

B. W. TUCKER,
PACKAGING MACHINE.
APPLICATION FILED AUG. 1, 1904.

939,353.

Patented Nov. 9, 1909
25 SHEETS—SHEET 1.

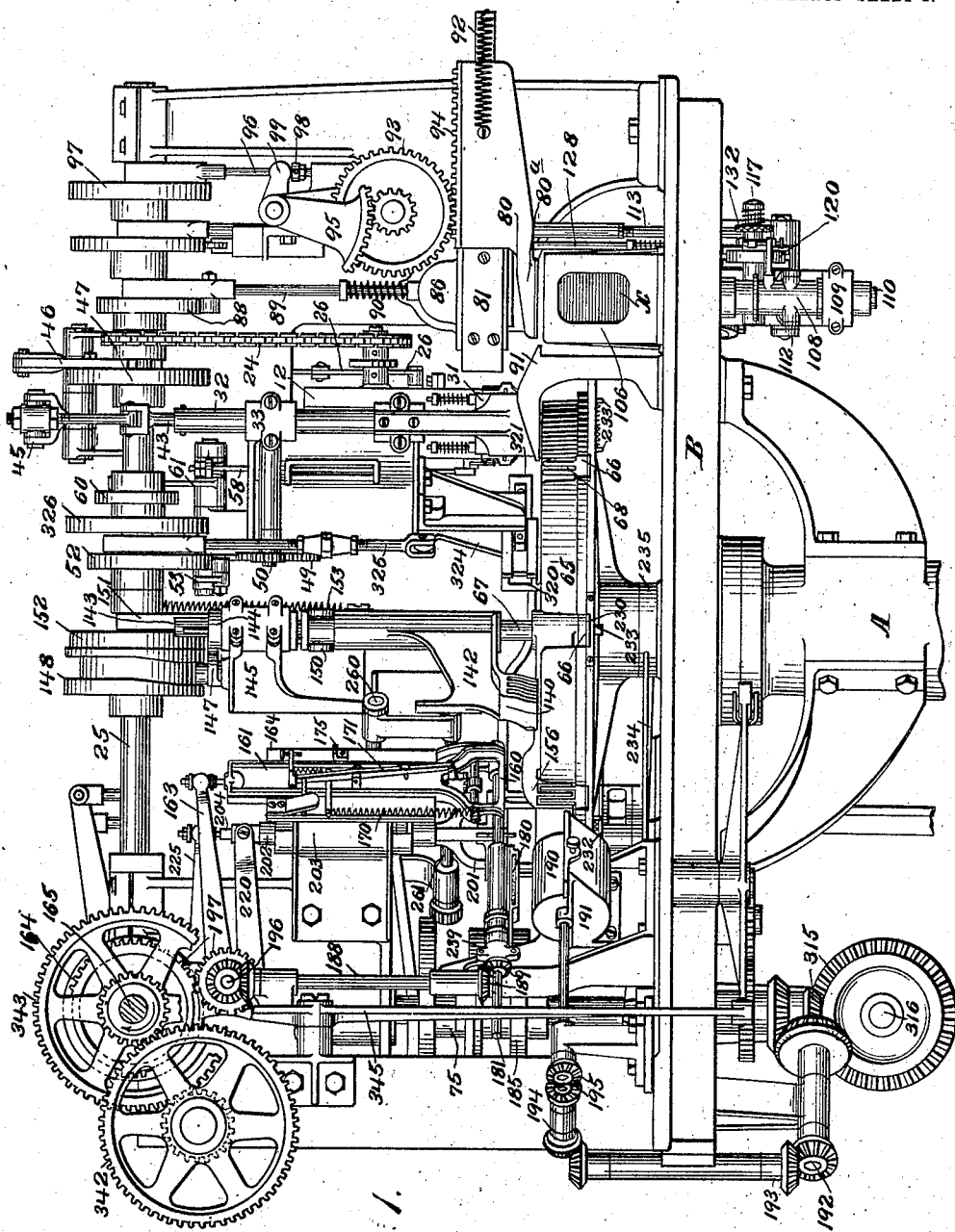


Fig. 1.

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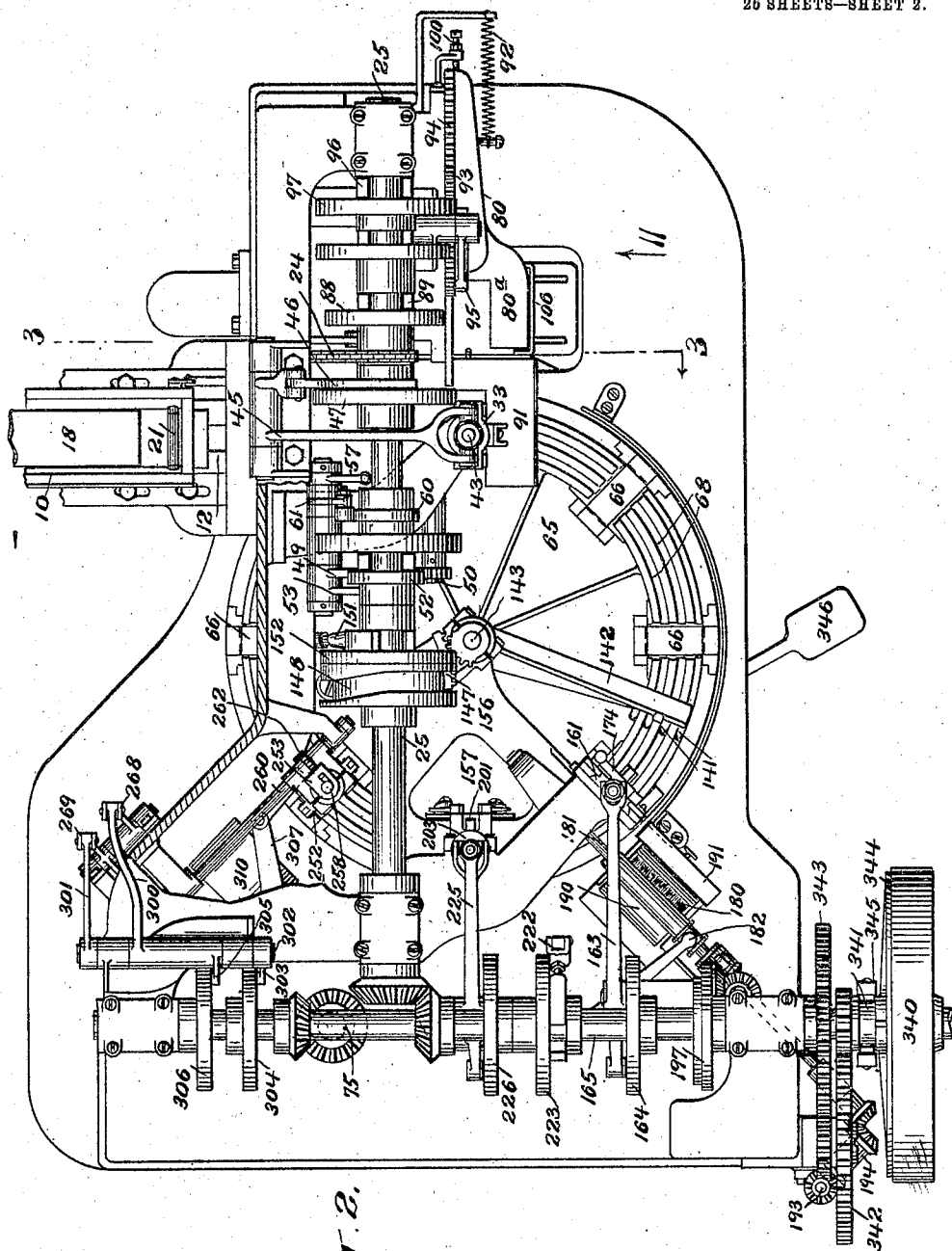


Fig. 2.

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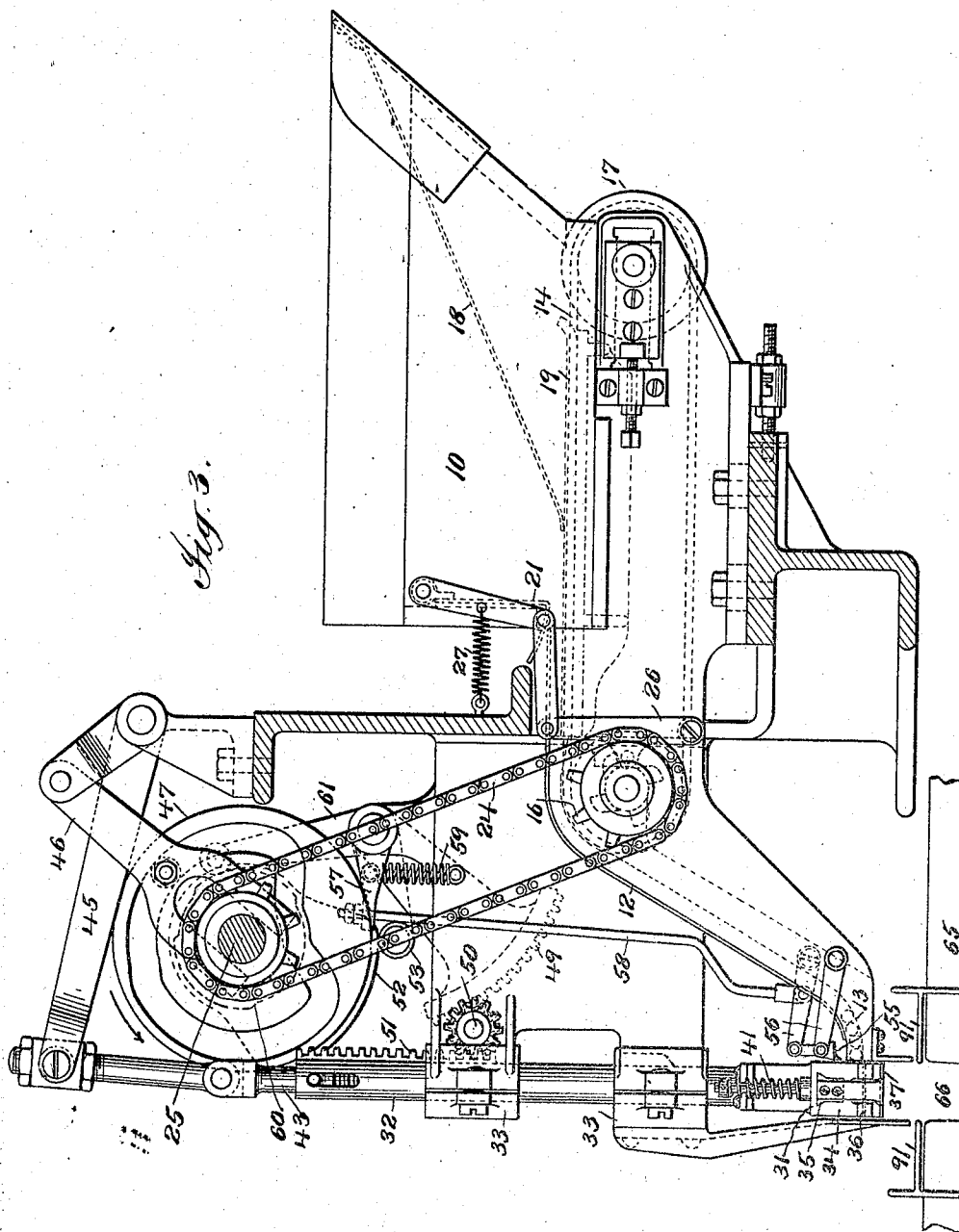
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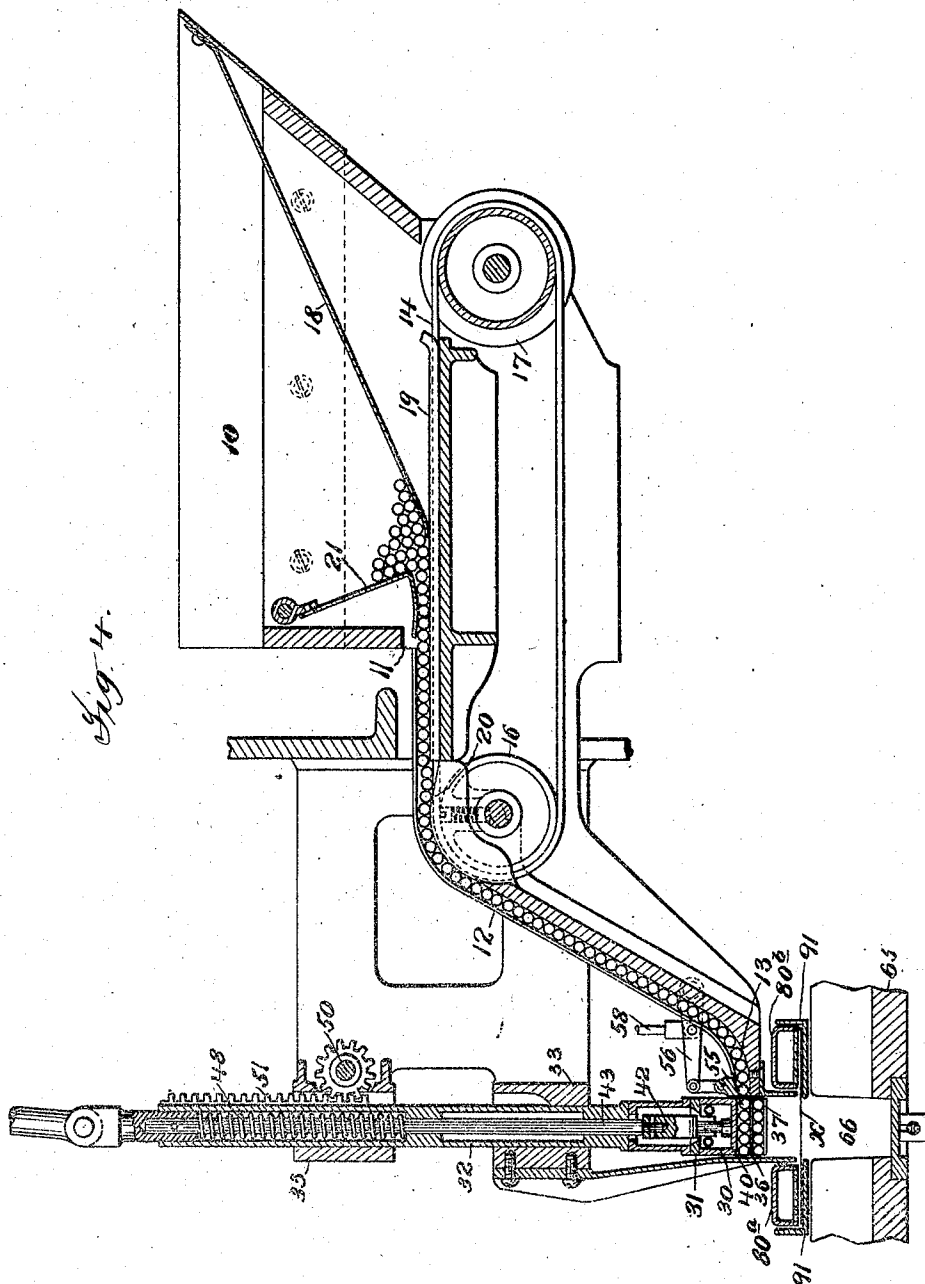


Fig. 4.

