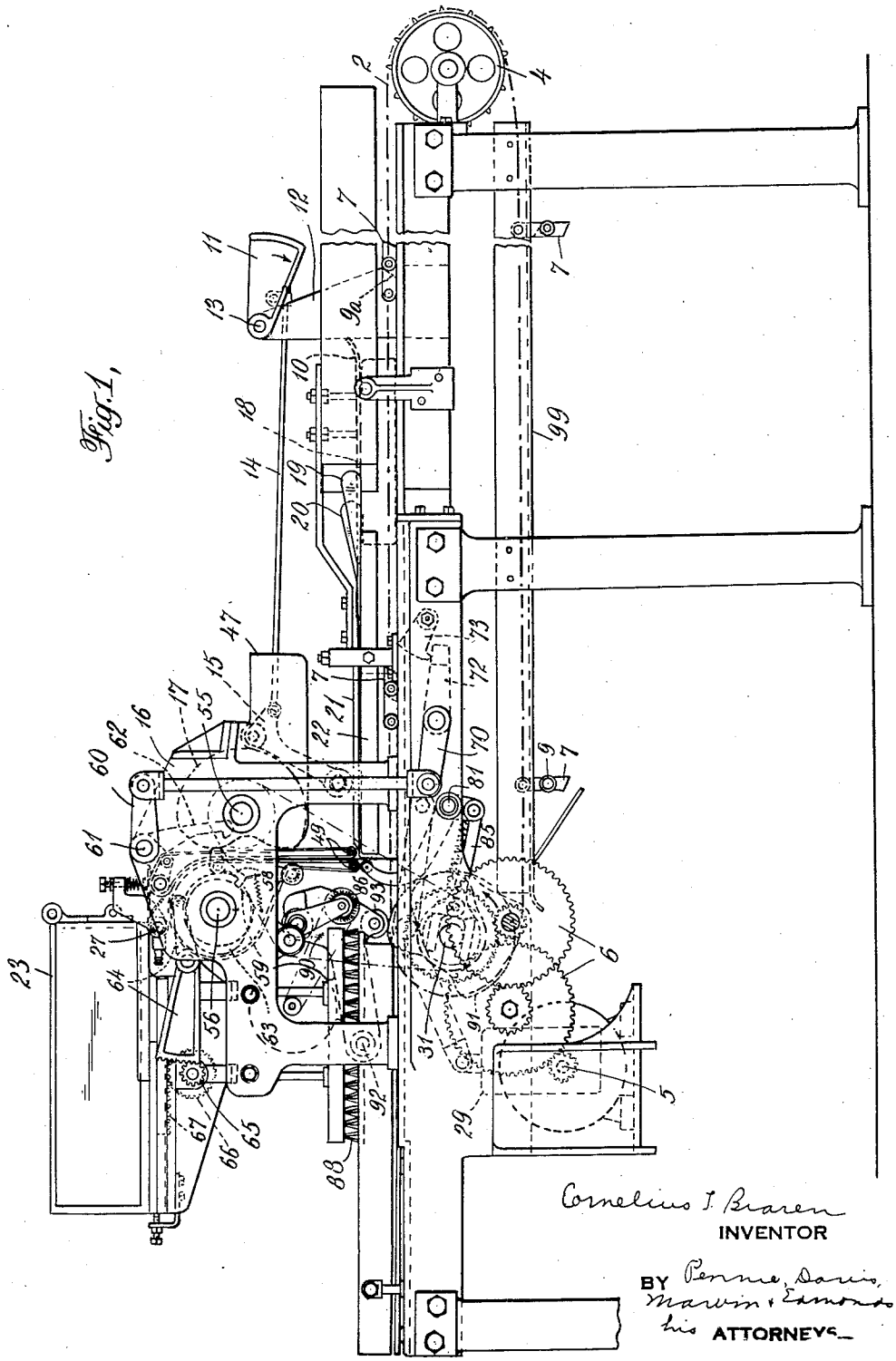
Dec. 12, 1933. C. T. BRAREN 1,938,654

SEALING MACHINE

Filed Dec. 11, 1930 7 Sheets-Sheet 1

Fig. 1.



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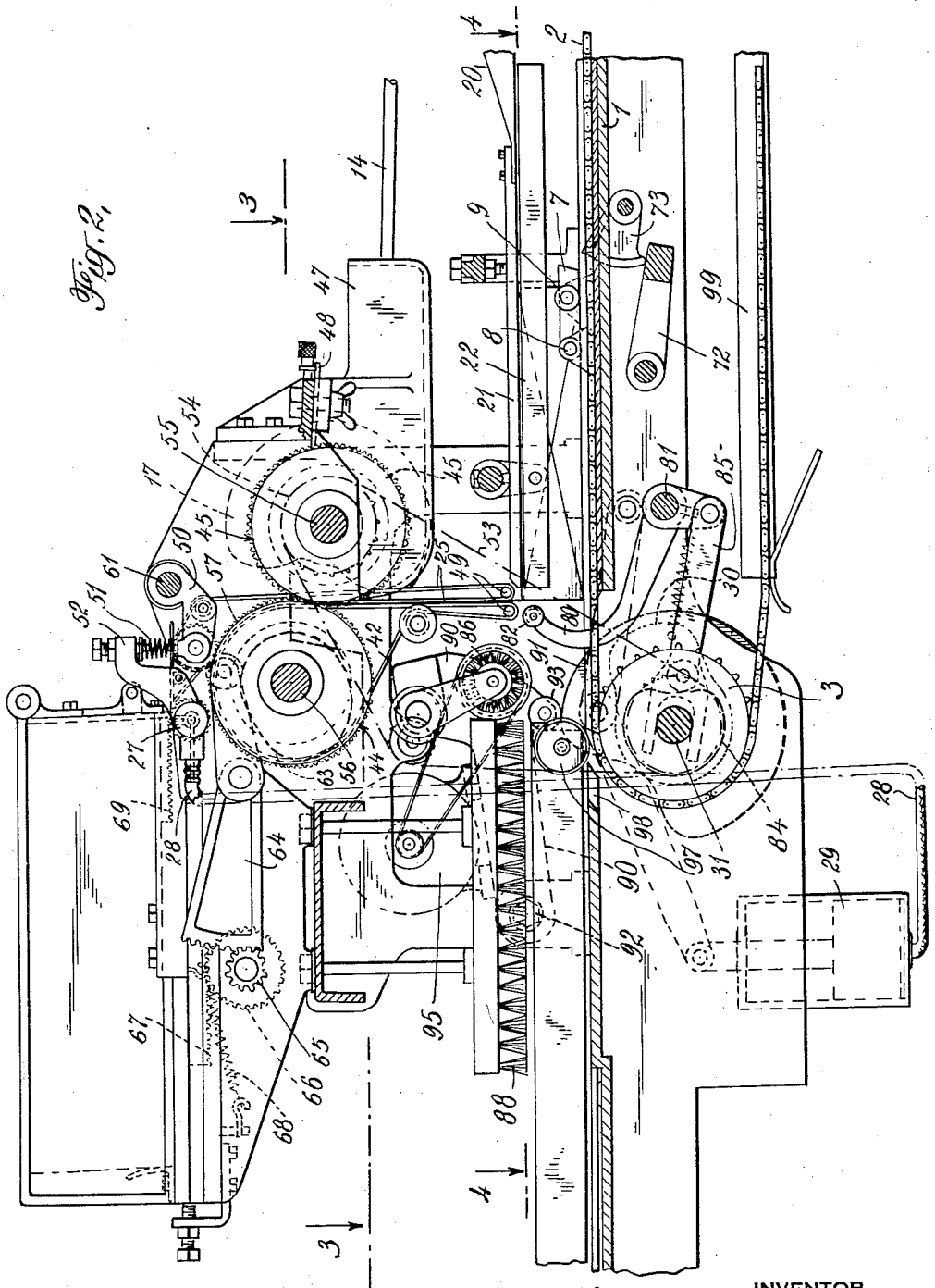
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his ATTORNEYS

