the center of this table is firmly fixed a shaft 3, upon which is mounted rotatably a spider 4, to which a continuous rotary motion, on the shaft as an axis, is imparted by means of a motor 5, power transmitting connections 6, counter-shaft 7, bevel pinion 8 and gear 9, all as clearly shown in Fig. 3.

Upon the rim of the spider 4, at suitable intervals, are fixed the carton-receiving forms 10, of dimensions suitable to receive the empty open-ended cartons which are slipped over them. Two of these cartons, indicated by 11, are shown in Fig. 3, one being fitted upon one of the forms 10, prior to any folding and gluing operation, and the other undergoing said operation. In Fig. 4 three cartons appear, one of them being shown after its upper end flaps have been folded and glued, said carton being in process of elevation from the form, in order to discharge it from the machine. This carton 11, as will be seen in Fig. 3, has at each end, foldable side-flaps 12 and foldable end-flaps 13.

In each carton-form 10 is made a vertical slot 14, in which plays a cross lifter shaft 15, having at each end, just outside the sides of the form, flanges 16, which receive the lower edges of the unfolded lower side-flaps 12, and support the carton. The inner end of the lifter-shaft 15 has also a roller 16′.

Rigidly secured to the shaft 3, near its upper end, and radially extending therefrom, is an arm 17. In the outer end of this arm is mounted a shaft 18, seen clearly in Fig. 4, to which an intermittent oscillatory movement is imparted. The end of this shaft carries the first folder plate 19, said plate swinging upward to allow both end flaps 13 of the carton to pass it, and then swinging down to and into contact with the back of the second end-flap to fold the latter down, as is indicated in dotted lines in Fig. 2.

Rigidly secured to the shaft 3, by a common hub 20, are two radially extending arms 21, in the same horizontal plane. Each of these arms carries at its outer end a glue-trough 22, having mounted in connection with its delivery end a glue-feed roll 23, by the rotation of which its own surface is spread with glue, somewhat similar to the ink-feed rolls of printing presses. Pivoted at 24′ (see Fig. 2) to the rear end of the glue-trough 22 is an arm 24, which extends forwardly and carries a frame 25, in which is mounted the gluing roll 26, lying under and slightly in advance of the glue-feed roll 23. A movement through a vertical arc is given to the gluing roll, whereby it rises to receive the glue from the feed roll and descends to apply it to the flaps of the carton.

To the front of the frame 25 of the first gluing device, is secured the second folding plate 25′, seen in dotted lines in Fig. 2, said plate lying in the path of the leading end-flap 13 of the carton, and as said flap is brought into contact with the plate, the lat-

ter folds the flap down, at the same time that the first folder plate 19, by swinging down, has folded the other end flap down, as shown in the dotted lines in Fig. 2; and thereupon the continued travel of the carton, causes both its folded end flaps to pass under the gluing roll 26, which thereby spreads their upper surfaces with glue.

The frame 25 of the gluing roll of the second gluing device, has secured at its front a third curved folding plate 27 which lies in the path of and is adapted to fold over onto the folded and glue-smeared end flaps, the inner one of the side flaps 12, as seen in Fig. 2; and said flap then passing under the second gluing roll 26, is pressed fully down to place, and its top surface is provided with glue from said roll. Hanging from the arm 24 of the second glue-trough, at a point behind the gluing roll, is a curved folding plate 28, seen in Fig. 2 and in dotted lines in Fig. 1, which is adapted to start the folding over of the outer side flap 12, said folding being completed by means of the swinging roll 29, Figs. 1 and 2, which moves inwardly across the flap as shown by the dotted arc in Fig. 1, and presses it down upon the glue-smeared surface of the first side flap. This folding roll 29, is mounted in a bracket 30, which is pivotally supported at 31, (Fig. 1), and has a contact-roller 32 on its inner end, and a spring 33 attached to its outer end. The roller 32 lies in the path of one corner of the advancing carton, and the contact therewith causes the bracket 30 to swing inwardly thereby passing its roll 29 over the outer flap and forcing it down. When the contact ceases, the spring 33 returns the bracket and its roll to normal position.

Fixed upon the shaft 3 is a radially extending arm 34, carrying at its outer end a frame 35 in which are mounted pressure rolls 36, in any suitable number, three being shown in Fig. 1. Under these rolls the now folded end of the carton passes, and its folded flaps are thus pressed down to insure the adherence of the glue.

37 is a curved inclined track, Figs. 1 and 4, the lower end of which begins at a point in a vertical plane just succeeding the series of pressure rolls 36. The roller 16′ of the lifter-shaft 15, enters upon the lower end of this track, and by traveling up it, causes the lifter-shaft with its flanges 16 to raise the carton from the carton-form, this action being seen in progress in Fig. 4.

Extending from the hub 20, is a radial arm 38, Figs. 1 and 3, which lies in the path of the lifted carton, and the effect of which is to tip the carton from the form. As soon as the roller 16′ is free of the track 37, the lifter-shaft drops by gravity to the bottom of the form, ready to receive a fresh carton.