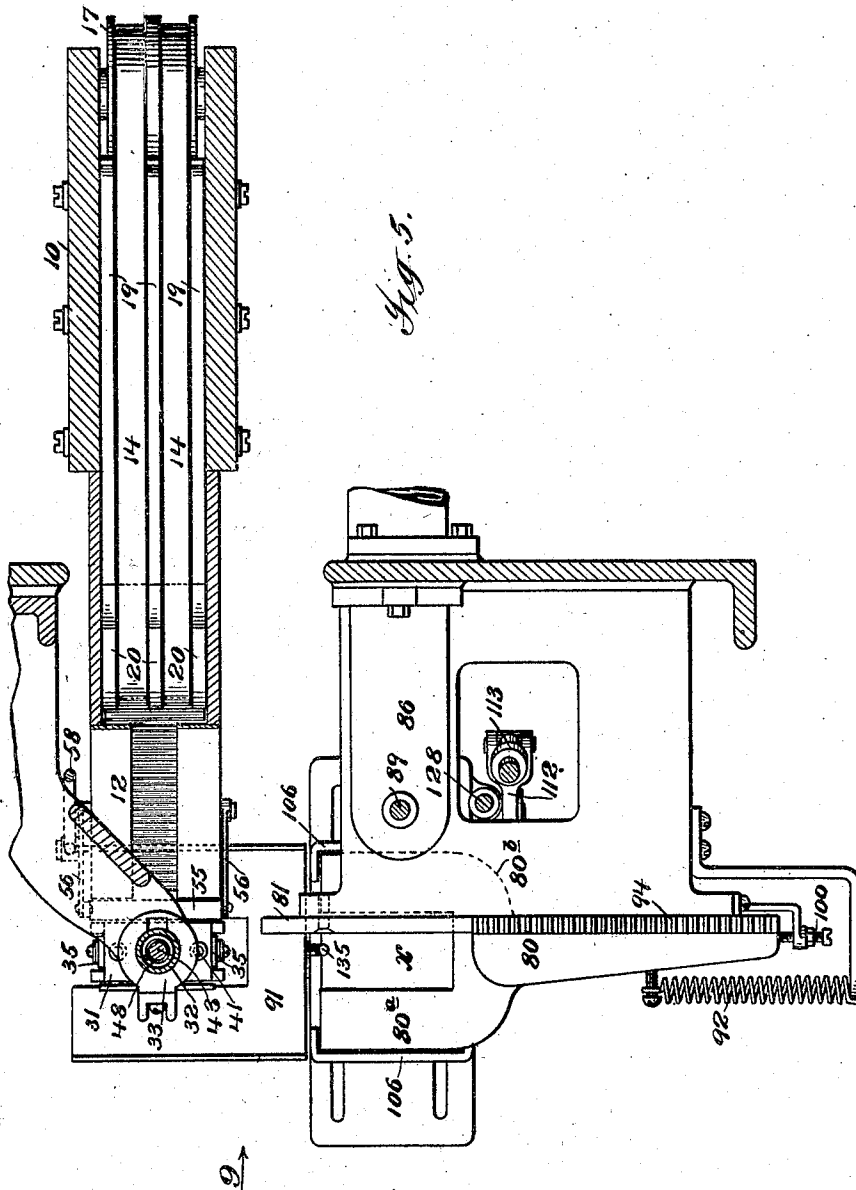
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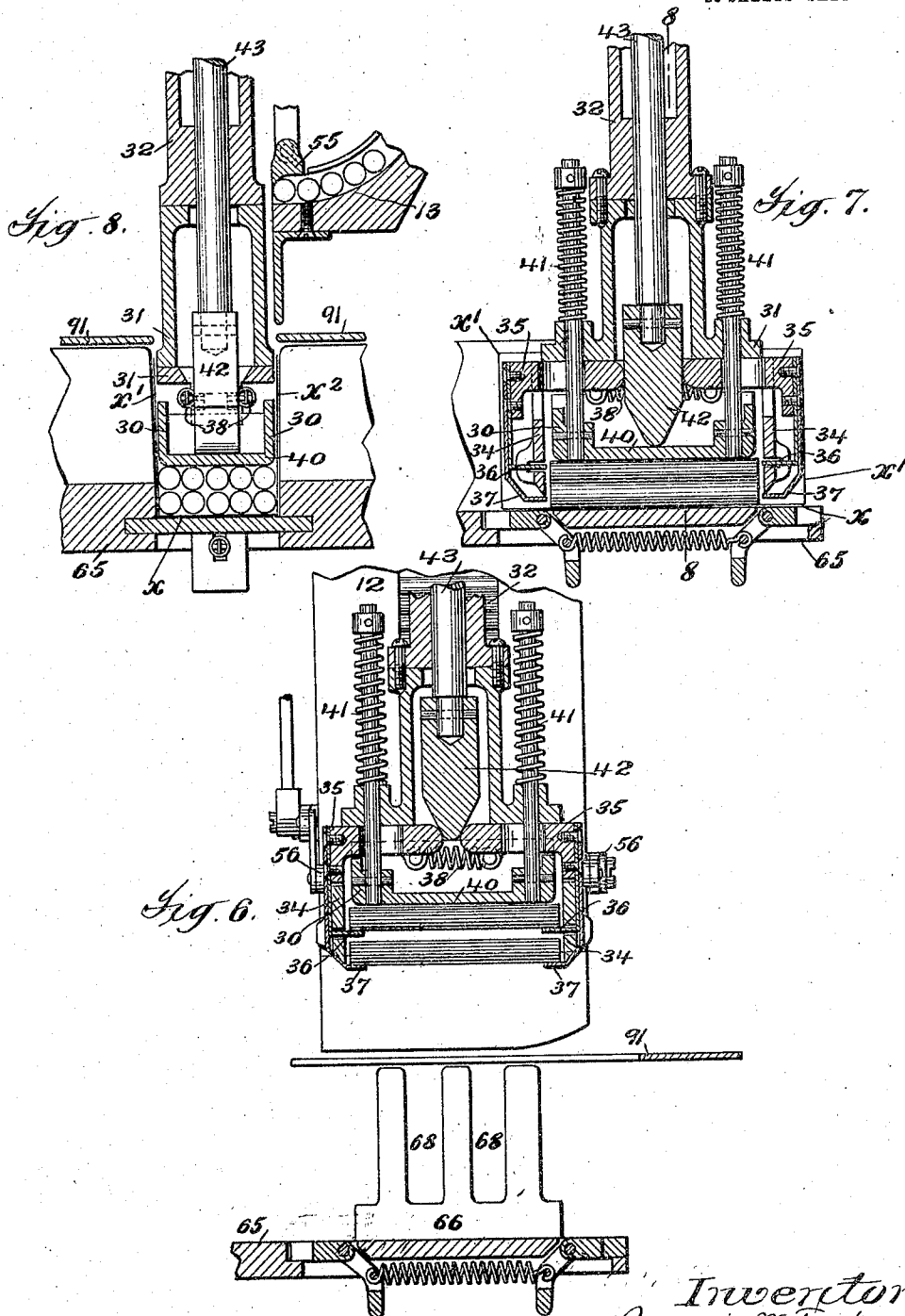
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25 SHEETS—SHEET 6.

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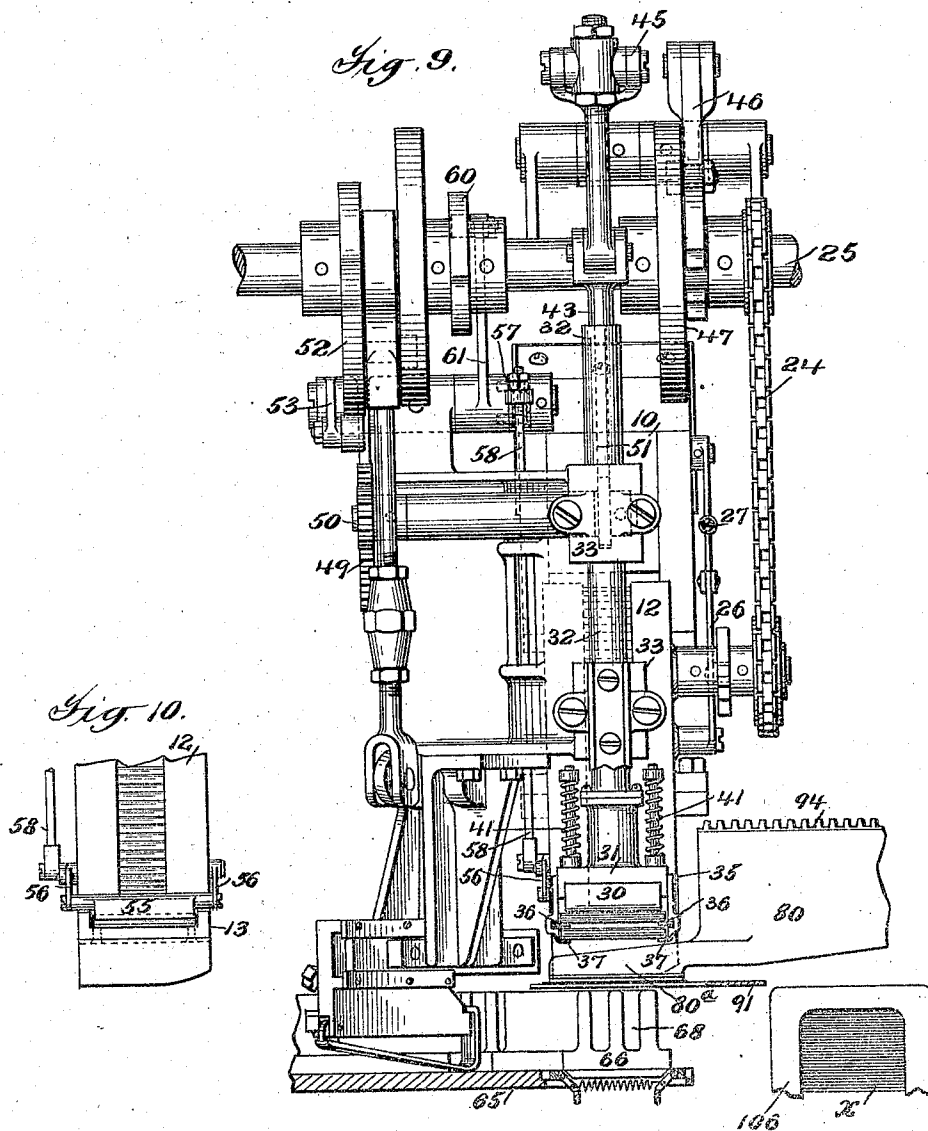
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25 SHEETS—SHEET 7.



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26 SHEETS—SHEET 8.

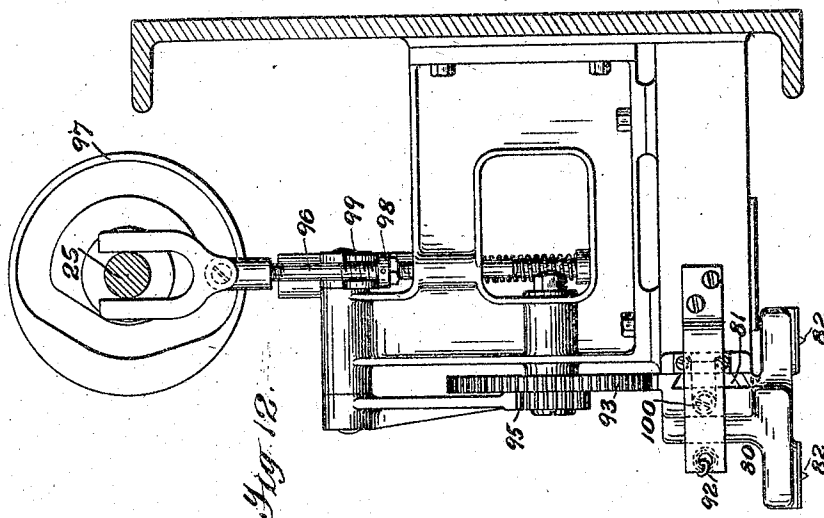


Fig. 12.