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Fig. 2.



INVENTOR
Cornelius T. Braren

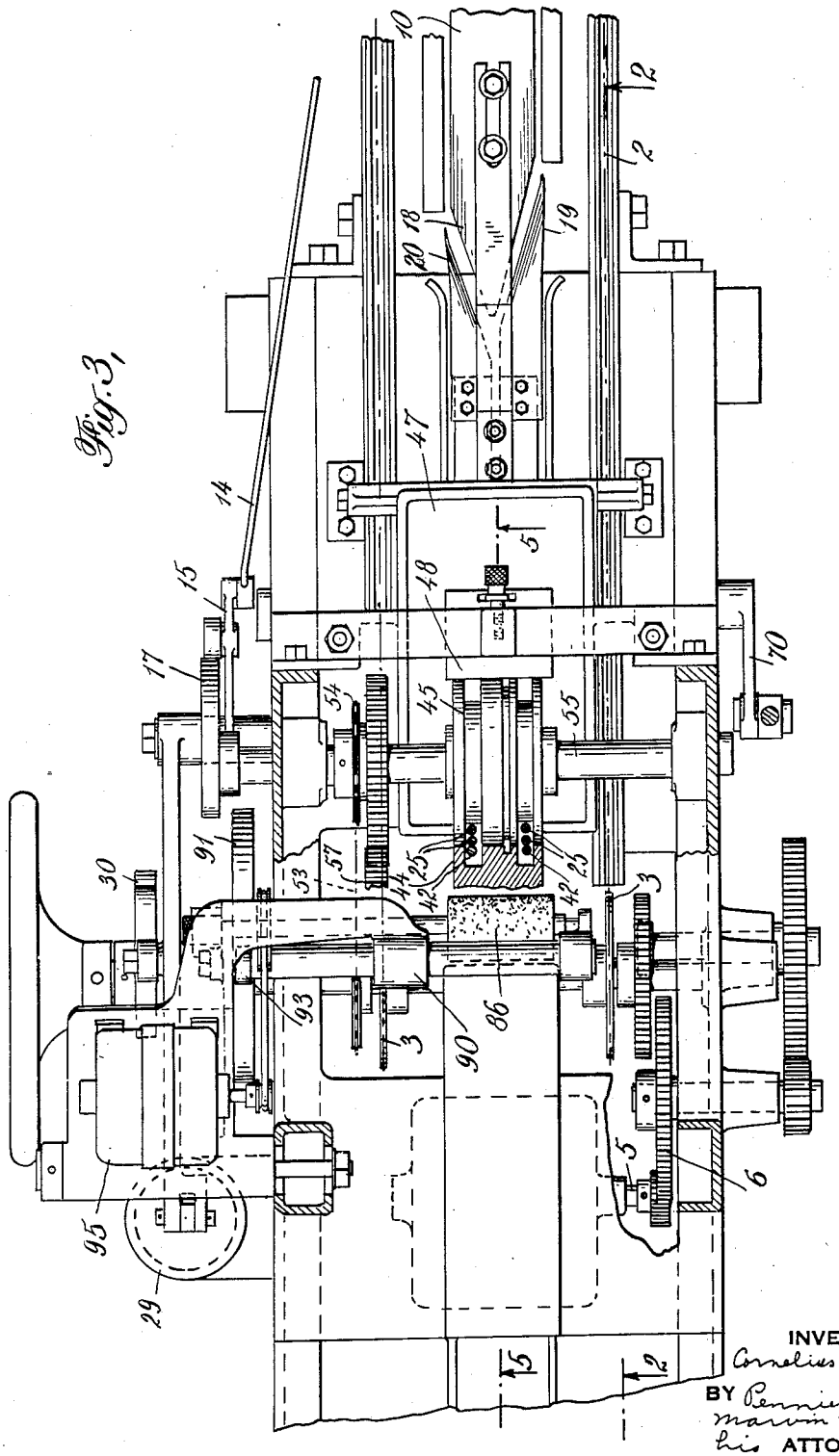
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Fig. 3.