Having now described, for the sake of clearness, the several parts and their operation, I will point out the connections by which their movements are effected.

Referring to Fig. 3, the counter-shaft 7 transmits its movement through a chain 39, to the shaft 40 of the glue-feed roll 23 of the first glue-trough 22, Figs. 3 and 1, whereby said roll is rotated. Upon this same shaft 40 is a cam 41, seen best in Fig. 2, which operates against a roller stud 42 on the end of a lever-arm 43, the other end of which is connected rigidly with the pivoted end of the arm 24 which carries the gluing roll 26. By this cam 41, and lever arm 43, the gluing roll 26 is timely raised to contact with the glue-feed roll 23, and allowed to drop therefrom.

The inner end of the shaft 40 carries a bevel gear 44, which meshes with a bevel gear 45 (Fig. 3) on a vertical shaft 46, the upper end of which carries a sprocket 47. From this sprocket an endless chain 48 (Fig. 1) passes to a sprocket 49 on a vertical shaft 50, the lower end of which carries a bevel gear 51, shown in dotted lines, which meshes with a bevel gear 52 on the shaft 53 of the glue-feed roll 23 of the second glue-trough 22. The outer end of this shaft 53 carries a cam 54 (Fig. 2) which operates, through contact with a roller stud 55, a lever arm 56 which is connected with and operates the arm 24 of the second gluing roll 26, in the same manner as the arm and gluing roll of the first gluing device were operated.

Secured to the shaft 46 above the sprocket 47 (Figs. 1 and 3) is a crank 57 from which a link 58, extends to and is slotted over a pin 59 in the end of a crank 60, secured to a short vertical shaft 61, mounted in the radial arm 17 which carries the shaft 18 bearing the first folder plate 19. This short shaft 61, as seen in Fig. 4, carries at its lower end a bevel gear 62 which meshes with a bevel gear 63 on the shaft 18. Thus motion is transmitted to said shaft to effect an intermittent oscillation thereby causing the folder plate 19 to swing back and forth as heretofore described.

In order to check the shaft 18 in its position of rest, there is, on its inner end (Fig. 4) a slightly notched disk 64, with which a spring 65 engages.

In Fig. 4, a small bearing wheel 66 is shown to support the spider 4 on that side. Up to this point I have described the folding and gluing of only one end of the carton. When the carton, with one end thus folded and glued, is tipped from its form, it is then filled with the commodity which it is to contain. It is then taken to a machine of a character similar to the one described, and differing therefrom only in its forms which, of course, must be adapted for filled cartons. I mean by this that the second machine, has the same folding and gluing

devices, as that already described, but instead of the carton-forms heretofore explained, it has others adapted for this purpose, but which form no part of the present invention.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent is—

1. A carton folding and gluing machine, comprising a central shaft; a carrier rotatably mounted thereon; means for imparting rotation to said carrier; an annular series of carton-receiving forms on said carrier; means supported from the central shaft, for folding down the end flaps of the carton; means supported by said shaft for applying glue to the upper surfaces of said flaps when folded down; succeeding means supported by said shaft for folding down one of the side flaps of the cartons upon the glued surfaces of the folded end flaps; means supported from said shaft for applying glue to the upper surface of said side flap when folded down; succeeding means supported by said shaft for folding down the other side flap upon the glued surface of the folded first side flap; succeeding pressure devices supported from said shaft for pressing upon all the folded flaps; and succeeding means called into operation by the travel of the cartons for automatically discharging them from their forms.

2. In a carton folding and gluing machine, the combination of a traveling carrier; a carton-receiving form thereon; means in the path of the carton for folding down and applying glue to the end flaps of the carton; a succeeding plate for folding down one of the side flaps, upon the glued surfaces of the folded end flaps; a succeeding gluing roll for applying glue to the surface of said folded side-flap; and a succeeding roll pivoted to swing diagonally across the path of the carton to fold down upon said glued surface, the other side flap.

3. In a carton folding and gluing machine, the combination of a traveling carrier; a carton-receiving form thereon; means in the path of the carton for folding down and applying glue to the end flaps of the carton; a succeeding plate for folding down one of the side flaps, upon the glued surfaces of the folded end flaps; a succeeding gluing roll for applying glue to the surface of said folded side-flap; a succeeding roll pivoted to swing across the path of the carton to fold down upon said glued surface, the other side flap, said roll being provided with a portion normally lying in the path of the carton and adapted upon contact therewith to swing the roll.