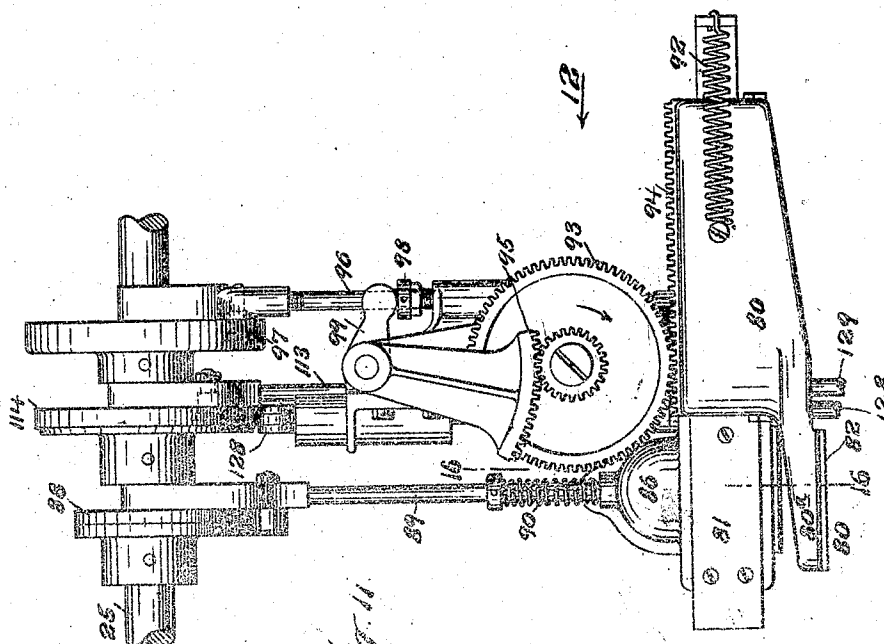


Fig. 11.

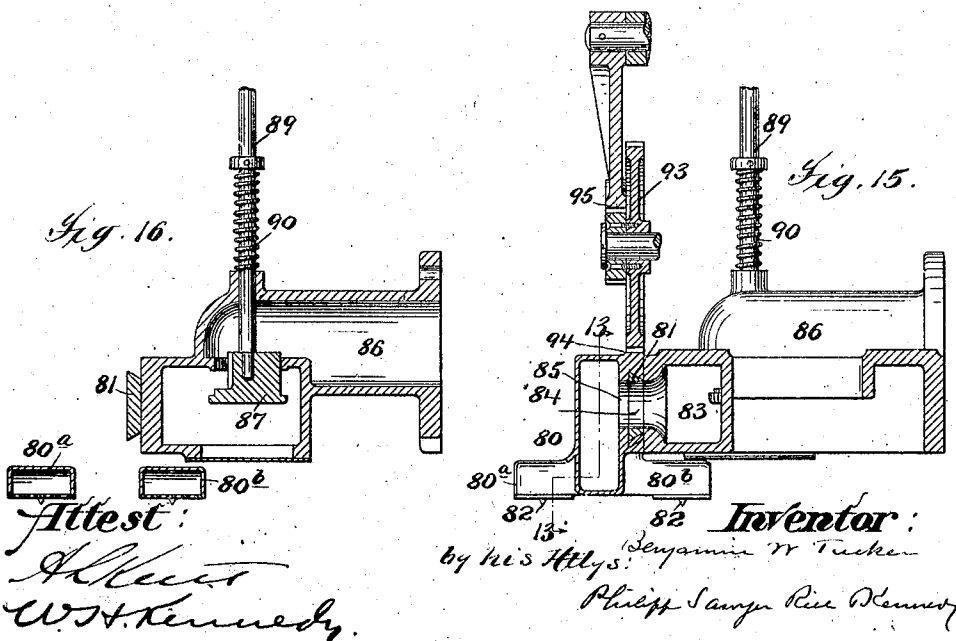
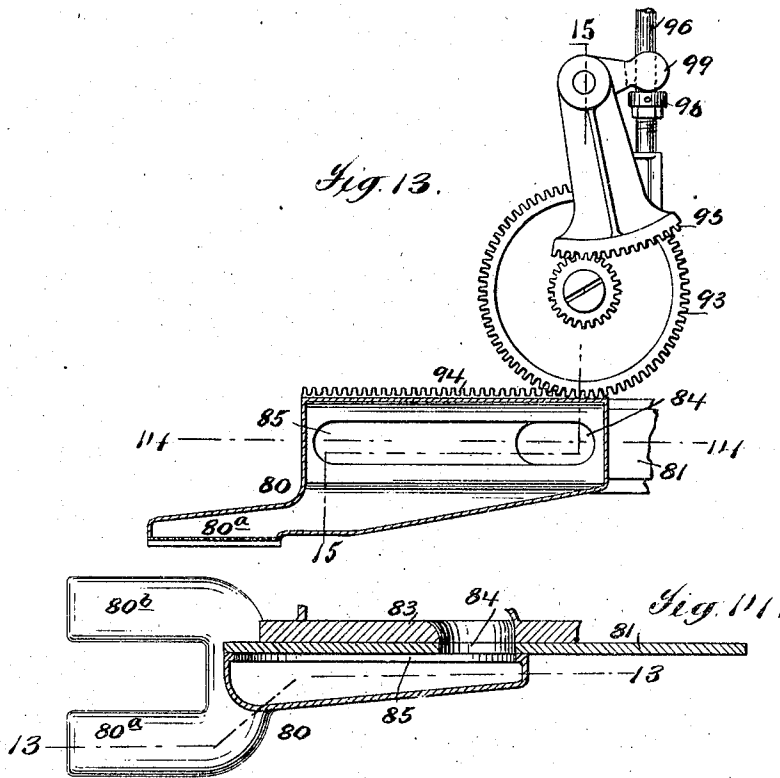
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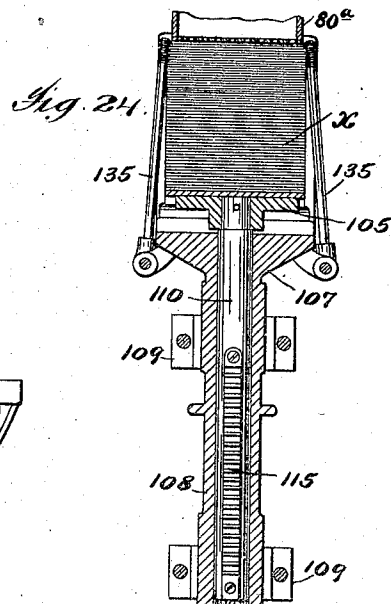
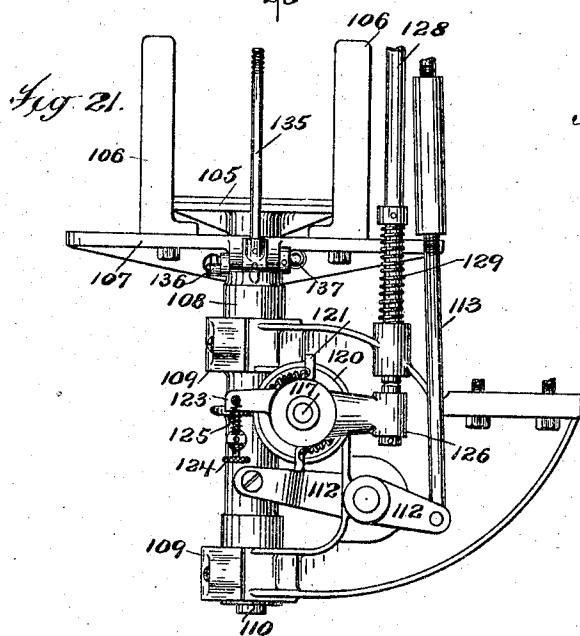
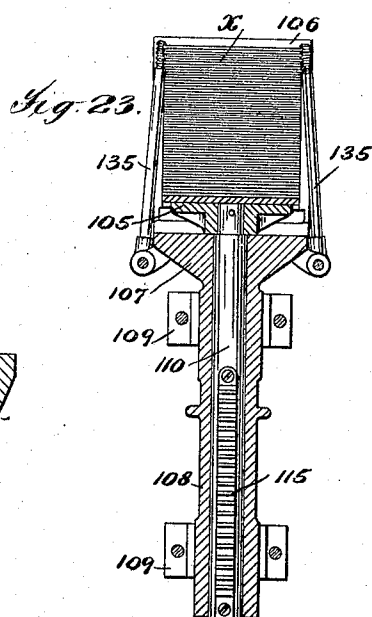
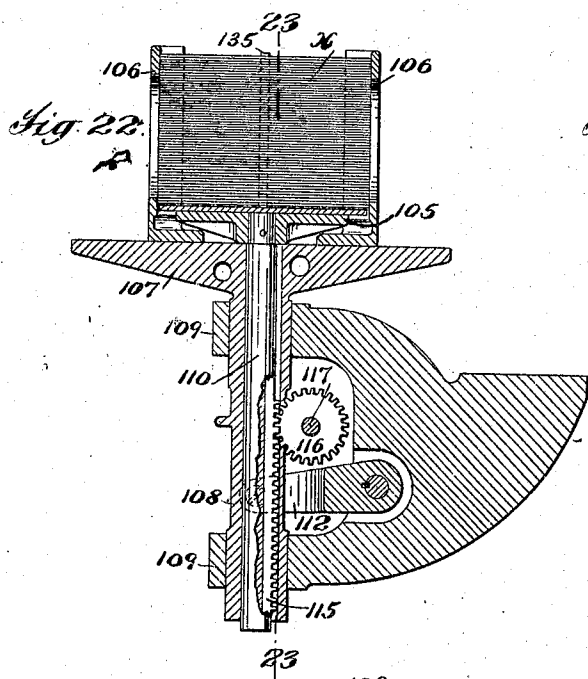
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26 SHEETS—SHEET 9



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26 SHEETS—SHEET 11.