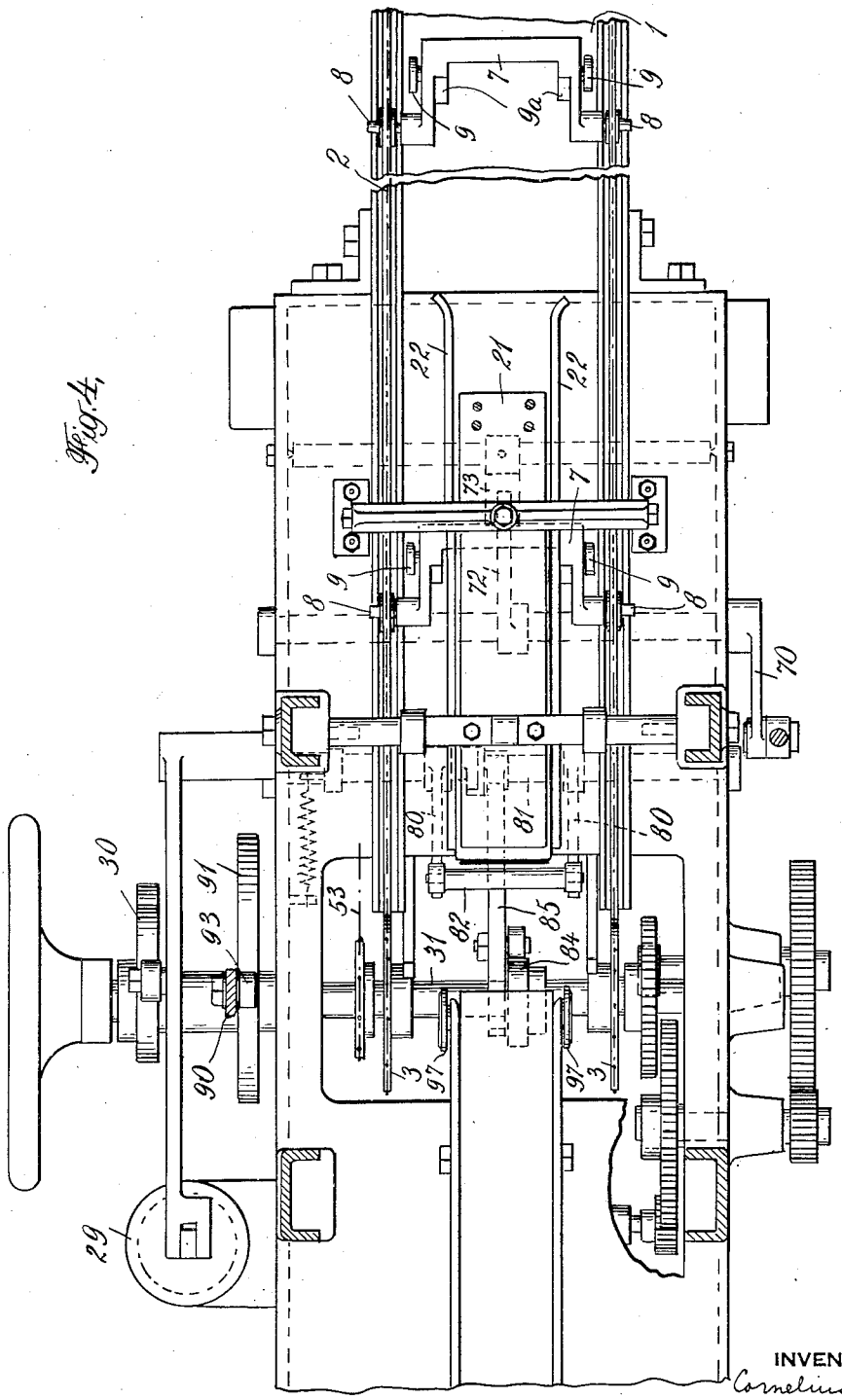
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Fig. 4.