4. In a carton folding and gluing machine, the combination of a traveling carrier; a carton-receiving form thereon; a vibratable folding-plate adapted to fold one of the end flaps of the carton; a succeeding fixed folding-plate to fold down the other end flap; a succeeding gluing roll adapted to apply glue to the folded end flaps; means for timing the vibration of the swinging folding-plate to cause it to fold down the rear end flap as the succeeding fixed plate folds down the end flap in advance, whereby both flaps are folded preceding their passage under the gluing roll; a succeeding plate for folding down one of the side flaps upon the glued surfaces of the folded end flaps; a succeeding gluing roll for applying glue to the surface of said folded side flap; a succeeding plate to start the other side flap to fold down; a swinging roll moving across the path of the carton, to complete the folding down of said side-flap upon the glued surface of the folded first side flap, and means operated by the contact of the traveling carton, to swing said roll.

5. In a carton folding and gluing machine, the combination of a traveling carrier; a carton-receiving form thereon; a vibratable folding-plate adapted to fold one of the end flaps of the carton; a succeeding fixed folding-plate to fold down the other end flap; a succeeding gluing roll adapted to apply glue to the folded end flaps; means for timing the vibration of the swinging folding plate to cause it to fold down the rear end flap as the succeeding fixed plate folds down the end flap in advance, whereby both flaps are folded preceding their passage under the gluing roll; a succeeding plate for folding down one of the side flaps upon the glued surfaces of the folded end flaps; a succeeding gluing roll for applying glue to the surface of said folded side flap; a succeeding plate to start the other side flap to fold down; a swinging roll moving across the path of the carton, to complete the folding down of said side flap upon the glued surface of the folded first side flap, means operated by the contact of the traveling carton, to swing said roll, and succeeding pressure rolls under which the folded flaps pass.

6. In a carton folding and gluing machine, a fixed shaft, a table rotatable thereon, a carton receiving form on said table, a vertically movable rest on the form adapted to support a carton, means supported by the central shaft and operable upon the rotation of the carrier for folding and gluing the end flap thereof, and means supported by the central shaft and arranged in the path of travel of the rest to elevate the same and lift the carton on the form after the end flaps thereof have been folded and glued.

7. In a carton folding and gluing machine, a fixed central shaft, a carrier rotatable thereon, a vertically slotted carton receiving form on said carrier, a vertically movable carrier rest mounted to slide in said slotted form, folding and gluing instrumen-

talities supported by said central shaft and acting upon the rotation of the carrier to fold down and glue the end flaps thereof, and an inclined track supported by the central shaft upon which said rest runs during a portion of its travel to effect its elevation and the lifting of the carton on the frame.

8. A carton folding and gluing machine, consisting of a fixed shaft; a carrier rotatable thereon; an annular series of carton-receiving forms on the carrier; a radially extending arm fixed to the shaft; a vibratable folding plate carried by the arm in position to fold down one of the end flaps of one end of the carton; a second radially extending arm fixed to the shaft; a fixed folding plate, carried by said arm to fold down the other end flap; a gluing roll carried by said arm in position to apply glue to the surfaces of both folded end flaps; a third radially extending arm fixed to the shaft; a folding plate carried by said arm to fold down one of the side flaps, and a gluing roll carried by said arm to apply glue to the folded side flap; a fourth arm fixed to the shaft; a swinging roll carried by said arm and operated by contact with the traveling carton, to fold down the other side flap; pressure rolls also carried by said fourth arm to apply pressure to the folded flaps; and succeeding means to automatically and successively discharge the cartons from their forms.

9. A carton folding and gluing machine, consisting of a fixed shaft; a carrier rotatable thereon; an annular series of carton-receiving forms on the carrier; a radially extending arm fixed to the shaft; a vibratable folding plate carried by the arm in position to fold down one of the end flaps of one end of the carton; a second radially extending arm fixed to the shaft; a fixed folding plate, carried by said second arm to fold down the other end flap; a gluing roll carried by said second arm in position to apply glue to the surfaces of both folded end flaps; a third radially extending arm fixed to the shaft; a folding plate carried by said arm to fold down one of the side flaps, and a gluing roll carried by said arm to apply glue to the folded side flap; a fourth arm fixed to the shaft; a swinging roll carried by said arm and operated by contact with the traveling carton, to fold down the other side flap; pressure rolls also carried by said fourth arm to apply pressure to the folded flaps; and succeeding means to automatically and successively discharge the cartons from their forms consisting of vertically moving carton-rests on the forms, a fixed inclined track to elevate said rests and lift the cartons, and a fixed arm to tip the lifted cartons from the forms.

10. In a carton folding and gluing machine, a fixed shaft, a table rotatable thereon, a carton receiving form on said table, a vertically movable rest on the form adapted to support a carton, means supported by a central shaft and operable upon the rotation of the carrier for folding and gluing the end flaps thereof, means supported by the central shaft and arranged in the path of travel of the rest to elevate the same and lift the carton on the form after the end flaps thereof have been folded and glued, and a fixed stop interposed in the path of the lifted carton and adapted upon contact therewith to tip it from said form.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

FREDERICK J. P. KUHLMANN.

Witnesses:
WM. F. BOOTH,
D. B. RICHARDS.