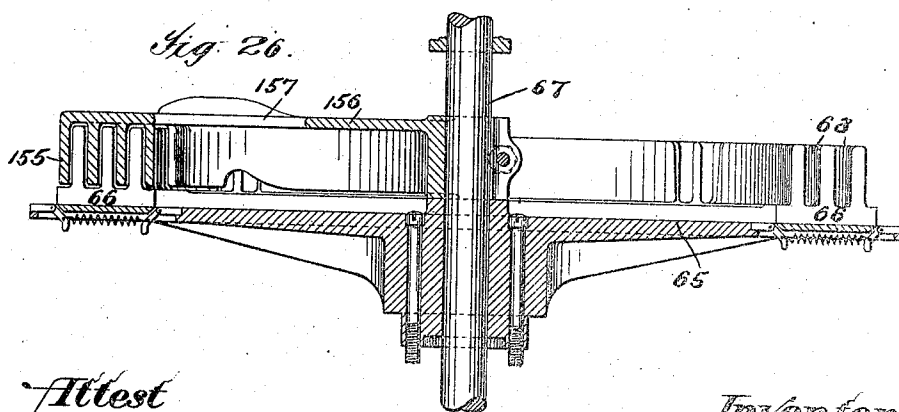
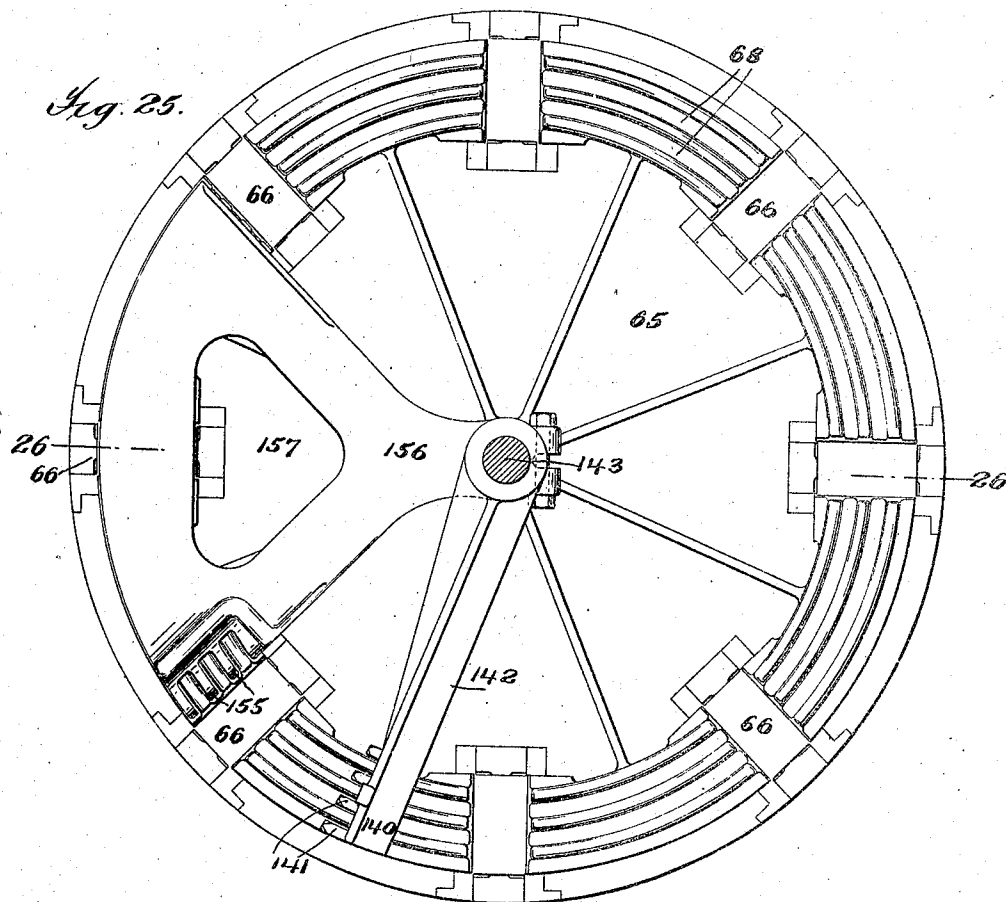
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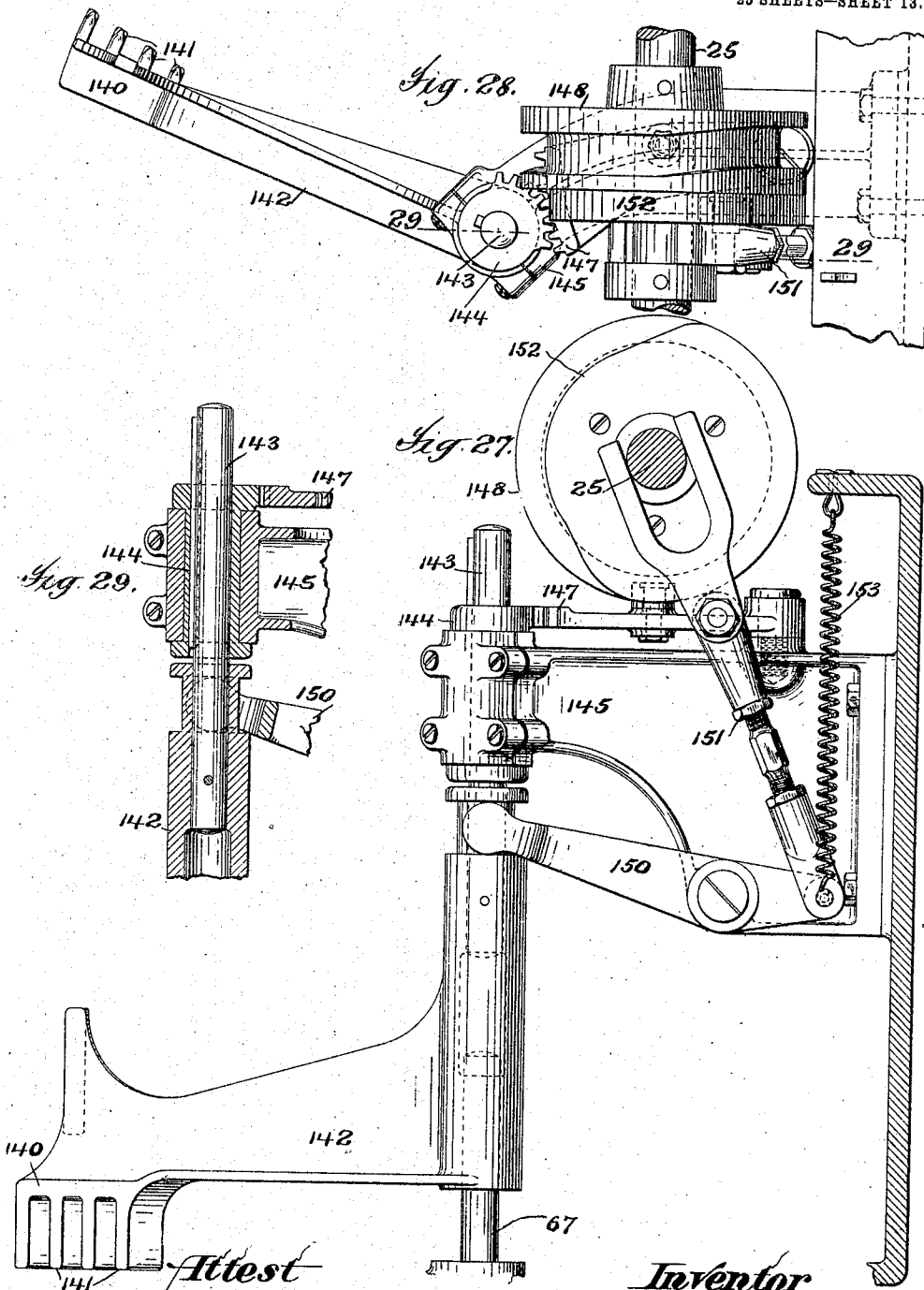
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25 SHEETS—SHEET 13.



Attest
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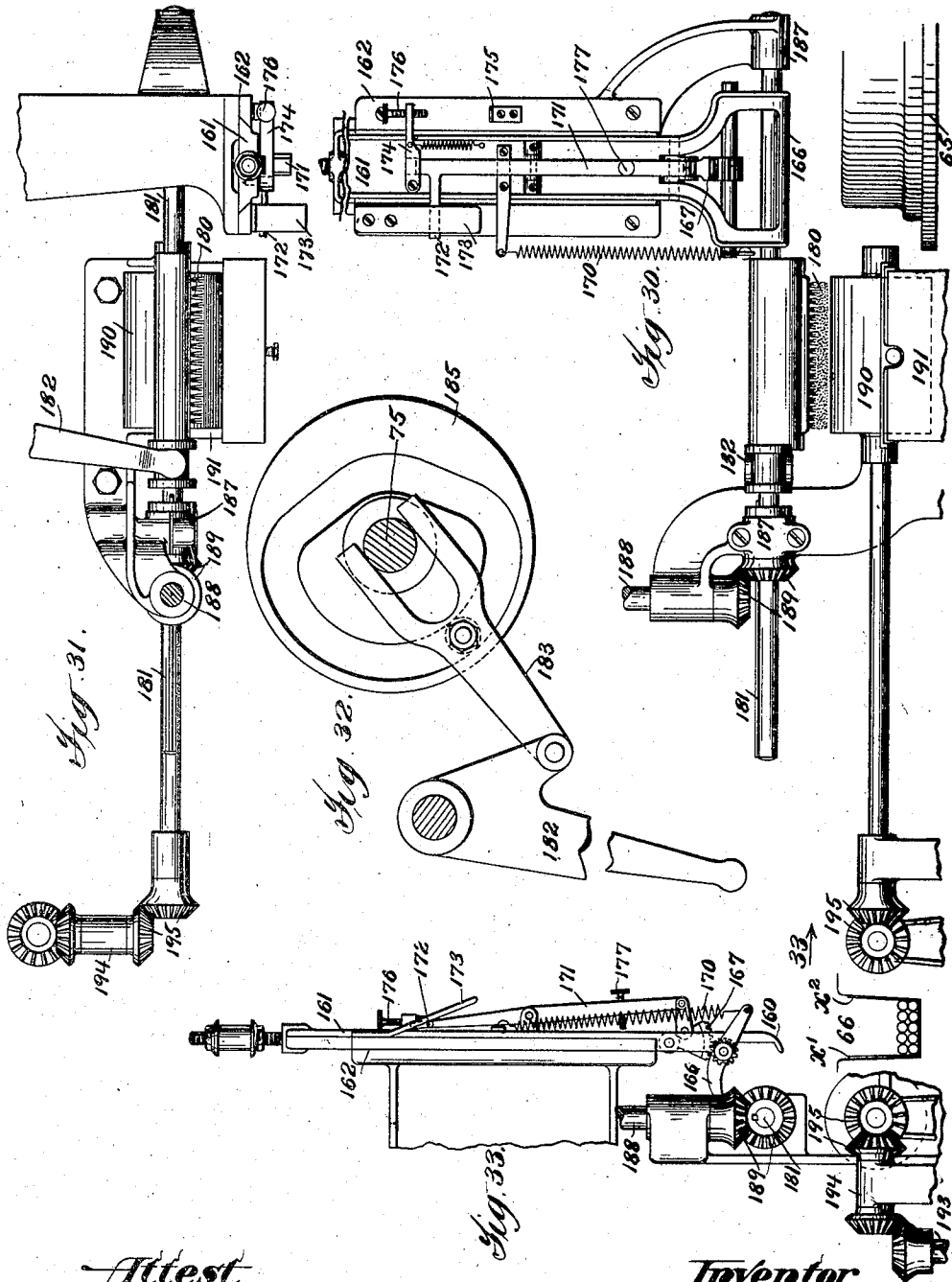
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26 SHEETS—SHEET 14.

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Patented Nov. 9, 1909.
25 SHEETS—SHEET 15.

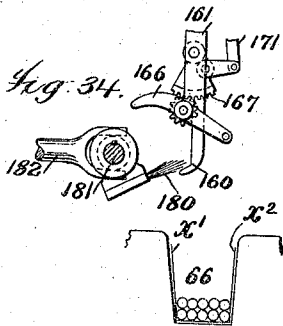
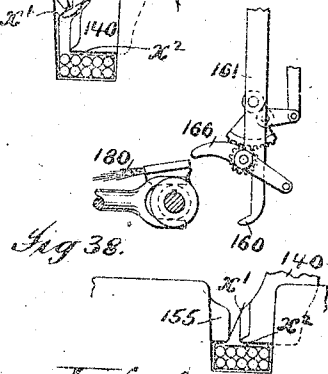
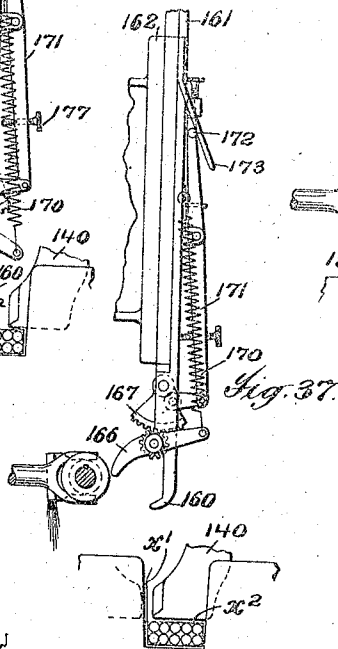
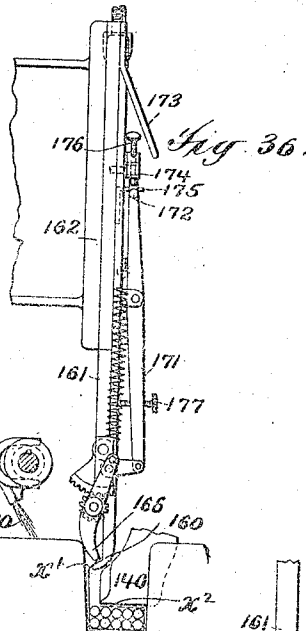
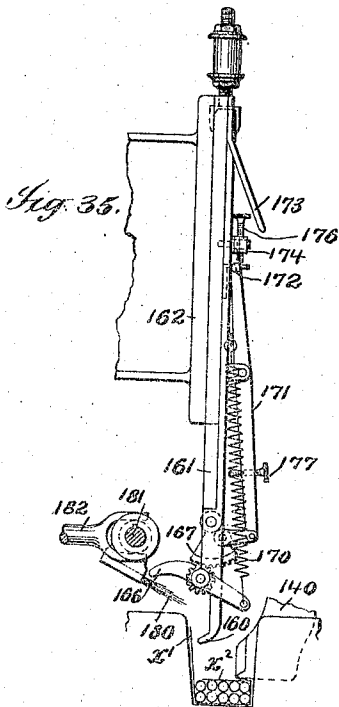
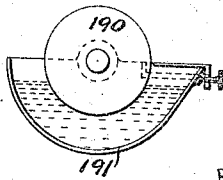


Fig. 39.