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Fig. 5,

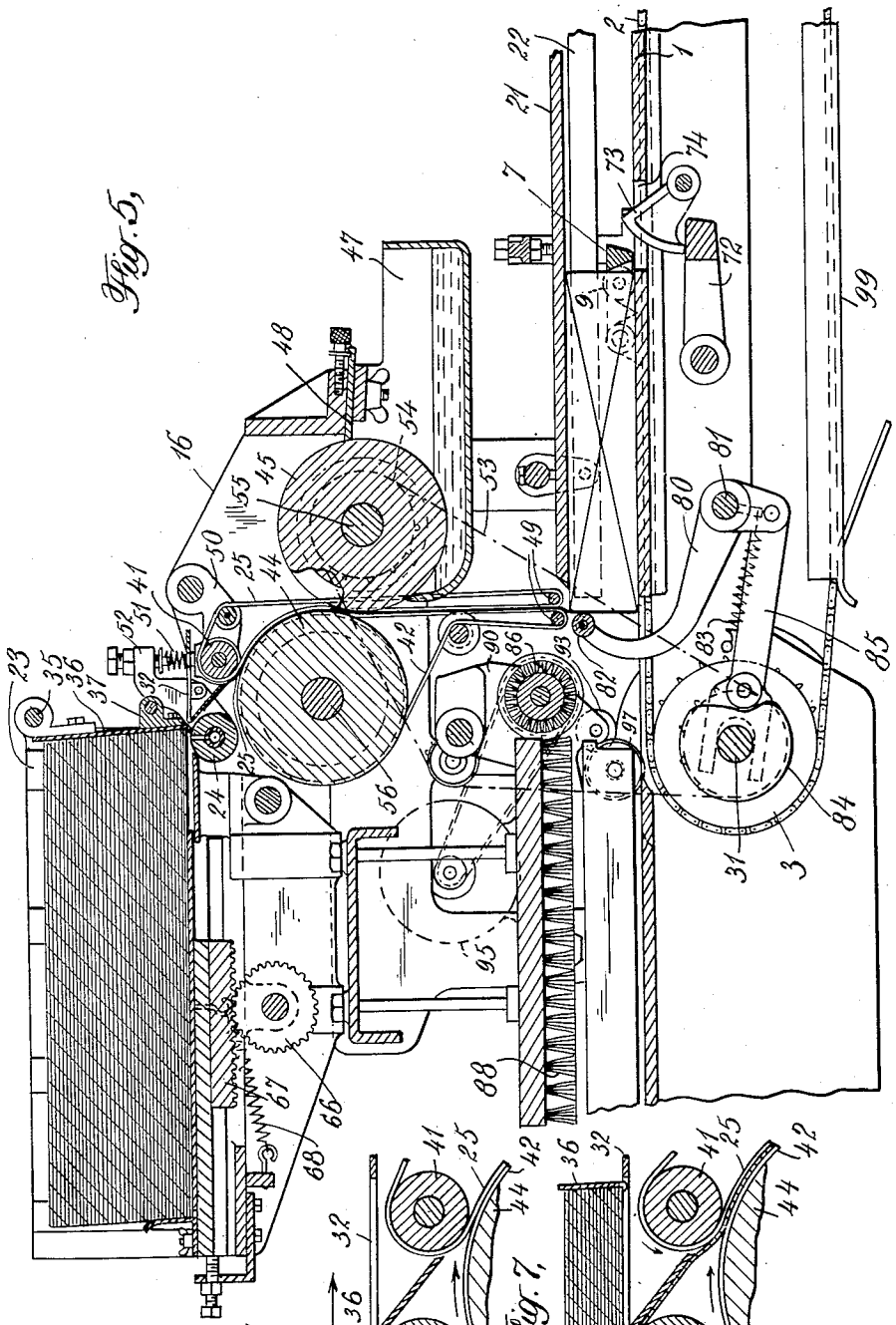


Fig. 6,

Fig. 7,

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Fig. 8,

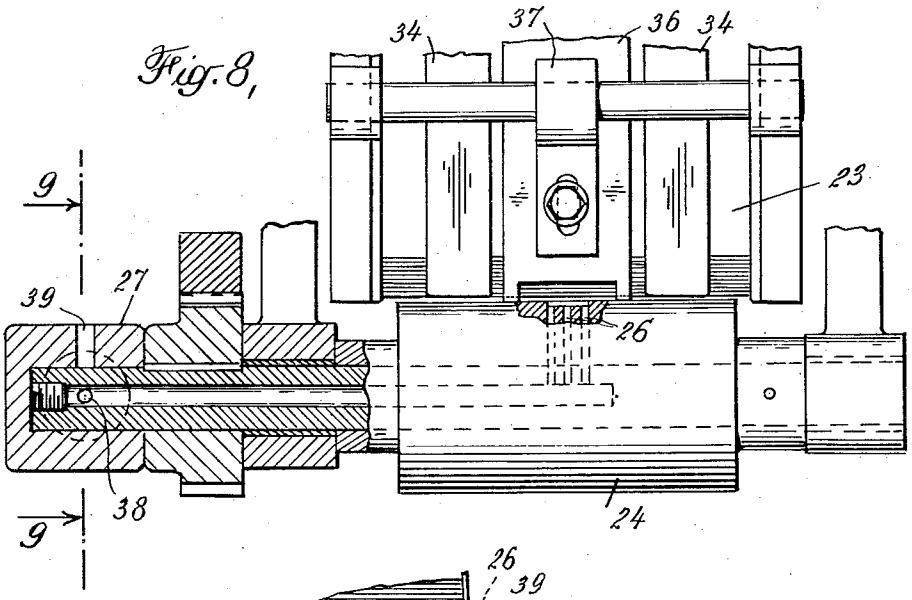


Fig. 9,

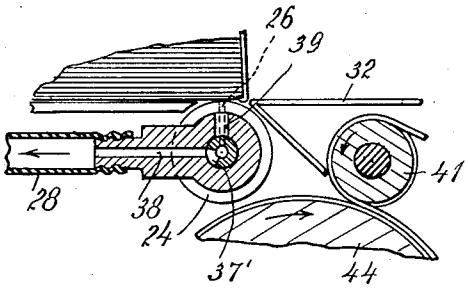


Fig. 10

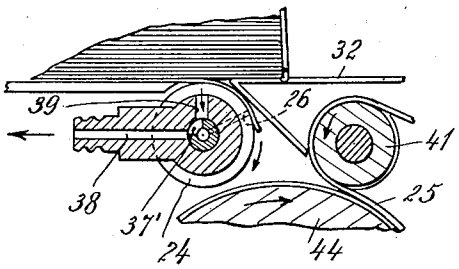
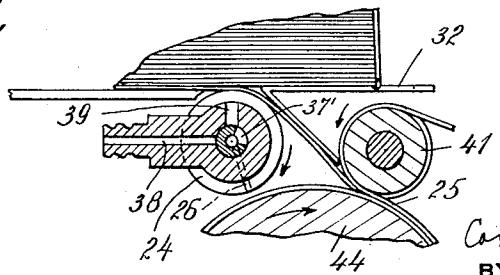