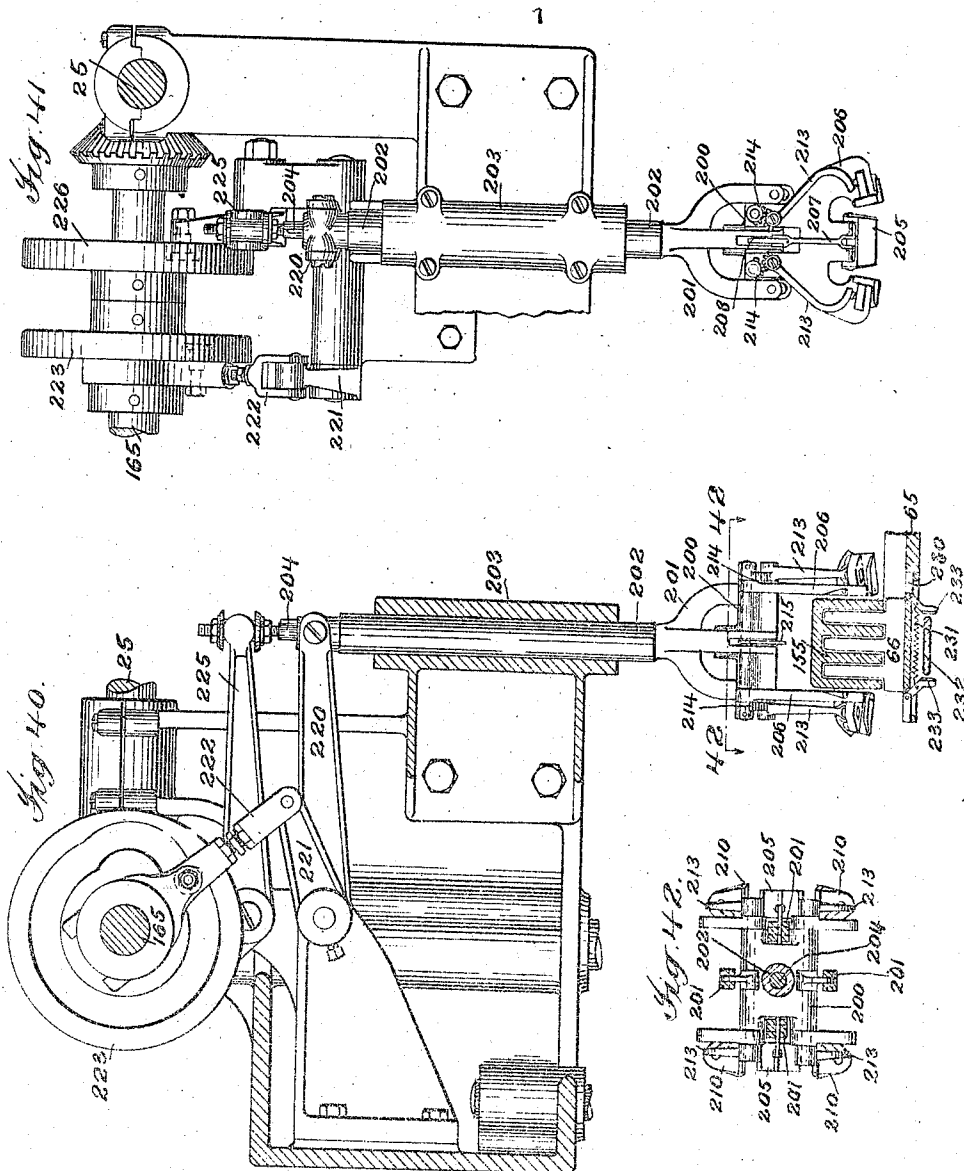
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PACKAGING MACHINE.
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Patented Nov. 9, 1909.
25 SHEETS—SHEET 16.



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PACKAGING MACHINE.
APPLICATION FILED AUG. 1, 1904.

25 SHEETS--SHEET 17.



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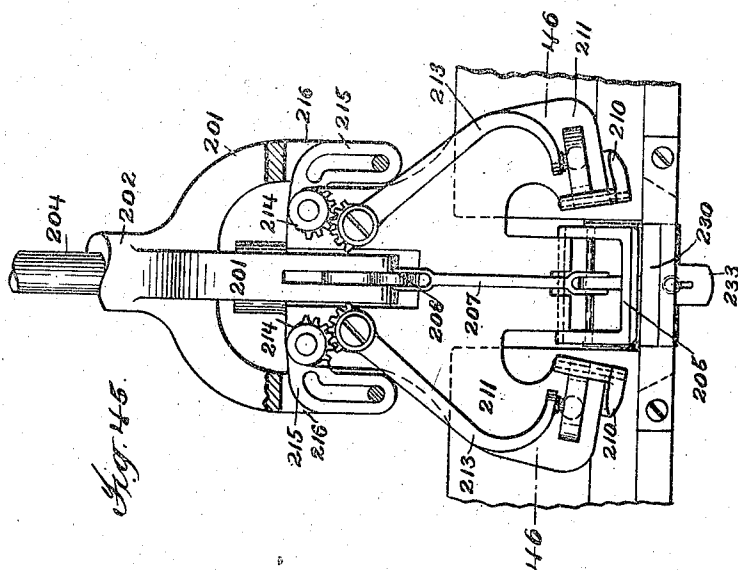
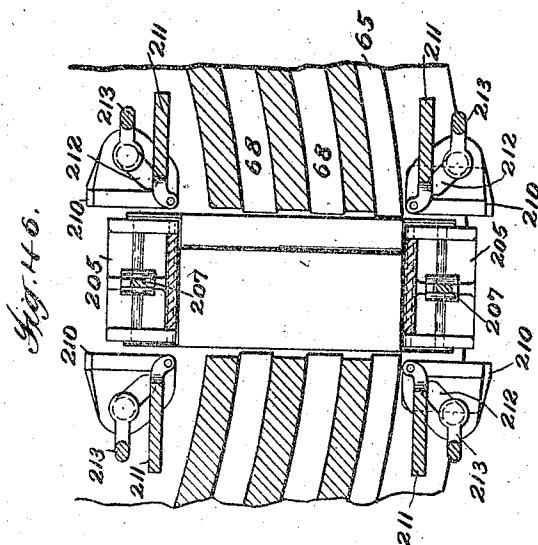
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B. W. TUCKER.
PACKAGING MACHINE.
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Patented Nov. 9, 1909.

25 SHEETS—SHEET 18.



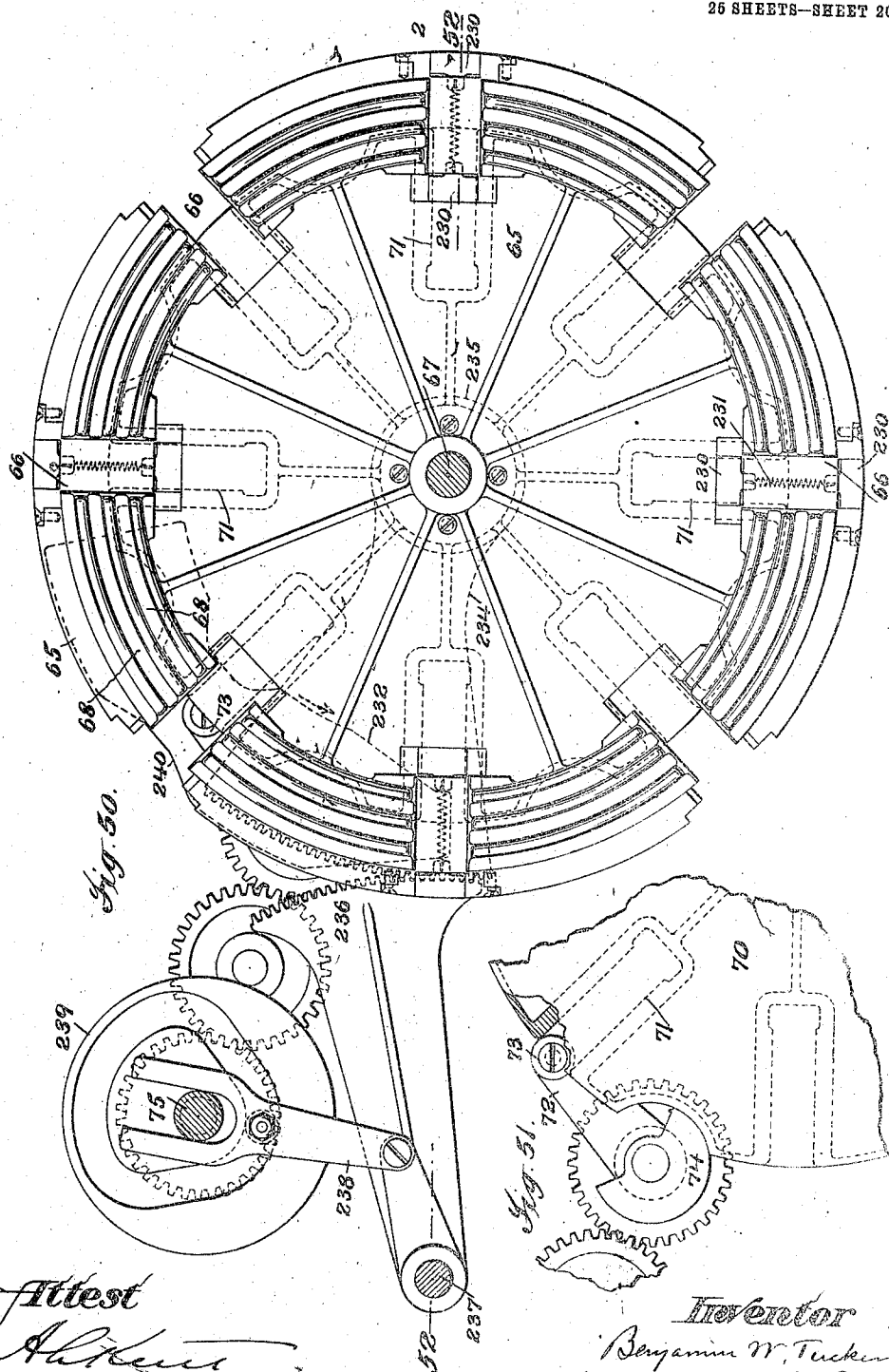
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PACKAGING MACHINE.
APPLICATION FILED AUG. 1, 1904.

Patented Nov. 9, 1909.
26 SHEETS—SHEET 20.



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PACKAGING MACHINE.
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Patented Nov. 9, 1909.
25 SHEETS—SHEET 21.

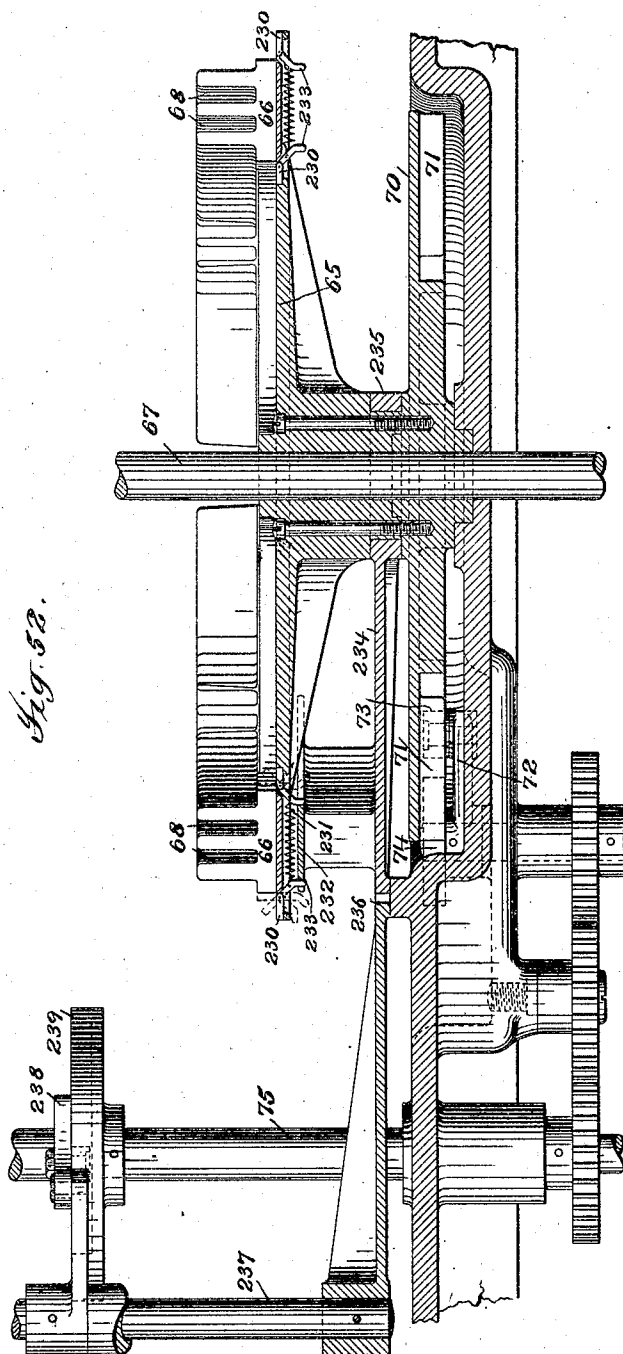


Fig. 52.

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PACKAGING MACHINE.
APPLICATION FILED AUG. 1, 1904.