Fig. 11,



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Fig. 12,

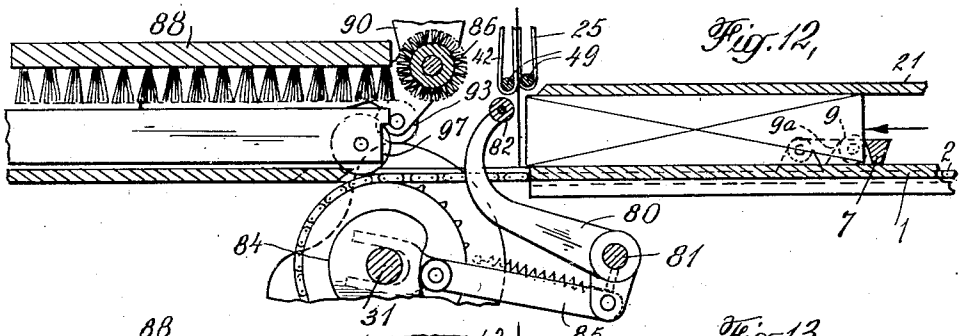


Fig. 13,

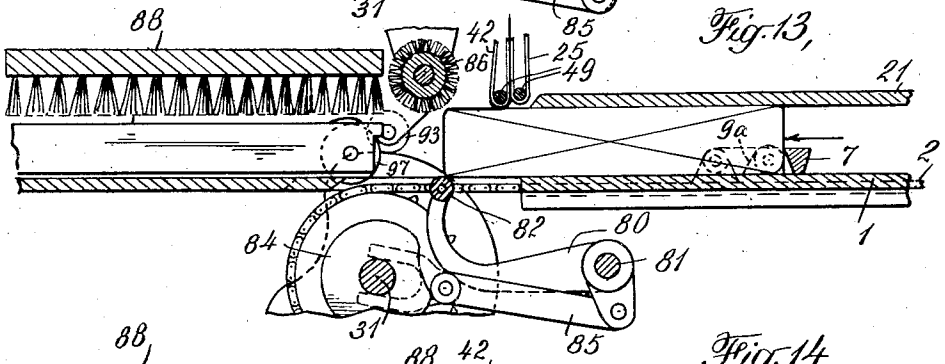


Fig. 14,

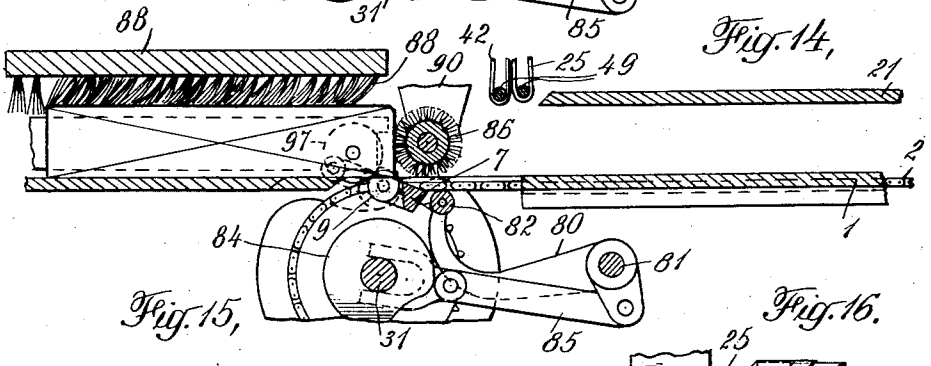


Fig. 15,

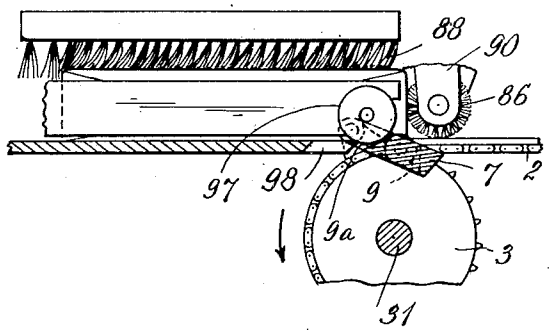
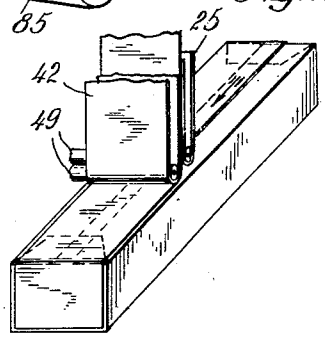


Fig. 16.



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Patented Dec. 12, 1933

1,938,654

UNITED STATES PATENT OFFICE

1,938,654

SEALING MACHINE

Cornelius T. Braren, Jamaica, N. Y., assignor, by mesne assignments, to Standard-Knapp Corporation of New York

Application December 11, 1930
Serial No. 501,513

10 Claims. (Cl. 93—7)

This invention relates to machines for closing and sealing cartons, particularly cigarette cartons containing ten packages of cigarettes and of the type described in my co-pending application filed concurrently herewith, directed to a machine for filling such cartons with ten packs of cigarettes arranged in two rows of five each. This application is Serial No. 501,511, filed December 11, 1930, entitled "Cigarette packing machine."

Cartons filled by that machine, and closed and sealed by the machine of the present application, are narrow pasteboard boxes of rectangular cross section with four flaps on the open side, which flaps by the operation of the present machine are folded inwardly upon the charge of cigarettes and then sealed by the application of a label which is attached to the end of the package, then laid over the folded flaps and pressed down against the other end of the package.

The machine of the present application may be timed to operate in sequence with the carton filling machine and a suitable transfer mechanism may be provided to transfer the filled cartons from one machine to the other. No such mechanism is, however, disclosed in the present application, as it will be assumed that the cartons as delivered onto the delivery chute of the machine of our co-pending application will be transferred one at a time by hand and placed in position to be engaged by the feed conveyor of the present machine.

The principal object of the present invention is to provide a machine for performing the operation above described, which may be operated at a high rate of speed without damage to the cartons or their contained packages, and which will uniformly and continuously produce a properly folded and completely sealed package.

In the preferred embodiment of the machine as shown in the accompanying drawings,

Figure 1 is a side elevation of the machine;

Fig. 2 is a similar view of a portion of the machine on an enlarged scale, certain parts being shown in section on line 2—2 of Fig. 3;

Fig. 3 is a plan view partly in section looking downward on the line 3—3 of Fig. 2;

Fig. 4 is a similar view on line 4—4 of Fig. 2;

Fig. 5 is a vertical sectional view on line 5—5 of Fig. 3;

Figs. 6–11 are detail views showing the operation of the pneumatic feed mechanism for the label strip by means of which the package is sealed;

Figs. 12–15 inclusive are detail views in longitudinal section showing the operation of folding the label about the carton; and

Fig. 16 is a detail view in perspective showing one step in the labeling operation.

Referring to the drawings, the machine as a whole comprises a frame having a main bed plate 1 along which the carton is advanced during the closing and sealing operation, with suitable upwardly projecting and downwardly depending parts for supporting the various instrumentalities of the machine. The carton is advanced along the bed plate 1 by a feed conveyor 2 comprising parallel chains extending along the bed plate between feed sprockets 3 and 4, respectively, which are continuously driven from the shaft 5 of the driving motor through a train of reducing gears indicated generally at 6.

The sprockets are spaced apart a distance substantially greater than the width of the cartons. The cartons are advanced and maintained in proper position with respect to the flap-folding and labeling devices by means of flights 7 which extend across the table from chain to chain. These flights 7, as shown particularly in Figs. 1 and 4, comprise U-shaped members having their ends turned outwardly and terminating in pins 8 which are journaled in the links of the conveyor chains. Rollers 9 are mounted on the outer face of each of the side members of the flights, these rollers resting on the top of the table, thereby maintaining the flights in horizontal position as the conveyor chain moves along the bed plate.

The open ends of the side members of the flights are spaced apart a distance somewhat greater than the width of the cartons, while the portions adjacent the cross bar of the flights are thickened, as shown in Fig. 4, so as to provide a pocket of substantially the dimensions of the end of the carton with an intermediate shoulder 9*a*. This shoulder is inclined as shown in dotted lines in Fig. 1, to provide a cam surface for causing the flight to be positively deflected out of the path of movement of the cartons, as will be later described.

In its advance across the bed plate 1 of the machine, the flaps of the carton are folded down in succession, the advancing front flap being first folded by a stationary folder 10 of usual construction. After the carton has been advanced partially under the stationary folder 10 the rear end flap is folded by a pivoted folder 11 mounted on a bracket 12 projecting upwardly from the

frame along side of the path of travel of the feed chain.

The folder is mounted for oscillation on a fixed shaft 13 which projects over the path of movement of the carton, the shaft being rocked by a crank arm having a connecting rod 14 which extends rearwardly to a cam rocker 15 pivoted on the superstructure 16 of the machine frame in position to be engaged by an operating cam 17 mounted for continuous rotation in the superstructure. The folder 11 operates to fold the rear flap down flat just as it reaches the stationary folder 10 so that the folder 10 will hold both flaps folded during the continuous advance of the carton.

The rear end of the folder 10 terminates in a pointed end 18 projecting between two plowshare folders 19 and 20, which serve to fold down the side flaps one after the other. To this end the point 18 of the folder 10 is not symmetrical with respect to the two sides of the machine, but on the side opposite the folder 18 has a greater taper than on the side opposite the folder 20. Also the folder 19, which is shaped to the same angle as the adjacent side of the point of the folder 10, projects rearwardly to a greater extent than the folder 20 and consequently engages the side flap on that side of the carton and folds it inwardly in advance of the other side flap. The carton with its flaps thus folded advances under the upper guide plate 21, whose under side lies in the same plane as the under side of the flap folders, and between the side guides 22 whose ends are turned outwardly to engage the advancing carton and center it accurately during its further advance through the machine.

As the carton emerges from beneath the upper guide plate 21 its end engages the depending end of the freshly gummed label strip and in the continued advance of the carton the label strip is smoothly applied to the end of the carton, is then laid across the top face of the carton and finally folded down against the rear end by the mechanism which will now be described.

The label strips are carried by a magazine 23 supported on the superstructure 16 and provided with a label feed mechanism adapted to withdraw the bottom label from the stack and advance it past the paste-applying rolls downward into position for its depending edge to lie just above the bed plate of the machine and in position to be engaged by the advancing carton.

The magazine comprises an open-top box of proper dimensions to contain the labels. The box is mounted for longitudinal reciprocation through a limited distance, for a purpose which will be presently described. The front of the box at the end through which the labels are withdrawn is formed of vertical slats 34 depending from the upper cross bar 35 of the magazine structure. Between the slats 34 a third vertical member 36 is provided, which member is adjustably supported on a bracket 37 extending across the front of the magazine and has its lower end shaped to provide slightly inturned spring fingers adapted to engage under the end of the bottom label so as to prevent more than one label being withdrawn from the magazine by the action of the label-feed mechanism.

This label feed mechanism comprises primarily a suction roller 24 adapted to engage the leading end of the bottom-most label in the magazine and by its rotation turn the end downward into position to be engaged by the feed belts 25 which feed the label past the paste-applying mechanism and into position to be applied to the package. The suction roller 24 is oscillated by the reciprocating movement of the label magazine and the mechanism for reciprocating the magazine is actuated from the driving shaft of the sprocket 3 through a stop mechanism shown in Fig. 1, controlled by the movement of the carton through the machine to stop the operation of the label-feeding devices in the event no carton is presented to receive the gummed label. This mechanism will be described later.

In the present description it will be assumed that the cartons are being fed to the machine in continuous sequence. The suction roller 24 has a hollow axle communicating with a line of perforations 26 through which the suction is applied to the end of the label. One end of the roller is journaled in a hollow bearing, as shown in Figs. 8–11 inclusive, which bearing 27 is shaped to maintain the suction in the roller in the desired interval of time and to cut off the suction and open the roller to the atmosphere when it is desired to strip the label from the roller. The hollow bearing is connected by a hose or pipe 28 with a suction pump 29 (see Fig. 2) the plunger of which is operated by a cam 30 on the shaft 31 of the sprocket 3. The cam is so shaped as to apply the suction to the line 28 during the interval that the hose is connected to the roller 24 through the ports in the bearing 27.

In front of the suction roller 24 are a pair of strippers 32 whose down-turned ends serve to pass between the lowermost label as drawn out of the magazine by the suction roller and guide its advancing end into the bight of the feed belts.

In the operation of feeding the label from the bottom of the stack, the magazine is at its rearmost position at the time the line of perforations in the suction roller comes uppermost and the suction is applied. As the magazine is shifted forwardly the suction roller begins to turn and thus draws the end of the bottom-most label downwardly and carries it forward under the strippers 32, the magazine as a whole being shifted forwardly at a rate of speed corresponding with the forward movement of the label under the action of the suction roller. The suction is maintained through the roller for a sufficient portion of its rotation to insure the label being well advanced under the inclined strippers 32. After the suction is broken by the suction port 37' in the hollow shaft, passing out of registry with the port 38 in the hollow bearing, and into registry with the port 39 which opens to the atmosphere, as indicated in Fig. 10, the label will of its natural resiliency spring back against the under side of the guides 32, and as the movement of the magazine continues the leading end of the label will be thrust into the bight of the feed belts.

The feed belts are preferably narrow rubber bands, as shown in section in Fig. 3, and are arranged to engage the edges of the label and advance it past the pasting rollers in a position to be applied to the package. The feed belts 25 which are on the side of the path of travel of the label away from the magazine, are supported at their upper ends by a grooved pulley 41 whose periphery lies immediately adjacent and substantially tangential to the downwardly inclined portions of the stripper plates. The other feed belts 42 lie in grooves near the end of a large feed roller or pulley 44 carried by a shaft extending across the superstructure of the machine beneath the suction roller and driven con-

tinuously whenever the machine is in operation. This roller 44 lies immediately under the small pulleys 41 which carry the feed belts 25 so that the feed belts 25 and 42 follow the periphery of the pulley 41 and furnish a positive feed for the label strip around the strippers 32 to the paste-applying roller 45.

The roller 45 is driven continuously when the machine is in operation, and the shafts of the rollers 44 and 45 are geared together for synchronous operation. The paste roller 45 is mounted in the paste tank 47 so that its periphery dips in the paste in the tank, the surplus being scraped off by a doctor blade 48 mounted in the usual manner to engage the periphery of the paste roll. As shown in Fig. 3, the paste roller is deeply grooved to permit free passage of the feed belts 42.

The feed belts are spaced apart a distance somewhat less than the width of the labels so that the labels will receive a stripe of gum or paste along the middle of the label and also at each edge, as will be evident from Fig. 3. The rollers 44 and 45 are also provided with a third groove to receive a stripper finger projecting upwardly from the forward lip of the paste tank to insure the labels being stripped off the paste roller. Beneath the rollers 44 and 45 the belts extend downwardly around the guide rods 49, as shown in Fig. 5, which serves to hold the feed belts tight and direct the projecting end of the label as it is fed forward by the belts into proper position with respect to the advancing package.