25 SHEETS—SHEET 22.



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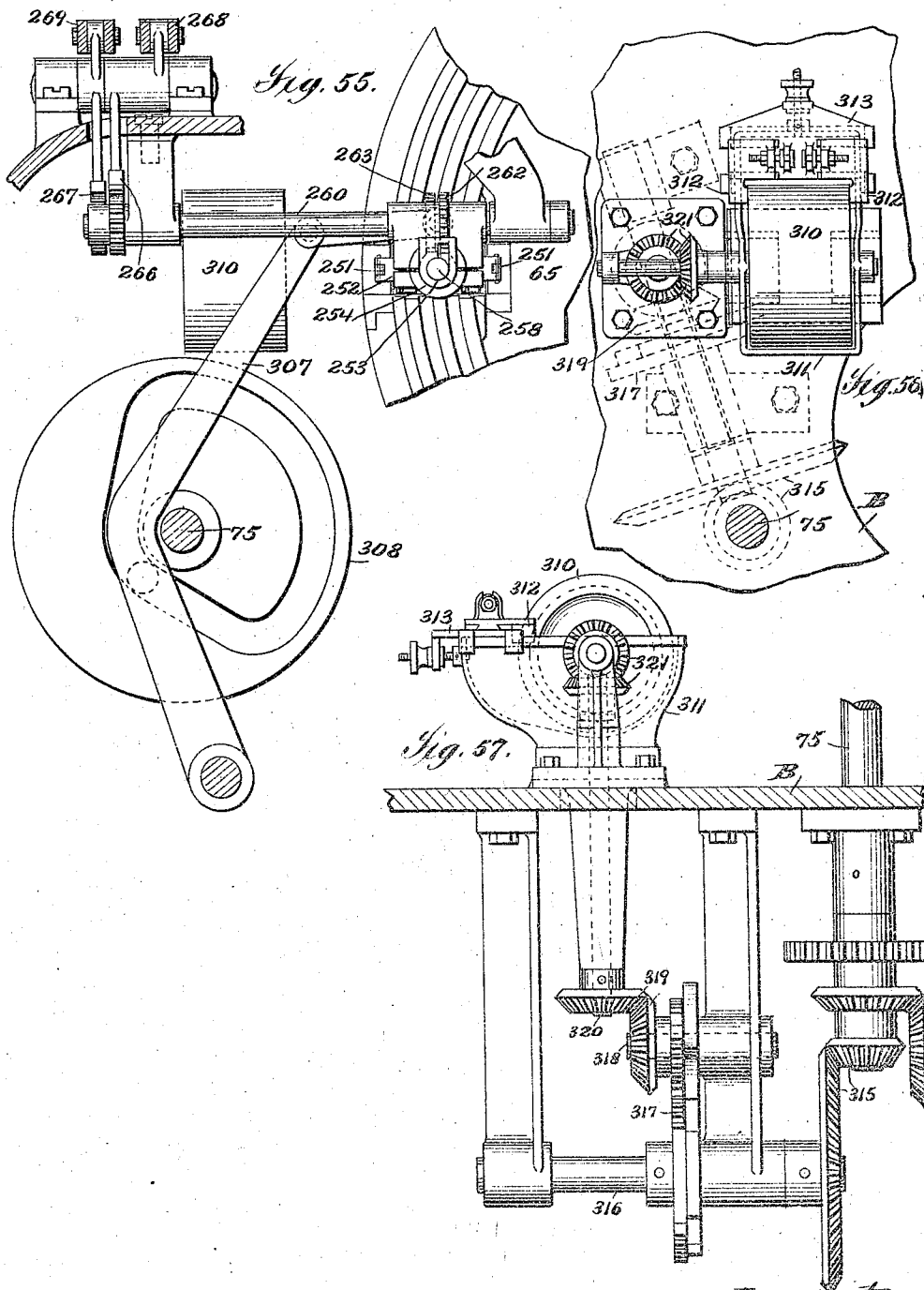
B. W. TUCKER.
PACKAGING MACHINE.

APPLICATION FILED AUG. 1, 1904.

Patented Nov. 9, 1909.

25 SHEETS—SHEET 23.

939,353.



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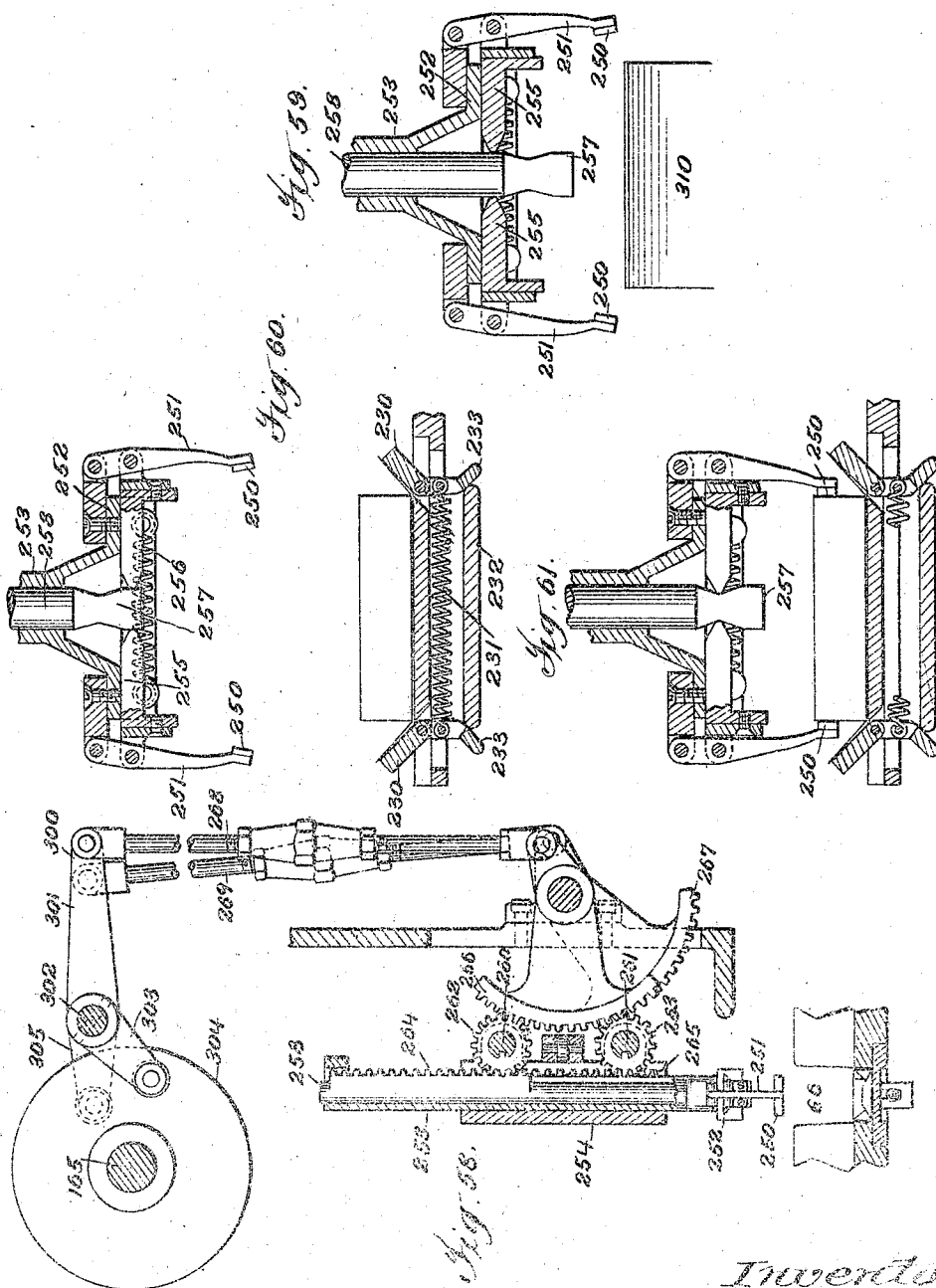
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B. W. TUCKER.
PACKAGING MACHINE.
APPLICATION FILED AUG. 1, 1904.

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25 SHEETS—SHEET 24.



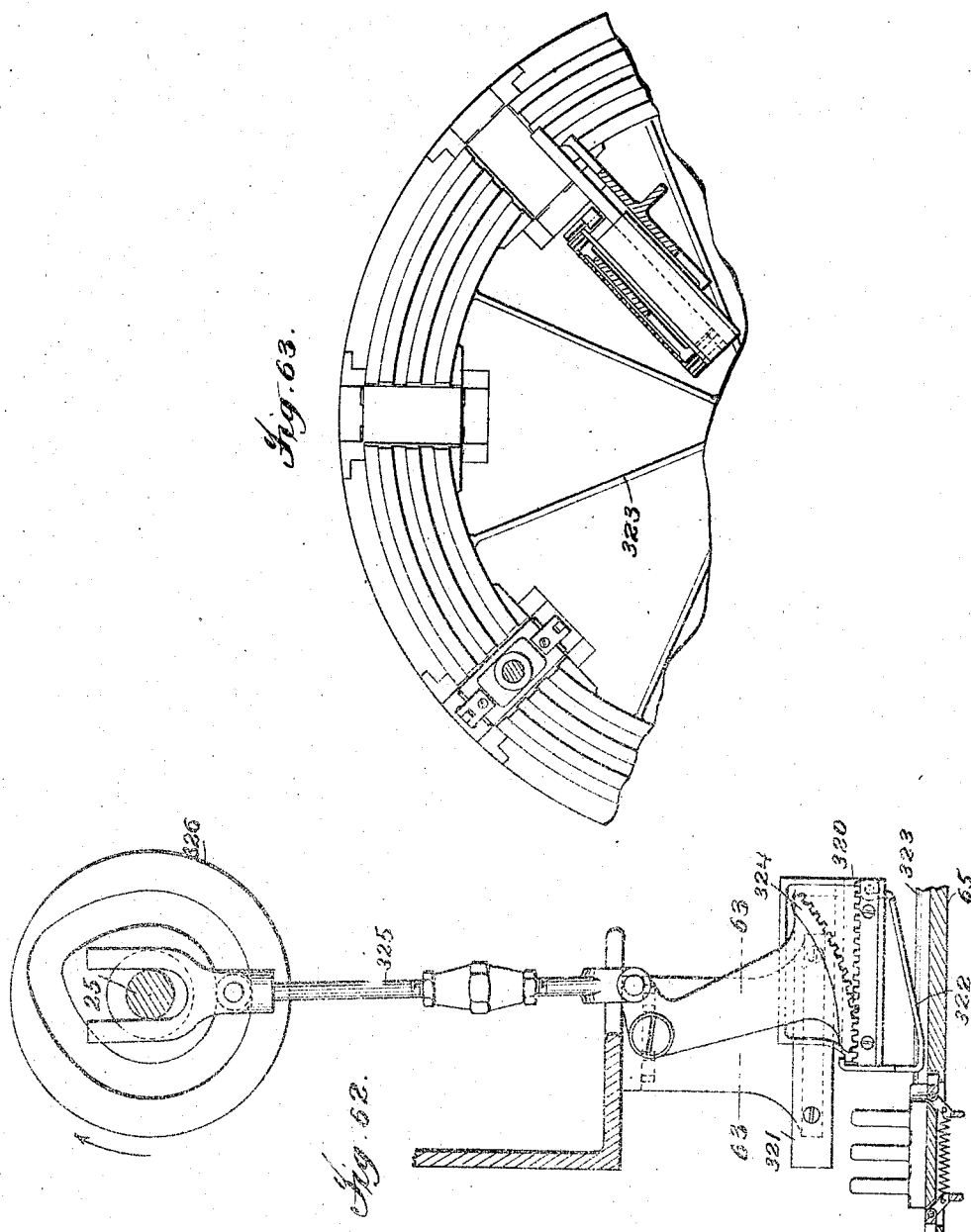
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APPLICATION FILED AUG. 1, 1904.

Patented Nov. 9, 1909.
25 SHEETS—SHEET 25.



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Inventor:
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UNITED STATES PATENT OFFICE.

BENJAMIN W. TUCKER, OF NEWARK, NEW JERSEY, ASSIGNOR TO THE AMERICAN TOBACCO COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

PACKAGING-MACHINE.

939,353.

Specification of Letters Patent.

Patented Nov. 9, 1909.

Application filed August 1, 1904. Serial No. 218,981.

To all whom it may concern:

Be it known that I, BENJAMIN W. TUCKER, a citizen of the United States, residing at Newark, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Packaging-Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

This invention relates to packing machines and aims especially to provide a machine adapted for forming packages of cigarettes or similar articles by folding a flexible wrapper sheet about a predetermined number of such articles and securing the folded wrapper sheet by means of suitable adhesive.

The invention includes various features relating to feeding and counting the cigarettes or other articles, feeding wrapper sheets and associating charges of cigarettes with the wrapper sheets, folding the wrapper sheets about the charges of cigarettes, applying paste or other suitable adhesive to the wrappers, and discharging the completed packages from the machine.

A full understanding of the invention can best be given by a detailed description of a construction embodying the various features thereof in a preferred form, and such a description will now be given in connection with the accompanying drawings showing a preferred construction.

In said drawings: Figure 1 is an elevation partly broken away of an organized machine embodying the various features of the invention. Fig. 2 is a plan view of the machine with the cigarette feeding mechanism partly broken away. Fig. 3 is a view partly in section on line 3 of Fig. 2 showing the cigarette feeding and depositing mechanism in elevation. Fig. 4 is a sectional view of the cigarette feeding and depositing mechanism. Fig. 5 is a plan view partly in section of the cigarette feeding and depositing mechanism and the wrapper feeding mechanism. Fig. 6 is a sectional view, on a still larger scale, of the cigarette depositing plunger and one of the receiving pockets. Fig. 7 is a similar view showing the depositing plunger in delivering position. Fig. 8 is a section taken on line 8 of Fig. 7. Fig. 9 is an elevation of the cigarette feeding and depositing and the wrapper feeding

mechanisms looking in the direction of the arrow 9 of Fig. 5. Fig. 10 is a detail view showing a part of the cigarette feeding mechanism. Fig. 11 is an elevation of the wrapper transferring mechanism looking in the direction of the arrow 11 of Fig. 2 and arrow 9 of Fig. 5. Fig. 12 is a view looking in the direction of the arrow 12 of Fig. 11. Fig. 13 is a detail view of parts shown in Fig. 11, partly in section, on line 13 of Fig. 14 and showing the wrapper transferrer in its forward or delivering position. Fig. 14 is a detail sectional view taken on line 14 of Fig. 13. Fig. 15 is a detail sectional view on line 15 of Fig. 13. Fig. 16 is a detail sectional view on line 16 of Fig. 11. Fig. 17 is an elevation of the mechanism for supporting the pile of wrapper sheets and for presenting the top sheet of the pile in position to be engaged by the transferrer. Fig. 18 is a view looking in the direction of the arrow 18 of Fig. 17. Fig. 19 is a plan view of parts shown in Figs. 17 and 18 with the operating rods broken off. Fig. 20 is an enlarged detail sectional view on line 20 of Fig. 17. Fig. 21 is a view similar to Fig. 18 but showing the sheet holder in its raised position. Fig. 22 is a section taken on line 22 of Fig. 17. Figs. 23 and 24 are sections taken on line 23 of Fig. 22 showing the parts in different positions. Fig. 25 is a plan view of the wrapping carrier and parts coöperating therewith for performing a part of the wrapping operation. Fig. 26 is a section on line 26 of Fig. 25. Fig. 27 is an elevation of the arm for folding down one of the upwardly extending sides of the wrapper and the mechanism for operating the same. Fig. 28 is a plan view of parts shown in Fig. 27. Fig. 29 is a detail sectional view on line 29 of Fig. 28. Fig. 30 is an elevation of the pasting mechanism for applying paste to one of the edges of the wrapper. Fig. 31 is a plan view of parts shown in Fig. 30. Fig. 32 is a detail view of the cam and connections for reciprocating the pasting brush. Fig. 33 is an elevation of parts shown in Fig. 30 looking in the direction of the arrow 33 of Fig. 30. Figs. 34, 35, 36, 37 and 38 are views similar to Fig. 33 and partly in section illustrating successive steps in the operation of the pasting mechanism, and Figs. 34 and 38 being broken away to show less of the mechanism than the other figures.

Fig. 39 is a detail sectional view of the paste fountain and roll. Fig. 40 is an elevation of the folding plunger carrying the folders for folding the ends of the wrapper and showing the means for operating said plunger. Fig. 41 is a view of the parts shown in Fig. 40 taken at right angles thereto. Fig. 42 is a section on line 42 of Fig. 40. Fig. 43 is an enlarged sectional view of the folding plunger viewing the same sidewise of the package. Fig. 44 is a similar view showing the parts in different position. Fig. 45 is an elevation of the folding plunger viewing the same endwise of the package. Fig. 46 is a section on line 46 of Fig. 45. Fig. 47 is a view similar to Fig. 45 but showing the parts in different position. Fig. 48 is a section on line 48 of Fig. 47. Fig. 49 is a detail sectional view showing the folders for making the last of the end folds in their up turned position and showing the cam whereby such folders are operated. Figs. 44^a and 48^a are perspective views of the package with the wrapper sheet partially folded, Fig. 48^b is a broken sectional view through one end of the package, and Fig. 49^a is a perspective view of the package after the ends have been completely folded. Fig. 50 is a plan view of the wrapping carrier and means for rotating the carrier and for operating the cam whereby the end folders shown in Fig. 49 are operated. Fig. 51 is a detail plan view of the mechanism for intermittently rotating the wrapping carrier. Fig. 52 is a sectional view taken on line 52 of Fig. 50. Fig. 53 is an elevation of the mechanism for applying paste to the ends of the package for securing the last folded end. Fig. 54 is a detail view of the stop gear by which the paste roll is intermittently rotated. Fig. 55 is a plan view of the parts for operating the paste applying device shown in Fig. 53. Fig. 56 is a plan view of the paste fountain and roll and operating mechanism shown in Fig. 53. Fig. 57 is an elevation of parts shown in Fig. 56 looking in the direction of the arrow 57 of Fig. 53. Fig. 58 is a sectional view of the paste applying mechanism on line 58 of Fig. 53 and showing also the operating cams and connections. Figs. 59, 60 and 61 show the pasting device in successive positions. Fig. 62 is an elevation of the pusher for delivering the completed packages from the wrapping carrier. Fig. 63 is a sectional plan view taken on line 63 of Fig. 62.

Referring to the drawings, the various parts of the machine are supported by a standard A and a table B mounted on the standard A. The machine shown in the drawings is in its general construction and in many of its parts similar to the machine shown and described in my application No. 125,419. In the machine of that application,

however, the charges of cigarettes after being inclosed in a wrapper sheet to form a package are deposited in boxes with charges of cigarette holders, and the wrapper sheet after being folded about the charge of cigarettes is not secured by paste.

The machine shown herein embodying my present invention is, as before pointed out, adapted to form packages by folding wrapper sheets about successive charges of cigarettes and securing the wrapper when thus folded by means of paste or other suitable adhesive. There is thus produced a complete and finished package suitable for the market, and in the machine shown the packages are delivered from the machine as thus completed. Obviously, however, the mechanism for producing such packages might be combined with boxing mechanism or other mechanism for performing further operations on the packages. Features of the present invention also are applicable to and may be employed in other forms of machines for packing cigarettes or other articles.

The cigarettes are fed from a hopper 10 through an opening 11 and through a feed-way 12 a portion of which is inclined downwardly and has a curved delivery end 13 from which the cigarettes pass to a reciprocating carrier or depositing plunger by which they are delivered to a pocket in a carrier which will be termed the "wrapping carrier"; the charges of cigarettes being enveloped in a wrapping sheet while supported by this carrier, as in my application No. 125,419 above referred to. The cigarettes are advanced to the inclined portion of the way 12 by means of a feeding belt or belts 14, the upper or feed run of which belts run horizontally between supporting pulleys 16 and 17. The bottom of the hopper is formed by means of an inclined plate 18 extending to or near the opening 11 and by means of horizontal supporting bars 19 extending beneath the plate 18 and through and beyond the opening 11. These supporting bars extend slightly above the feeding belts 14 so as to support the cigarettes out of contact with the feeding belts as they are advanced from the hopper through the first portion of the way 12. Beyond the end of the bars 19 the feeding belts form the bottom of the way 12 for a short distance, and supporting plates 20 extending concentric to the belt pulleys 16 and slightly above the surface of the belts as they pass about the pulleys are preferably provided. The cigarettes passing through the horizontal portion of the way 12 will thus come in contact with the feeding belts only for a short distance sufficient to cause the cigarettes to be fed from the end of the supporting bars 19 to the inclined portion of the way 12. An oscillating separator 21 is provided for preventing

the cigarettes from becoming clogged and for securing proper feeding of the cigarettes from the inclined bottom of the hopper through the feed-way 12. By this feeding mechanism all danger of excessive pressure on the cigarettes in the inclined portion of the feed-way 12 when the delivery of the cigarettes from the end of the feed-way is stopped, is avoided.

10 The belt pulleys 16 are driven by means of a sprocket chain 24 from a cam shaft 25, and the separator 21 is vibrated by means of a lever 26 rocked against the tension of a spring 27 by means of a spur wheel on the shaft of the pulleys 16.

15 The carrier for receiving the cigarettes from the way 12 and depositing them in the pockets of the wrapping carrier may be of any suitable construction. Preferably and as shown, see Figs. 1 to 10, it is formed by a depositing plunger 30. The machine shown is constructed to form packages of two layers of five cigarettes each and the depositing plunger is preferably formed to

25 receive the two layers of cigarettes to form a charge and then to descend to deposit the two layers of cigarettes at once in one of the pockets of the wrapping carrier. The preferred form of the depositing plunger shown comprises a head 31 carried by a hollow plunger stem 32 mounted to reciprocate vertically in a guide 33 and having downward extensions 34 which form the ends of the cigarette receiving chamber. The head 31 carries horizontally moving slides 35 which carry downwardly extending plates having their lower ends turned inward to form supports 36 and 37. The slides 35 are normally drawn inward toward each other by means of springs 38, and when in their normal inward position, as shown in Fig. 6, the supports 36 and 37 extend inward beyond the inner face of the ends 34 in position to support the cigarettes. The plunger head also preferably carries a presser plate 40 mounted on spring rods 41 and normally held in its upper position, as shown in Fig. 6. The slides 35 are forced outward for withdrawing the supports 36 and 37 and the presser plate 40 operated by means of a wedge shaped plunger head 42 carried by a plunger stem 43 mounted to reciprocate vertically within the plunger stem 32.

In the operation of the machine, after the 55 depositing plunger has deposited a charge of cigarettes, it is moved upward opposite the delivery end of the way 12 with the supports 36 in position to receive a layer of cigarettes. The cigarettes will then be fed by gravity down the way 12 until five have been received on the supports 36. The depositing plunger next moves upward far enough to bring the space above the supports 37 opposite the delivery opening of the 65 way 12 to receive the second layer of five

cigarettes. After the second layer of cigarettes has been received by the plunger, it is moved downward to carry the cigarettes into a pocket of the wrapping carrier, the two stems 32 and 43 at first moving together so that the supports 36 and 37 remain in their inner position. As the plunger head reaches its lowermost position, the plunger stem 43 is given a further movement to cause the head 42 to force the slides 35 apart and withdraw the supports from beneath the ends of the cigarettes, and also to engage the presser plate 40 and force it slightly downward to insure the delivery of the cigarettes and their even packing. The plunger stem 32 then begins to rise, the stem 43 remaining at first in its lowermost position to hold the supports retracted and to retain the presser plate in its pressing position. Then the stem 43 also begins to rise and the depositing plunger is brought back into position to receive the first layer of another charge of cigarettes.

The plunger stem 43 is reciprocated by means of a lever 45 which is oscillated by a 90 pitman 46 having a forked end to straddle the shaft 25 and carrying a roll running in the groove of a cam disk 47, and the plunger stem 32 is held normally in the relation to the stem 43 shown in Fig. 6 by means of a spring 48 and is moved relatively to the stem 43 against the tension of the spring 48 by means of a gear segment 49 which engages a pinion on a shaft 50 which also carries a pinion engaging a rack 51 on the stem 32, the segment 49 being oscillated by means of a cam 52 on the shaft 25 acting on a lever 53 mounted to move with the segment 49.

To prevent injury to the end cigarette remaining in the way 12 by the movement of the depositing plunger past the end of the way, a holding device is preferably provided to engage the end cigarette in the way and hold it out of contact with the plunger during the movement of the plunger. This holding device is preferably formed by a bar or block 55 carried by arms 56 pivoted so as to rock to move the block 55 vertically into and out of engagement with the end cigarette in the way 12, see Figs. 3 and 6. The holding block is formed with an inclined face to engage the end cigarette, whereby when the block is moved down to engage the cigarette it will crowd the same slightly back into the way 12 and away from the path of the plunger. The block is preferably moved into holding position after the delivery of each of the layers of cigarettes to the depositing plunger, and remains in its holding position after the delivery of the second layer of cigarettes during the depositing and return movements of the plunger and until the first layer of the next charge is to be delivered to the plunger. As shown, the hold- 130

ing block is reciprocated by means of a lever 57 connected to one of the arms 55 by a rod 58 and oscillated against the tension of a spring 59 by a cam 60 on the shaft 25, the cam acting on a lever 61 carried by the shaft of the lever 57.

The wrapping carrier may be of any suitable construction, but is preferably a rotating carrier 65 provided with a plurality of radially arranged pockets 66, and mounted on a vertical spindle 67 carried by the standard A, and is given a step by step rotating movement, each movement corresponding to the distance between adjacent pockets. The pockets 66 are preferably formed with open ends and with side walls of suitable height for the purpose of holding up the sides of the wrapper, and the side walls are preferably formed with vertical cuts or grooves 68 extending downward preferably to a distance from the bottom of the pockets slightly less than the thickness of the packages of cigarettes, these openings 68 being for the purpose of receiving correspondingly formed folders for folding down the up-turned sides of the wrappers, as will be hereinafter described.

For giving the carrier a step by step rotation, a plate or disk 70 is secured to the carrier to rotate therewith, as shown in Fig. 52, which disk is formed on its under side with a plurality of radial pockets 71 corresponding in number with the pockets of the carrier, and a rotating arm 72 carrying a roll 73 is mounted in position so that at each rotation of the arm the roll will enter one of the pockets and move the carrier forward one step. A locking segment 74 rotates with the arm 72 to enter peripheral recesses in the disk 70 to lock the carrier in position between its step by step movements. The arm 72 and locking disk 74 are driven from a vertical shaft 75 by a train of gears, as shown in Figs. 50 and 51.

Before a charge of cigarettes is deposited in a pocket of the wrapping carrier a wrapper sheet *x* is fed into position over the pocket so that it will be carried down into the pocket with the cigarettes. Any suitable mechanism may be provided for feeding successive wrapper sheets to position over the pockets. The means shown, however, is preferred and forms a feature of the invention. Such means acts to feed successive wrapper sheets from a pile and includes means for transferring successive top sheets from the pile into position over the pockets of the wrapping carrier and means for supporting the pile of sheets and for presenting successive top sheets of the pile to be engaged by the transferring means.

The wrapper sheets are transferred from the holder by a reciprocating suction transferer 80 mounted to slide on a horizontal slide way 81 and having two suction feet

80^a and 80^b separated so as to permit the depositing plunger 30 to move down between them when the suction head is in its delivering position. The suction feet are provided with perforated bottoms as usual, and such perforated bottoms are preferably provided with parallel ribs 82 for the purpose of insuring but one sheet becoming attached to the transferer at a time. The suction transferer is in communication with a suction box 83 through an opening 84 in the face of the slide-way 81 and an opening 85 in the side of the transferer which moves against the face of the slide-way 81, the opening 85 being of sufficient length so that the interior of the transferer will remain in communication with the suction box throughout the entire movement of the transferer. The suction box 83 communicates with a suitable exhausting apparatus through a passage 86 controlled by a valve 87 operated by a cam 88 on the shaft 25, the valve being carried by a rod 89 having its upper end forked to embrace the shaft 25 and carrying a roll which is engaged by the cam 88, whereby the rod is reciprocated against the tension of a spring 90. The cam 88 is timed to open the valve when the transferer is in its sheet engaging position, shown in Figs. 1 and 11, and close the valve as the transferer comes to its delivery position, shown in Fig. 9.