The roller 41 which constitutes the supporting and driving roller for the belt 25, is supported in pivoted brackets 50 and is maintained in yielding contact with the pulley 44 by means of springs 51 adjustably supported at each end of the roller 41 between the brackets 50 and a fixed stop 52 projecting upwardly from the journals of the suction roller, as shown in Fig. 5.

The label-feeding and pasting mechanism is operated from the drive shaft 31 by means of a sprocket chain 53 which leads to a sprocket wheel 54 fixed to the shaft 55 of the paste roller 45. This shaft and the paste roller are driven continuously whenever the machine is in operation. This shaft also carries the cam 17 which operates the pivoted folder 11 so that these parts also are operated continuously. The shaft 56 of the main pulley 44 of the feed belts 42 is driven continuously from the shaft 55, but the cam 63 which effects the reciprocation of the label magazine is driven intermitently through a stop mechanism controlled by the carton in its passage through the machine so that should no carton be present in the machine the feeding mechanism will stop and will remain stopped until the carton is supplied. This driving mechanism comprises a gear 57 fast on the shaft 56 of the belt pulley 44 and continuously driven through a similar gear fixed to the shaft 55 of the paste roller.

The shaft 56 has attached to it a notched disk 59 for cooperation with a pawl 58 spring-pressed toward the notched disk and carried by a disk attached to the cam 63 which is loose on the shaft. A rock arm 60 is attached to a shaft 61 extending across the superstructure frame above the belt pulleys and also attached to the shaft 61 is a stop arm 62 having a hooked end adapted when the shaft 61 is rocked, to be projected into the path of the pawl 58 and thereby withdraw the pawl from engagement with the disk 59, and allowing the disk 59 and the shaft 56 to continue their rotation while holding the pawl 62 with its attached parts stationary. Thus the cam 63 which operates the mechanism for reciprocating the label magazine will be held against movement and as the movement of the magazine operates the suction roller, all parts of the label-feeding mechanism will be stopped when the rock arm 60 is rocked to stop the machine.

The magazine is reciprocated by the cam 63 through a rocking sector 64 whose toothed end meshes with a pinion 65 attached to a shaft extending across the superstructure of the frame beneath the magazine. Also attached to the shaft of the pinion 65 is a gear 66 meshing with the rack 67 attached to the bottom of the magazine, a spring 68 serving to return the magazine to its rearmost position and thus maintain the cam roller of the sector 64 in engagement with the cam. The movement of the magazine oscillates the suction roller 24 by means of a rack 69 attached to the magazine, and meshes with a pinion fixed to the shaft of the suction roller.

The rock arm 60 is actuated by the moving cartons by means of a rock arm 70 attached to a rock shaft extending across the main frame beneath the path of travel of the carton conveyor. This rock arm 70 is connected to the rock arm 60 by a suitable link and mounted on the shaft of rock arm 70 in a position immediately beneath the path of travel of the cartons, is an arm 72 whose projecting end underlies a pivoted dog 73 whose upper end projects through a slot 74 in the bed plate of the machine into position to be engaged by the edge of the advancing cartons and pressed downwardly, thereby rocking the shaft, rock arm 70 and with it the arm 60 and shaft 61 to shift the stop arm 62 out of engagement with the pawl 58 so that the toothed end of the pawl will be engaged by the driving notch in the disk 59 and the cam 63 thereby rotated in unison with the disk 59 through one complete revolution of the shaft 56.

The dog 73 is so positioned with respect to the path of travel of the cartons that the end of the label will be projected by the feed belts in position to be engaged by the advancing end of the carton as the latter is moved forward by the continuously moving carton conveyor. As the feed belts continue their movement the label will be fed downwardly at just the rate that the box is advanced to spread the label smoothly over the top of the box, thereby sealing the outside longitudinal flaps of the box together and forming a tight closure for the carton.

To smoothly apply the label to the end of the carton there is provided a label-applying arm 80 attached to the rock shaft 81 extending across the machine frame beneath the carton-feeding conveyor. This arm curves upwardly through a slot in the bed plate of the machine and is provided at its upper end with a roller in position to engage the outer face of the label near the upper edge of the box end. On continued movement of the box the roller 82 moves downwardly over the label in contact with the box end and is then withdrawn through the slot in the table to allow the carton to continue its forward movement. The rock arm 80 is spring-held toward the box by a suitable spring 83 and is withdrawn from engagement with the box by means of a cam 84 fast to the main driving shaft 31. The cam 84 engages a cam roller attached to a link 85 pivoted to an arm attached to the rock shaft 81, the link being supported at its inner end by a fork resting on the shaft 31.

The parts of the machine are so timed that the end of the box will engage the roller 82 and tend to rock the arm 80 against the tension of the spring 83, just before the movement of the arm 80 under the influence of the cam begins, but when the roller reaches the bottom corner of the box the cam will come into positive operation and withdraw the roller completely from the path of travel of the box, as shown more particularly in Figs. 13 and 14.

As the carton continues its advance it comes under a brush 86 which is rapidly rotated in a direction away from the path of travel of the box so as to smooth the label over the top of the box. After passing the rotating brush the boxes pass under a stationary brush 88 which serves to further press the label into engagement with the box top and also serves to hold the label for a brief period while drying, as will be later described.

The rotating brush 86 serves also to smooth the rear end of the label down over the rear end of the carton. To this end the roller is carried by a pair of swinging brackets 90 which are periodically oscillated by a cam 91 on the main driving shaft 31 to cause the brush to drop down behind the carton as the latter reaches its position of rest under the stationary brush 88 and thereby wipe the label down firmly against the end of the carton, as shown in Figs. 14 and 15. The swinging brackets 90 are mounted on suitable pivots one of which is indicated at 92 on opposite sides of the stationary brush 89 and one of the brackets is provided with a cam roller 93 resting directly on the cam 91, the weight of the brackets and attached parts being sufficient to maintain the cam roller and cam in engagement.

The brush 86 is continuously rotated by a small electric motor 95 supported on one of the brackets 90 and belted directly to the shaft of the rotating brush.

Means are also provided for positively releasing the carton from the carton-conveyor at the proper time to stop in co-operating position with the rotating brush 86. To this end the side guides which lie on each side of the path of movement of the box beneath the brush 88 are provided at their forward ends with rollers 97 adapted to engage the cam faces 9*a* on the carton-engaging member 7 and press the latter down out of engagement with the rear end of the box in advance of the movement of the brush 86, as clearly shown in Figs. 14 and 15.

The bed plate of the machine is slotted at this point as shown at 98 to permit the carton-engaging member 7 to swing down on its pivot between the sprocket chains and beneath the bed plate, and in the movement of the members 7 back toward the rear of the machine the members 7 hang downward, as shown in Fig. 1 with the rollers 8 resting on channel guides 99 provided for that purpose beneath the table.

After the carton comes to rest under the stationary brush 88 and it is released by the conveyor as just described, it will remain in that position until engaged by the next carton and forced forward along the bed plate of the machine, whence it is removed by hand or a delivery conveyor or the like. The end of the label at the rear of the box is spun down against the end of the carton by the rapidly rotating brush 86 which, however, does not in its downward movement come low enough to smooth the end of the label. This, however, is unnecessary for the advancing end of the next carton presses the label firmly against the end of the carton so that by the time the carton is ejected from beneath the brush 85 the label will be stuck to the carton throughout its entire area.

If no carton should be present on the bed plate of the machine in position to be engaged by the flight 7 as it passes along the bed plate, the dogs 73 will not be depressed and consequently the label feed mechanism will not be actuated to withdraw the label from the magazine and direct it into the bight of the feed belts. The feed belts and the paste roller operate continuously whenever the machine is in operation, thereby preventing the paste drying on the roller or sticking to the belts, as would otherwise be the case. The cam 63, however, remains at rest unless the carton depresses the trip 73 and consequently the magazine is not reciprocated and the suction roller is not oscillated to feed the label out of the magazine.

In the foregoing specification I have described in detail an embodiment of the machine which has been found satisfactory in practical operation and one which is particularly adapted to be operated at high speed without danger of injury to the box or detract from the quality of the work, but it is to be understood, however, that my invention is not limited to the precise details of construction herein shown and described, as these may be modified within considerable limits without departing from the spirit of my invention as defined in the appended claims.

I claim:

1. In a carton-closing machine, the combination of means for continuously advancing a carton having upstanding flaps, means for closing the carton flaps as the carton is advanced, means for applying a sealing strip over the top of the carton to thereby seal the closed flaps, means for applying the sealing strip against the end of the advancing carton and thence across the top of the carton over the closed flaps, said means comprising a strip-feeding device adapted to intermittently project a gummed strip across the path of movement at the end of the carton, and a wiper to wipe the strip against the end of the carton comprising an arm yieldingly maintained in the path of movement of the carton and positively operated in sequence with the movement of the carton to prevent undue obstruction of the movement of the carton.

2. In a machine of the class described, the combination of means for advancing an article, means for applying a gummed strip thereto, a strip-feeding mechanism, said means comprising a magazine for the strips, a picker for delivering from the magazine a single strip at a time, means actuated by the article moving through the machine for actuating said picker, and continuously operating feed mechanism for advancing the strip from the picker to a point adjacent the path of movement of the article.

3. In a machine of the class described, the combination of means for advancing an article, means for applying a gummed strip thereto, a strip-feeding mechanism, said means comprising a magazine for the strips, a picker for delivering from the magazine a single strip at a time, means actuated by the article moving through the machine for actuating said picker, continuously operating feed mechanism for advancing the strip from the picker to a point adjacent the path of movement of the article, and a continuously operated gumming mechanism arranged adjacent said continuously operated feed-mechanism to apply gum to said strip as advanced thereby.

4. In a machine of the class described, the combination of means for advancing an article, means for applying a gummed strip to said article, said means comprising a strip-feeding and gumming mechanism and a rotating brush a vertically movable member supporting said brush adjacent the path of movement of the upper face of said article in position to apply the strip thereto, and means operating in sequence with the article-advancing means for vertically moving said brush across the rear end of the article to apply said strip thereto.

5. In a machine of the class described, a conveyor for advancing articles through the machine, said conveyor comprising spaced article-engaging members, means for applying a gummed strip to the upper face of said article while being advanced by said conveyor, means to shift said article-engaging members out of engagement with the article to thereby stop the movement of said article and means for applying the end of the strip to the rear end of the article while it is stationary.

6. In a machine of the class described, a conveyor for advancing articles through the machine, said conveyor comprising spaced article-engaging members, means for applying a gummed strip to the upper face of said article while being advanced by said conveyor, means to shift said article-engaging members out of engagement with the article to thereby stop the movement of said article, means for applying the end of the strip to the rear end of the article while it is stationary, said means comprising a brush, means for reciprocating the brush across the rear end of the article, and means for rotating the brush during such reciprocation.

7. In a machine of the class described, the combination of a strip-feeding and gumming mechanism, a conveyor for feeding articles through said machine, said conveyor having movable article-engaging members, means for advancing the gummed strip into position to be applied to the carton, a stationary brush in advance of said conveyor and positioned for the passage of articles advanced by the conveyor thereunder, means for applying the gummed strip to the upper surface of said article, means for shifting the article-engaging members after the article is in position beneath said brush, and means for applying the strip to the rear end thereof while in position beneath said brush.

8. In a machine of the class described, the combination of an article-feeding mechanism, means for applying a gummed strip thereto, and means for feeding a strip to said applying means, said means comprising a magazine, a suction roller mounted beneath said magazine and means for oscillating said suction roller and simultaneously shifting said magazine horizontally across said suction roller.

9. In a machine of the class described, the combination of an article-feeding mechanism, means for applying a gummed strip thereto, means for feeding a strip to said applying means, said means comprising a magazine, a suction roller mounted beneath said magazine, means for reciprocating said magazine across the top of said suction roller and a rack on said magazine, and an intermeshing gear on said suction roller whereby the reciprocation of the magazine effects the oscillation of the roller.

10. In a machine of the class described, the combination of an article-feeding mechanism, means for applying a gummed strip thereto and means for feeding a strip to said applying means, said means comprising a magazine mounted for horizontal reciprocation, a strip-delivery mechanism controlled by the reciprocation of said magazine and means controlled by the passage of articles through the machine for effecting the reciprocation of the magazine.

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