The wrapper sheets are carried by the suction transferer onto a support 91 formed by a plate extending over the wrapping carrier and having an opening therein of a size and in position to permit the passage of the depositing plunger therethrough. It will be understood that the positions of rest of the wrapping carrier will be such that the pockets 66 will successively be brought to rest in position beneath the depositing plunger and beneath the opening in the supporting plate 91.

As shown, the transferer is reciprocated against the tension of a spring 92 by means of a gear 93 which engages a rack 94 on the transferer, said gear being oscillated by means of a gear segment 95 engaging a pinion fast to the gear 93, and said segment being oscillated by means of a rod 96 one end of which is forked to embrace the shaft 25 and carries a roll running in the groove of a cam 97 on said shaft, and which rod has a collar 98 which engages the forged end of a lever arm 99 carried by the shaft of the segment gear 95. The collar 98 is adjustable for the purpose of adjusting the forward movement and delivery position of the transferer, the amount of return movement, and consequently the sheet engaging position of the transferer, being adjustable by means of an adjusting stop 100.

For supporting the pile of sheets and presenting the same in position to have the successive top sheets taken by the suction tran

ferrer, the sheet holding and presenting mechanism shown in Figs. 17 to 24 is preferably provided. The holder for the pile of sheets comprises a supporting plate 105 and vertical sides 106. The sides 106 are carried by a support or table 107 which is carried by a hollow rod or shaft 108 mounted to move vertically in guides 109. The supporting plate 105 is adapted to move upward independently of the table 107 and sides 106, and for this purpose is carried by a rod 110 mounted to move vertically within the hollow rod 108. Such independent movement of the supporting plate 105 is for the purpose of maintaining the top of the pile of sheets in a constant desired position with relation to the top of the sides 106, and the supporting rod 108 and table 107, and consequently the sheet holder as a whole, are movable vertically to provide for alternately raising the pile of sheets to present the top sheet in position to be engaged by the transferrer and lowering the pile away from the transferrer to permit the sheet which has been grasped by the transferrer to be moved edgewise thereby.

As shown the table 107 is alternately raised and lowered by means of a lever 112 having a forked end embracing and pivotally connected to the supporting rod 108, and which lever is oscillated by means of a rod 113 connected at one end to a lever arm on the shaft of the lever 112 and having its other end forked to embrace the shaft 25 and carrying a roll which runs in a cam groove in the face of a cam disk 114 on the shaft 25.

For feeding the support 105 upward independently of the holder as a whole, a non-positive feeding means is preferably provided. In the preferred construction shown, the rod 110 which carries the supporting plate 105 is provided with a rack 115 with which meshes a pinion 116 on a shaft 117 journaled in a bracket carried by the hollow stem 108. The shaft 117 also carries a flanged disk 120 on the flange of which disk are set clutch pawls 121 connected by springs to a collar 122 mounted to rotate concentrically with, but independently of, the disk 120, and having their inner ends engaging notches in the collar 122. The collar 122 carries a stop arm 123 which is normally held in engagement with an adjustable stop 124 by means of a spring 125. The collar also carries an operating arm 126 in which is mounted a yielding stud 127. A rod 128 is mounted to slide vertically in stationary bearings and pressed upward by a spring 129 by which its upper end is held in engagement with the cam periphery of the cam disk 114. The lower end of the rod 128 is vertically in line with the stud 127 and when the rod is in its normal position, as shown in Fig. 18, the end of the rod is such a distance above the stud 127 that the stud 127 is not engaged

by the end of the rod during the upward movement of the sheet holder. After the sheet holder as a whole has been raised, however, by the operation of the actuating rod 113 and the lever 112, the rod 128 is moved downward by the cam 114, and if the upward movement of the support 105 is not resisted the arm 126 and collar 122 will be thereby oscillated to cause, through the action of the pawls 121, a partial rotation of the disk 120, shaft 117 and pinion 116, whereby the rod 110 and support 105 will be moved upward relatively to the table 107 and sides 106. If the upward movement of the support 105 is resisted, however, so as to overcome the yielding tension of the stud 127, the stud 127 will move under the influence of the rod 128 without causing a corresponding movement of the arm 126. The construction is such, therefore, that at each elevation of the sheet holder the support 105 will be moved upward a distance equal to the maximum distance which may result from the movement of the rod 128 or such part thereof as the support 105 is permitted to move.

Means are provided for sustaining the rod 110 and support 105 in any position to which they have been raised relatively to the hollow stem 108 and table 107. For this purpose, as shown, a second pair or set of pawls 130 is provided to engage the flange of the disk 120, these pawls engaging the opposite edge of the flange from the pawls 121 and being connected by a spring with a stationary collar 131 and having their inner edges engaging notches in said collar.

In order to permit the supporting plate 105 to be lowered at will, as for the purpose of placing wrapper sheets in the holder, the disk is preferably connected to the shaft 117 by means of a clutch disk 132 mounted on the shaft 117 and held to turn therewith while movable longitudinally thereon by means of a pin extending from the disk into a slot in the shaft, as shown in Fig. 20. Said clutch disk is formed with teeth to engage corresponding teeth on the end of a sleeve by which the disk 120 is carried, and is normally held in clutching position, as shown in Fig. 20, by means of a spring 133. By drawing the clutch disk 132 outward, the shaft will be released from the disk 120 and may then be turned to move the supporting plate 105 downward or upward to the desired position.

In the operation of the machine, a pile of wrapper sheets having been placed in the holder and the holder being in the position shown in Figs. 18, 22 and 23, as the transferrer, after making its return movement, comes into position above the holder, as shown in Fig. 1, the lever 112 will be oscillated to elevate the holder toward the transferrer to the position shown in Figs. 21 and

24, thereby raising the pile of sheets to present the top of the pile in position to have the top sheet grasped by the transferrer. The rod 128 will then be moved
 5 downward against the stud 127 to cause the rod 110 and supporting plate 105 to be moved upward to raise the pile until the top sheet is pressed against the under face of the feet 80^a and 80^b of the transferrer.
 10 The exhaust valve 87 being then open, the top sheet will be sucked against the under face of the transferrer feet and the table 107 will then be moved downward again to lower the pile of sheets and the holder sides 106
 15 downward away from the transferrer, and the transferrer then will move forward to carry the sheet into position over and deliver it on the support 91. On the return of the transferrer to engaging position, the sheet
 20 holder will be again moved upward and the supporting plate again forced upward relatively to the sides 106 a distance corresponding to the thickness of a wrapper sheet. It will be seen that the top sheet of a pile will
 25 thus always be raised against the suction face of the transferrer and the pile then lowered away from the transferrer for the forward movement thereof, the upward movement of the supporting plate 105 relatively to the holder as a whole being always
 30 just sufficient to raise the pile the required amount whatever may be the thickness of the sheets.

The provision of the ribs 82 on the suction
 35 face of the transferrer will usually be sufficient to insure the taking of but a single sheet at a time from the pile. As an additional insurance of this result, however, a pair of spring pressed bars 135 are provided pivoted to the table 107 and extending
 40 upward into position to have their upper ends engage and press against the edges of the top sheets of the pile at opposite sides of the pile, said bars being preferably connected to move in unison by a link 136 and
 45 under tension to move inward by means of a spring 137. The upper ends of the rods are formed with serrated sheet engaging faces as by being screw-threaded for a short distance, as shown. The effect of such serrated
 50 ends of the rods pressing against the edges of the upper sheets of the pile is to slightly separate the edges and permit the entrance of air between the upper sheets, thereby aiding the separation of the top sheet from the
 55 pile when drawn against the suction face of the transferrer.

A wrapper sheet having been positioned on the support 91, as the depositing plunger
 60 descends with a charge of cigarettes the wrapper sheet will be carried downward through the opening in the support 91 and into the pocket of the wrapping carrier, its central portion being beneath the cigarettes
 65 and its sides bent upward about the ciga-

rettes and plunger, as shown in Fig. 8. After a charge of cigarettes has thus been deposited in one of the pockets 66 with the wrapper *x* partially folded thereabout, the
 70 wrapping carrier is moved forward one step to bring another pocket 66 into position to receive a charge of cigarettes and to carry the pocket with the preceding charge toward the folding devices whereby the folding of
 75 the wrapper about the cigarettes is completed. Such folding devices include means for folding down the upstanding sides of the wrapper and overlapping them on the top of the charge of cigarettes and means for folding the extending ends of the wrapper to close the ends of the package.

The means for folding the upstanding sides of the wrapper sheet down over the top of the charge of cigarettes are substantially as shown in my said application No. 125,419, 85 and include a stationary folder for folding down the forward side *x'* of the wrapper sheet and a moving folder for folding down the rearward side *x''*. The moving folder 140 is formed with downwardly extending
 90 plates 141 adapted to enter the grooves 68 in the blocks the ends of which form the sides of the pockets 66, and is carried by a horizontally swinging arm 142 mounted on a spindle 143 which is splined to slide
 95 vertically in a sleeve 144 journaled in a bracket 145, and the arm 142 is also preferably rotatably and slidably mounted on an upward extension of the spindle 67 on which the
 100 wrapping carrier is mounted. The sleeve 144 is oscillated for swinging the arm 142 to give the folder 140 a movement concentric with the movement of the wrapping carrier by means of a segment gear 147 which
 105 meshes with a gear on the sleeve 144 and is oscillated by means of a peripheral cam groove in a cam disk 148 on the shaft 25, the segment carrying a cam stud which runs in said cam groove. The folder is also reciprocated vertically for permitting it
 110 to clear the upturned sides of the wrappers as it moves backward, by means of a lever 150 one arm of which has a forked end extending into a groove in the neck of the arm 142, and the other arm of which is connected
 115 with a pitman 151, the other end of which pitman is forked to embrace the shaft 25 and carries a cam roll running in contact with a peripheral cam 152 on the shaft 25 by which the pitman and lever are oscillated
 120 against the tension of a spring 153.

The cams 148 and 152 are so formed that the folder arm having been raised and swung backward to the position shown in
 125 Figs. 1 and 25, will be maintained in that position until the wrapping carrier has made a forward movement, and then the arm will be moved downward to project the plates 141 into the grooves 68 and will then be swung forward to the position shown in 130

Fig. 37, thereby turning the upturned side x^2 of the wrapper sheet downward over the top of the cigarettes as shown in said figure. The folder will then remain at rest to maintain the folded side of the wrapper in its folded position until the carrier starts on its next movement, after which the arm will be raised and swung backwardly to carry the folder back to the position shown in Figs. 1 and 25 to allow the next pocket with its upturned wrapper sides to pass beneath it.

The forward side x' of the wrapper is folded down upon the side x^2 by means of a stationary folder formed to engage the upturned side x' as the carrier pocket advances from the position in which the side x^2 has been folded down. This stationary folder is formed by plates 155 projecting downwardly into the slots 68 of the carrier and extending preferably from the position of rest of the pocket at which the sides x' and x^2 are folded past the next two positions of rest of the pockets. The plates 155 are preferably stationary and are supported by means of a bracket 156 secured to the spindle 67. This bracket as shown is in the form of a plate having a central opening 157, as shown in Figs. 25 and 26, for permitting the end folding devices to be moved downward therethrough into operating position.

Before the last folded side x' of the wrapper is folded down onto the first folded side x^2 a line of paste is applied to the edge thereof. Any suitable pasting mechanism may be provided for this purpose, but the construction shown is preferred and forms a part of the invention. Such mechanism comprises a horizontally extending pasting blade 160 carried by a slide 161 mounted to move vertically on a guide-way 162, which slide is reciprocated to carry the paster from its paste receiving position, shown in Figs. 33 and 34, down to its paste applying position, shown in Figs. 35 and 36, by means of a lever 163 which carries a cam roll running in the groove of a cam disk 164 on the shaft 165, said cam being timed to bring the paster into pasting position while the wrapping carrier is at rest. When in its pasting position, the pasting blade 160 extends into the pocket 66 of the wrapping carrier which is just in advance of the stationary folder 155 and close to the upstanding side x' of the wrapper sheet in said pocket. The pasting face of the pasting blade is preferably inclined, as shown, and a pair of pivoted fingers 166 are provided for pressing the edge of the wrapper against the pasting blade. These pressing fingers 166 are carried by a shaft mounted on the slide 161 and are oscillated by means of a gear segment 167 pivoted to the slide and engaging a pinion on said shaft, and by which the pressing fingers are swung toward the paster

after the paster has been moved down into pasting position and are swung away from the paster before paste is applied thereto.

The segment is oscillated to swing the fingers against the tension of a spring 170 by means of a lever 171 mounted on the slide 161. As the slide moves upward, a finger 172 projecting from the upwardly extending arm of the lever is engaged by a stationary inclined cam 173 and the upper end of the lever is thereby thrown inward, causing the lower end of the lever to move outward away from the slide to move the segment and swing the pressing fingers against the tension of the spring 170 to their open position, as shown in Fig. 33. As the upper end of the lever makes its inward movement it moves past a spring latch 174 mounted on the slide 161 for the purpose of holding the lever in the position to which it is moved by the cam 173. The lever is then held in this position by the latch 174 during the downward movement of the slide, but just before the slide reaches the limit of its downward movement the latch 174 engages a stationary stop 175 and is thereby moved to release the end of the lever 171, whereupon the pressing fingers 166 are swung inward by the spring 170 to the position shown in Fig. 36, thereby carrying the edge of the upstanding side of the wrapper against the pasting blade, as shown in Fig. 36. The pressing fingers then remain in this position during the upward movement of the slide until the finger 172 is again engaged by the cam 173 and the upper end of the lever thrown inward again to position to be engaged and held by the latch 174. The latch 174 is preferably provided with an adjustable screw 176 for engaging the stop 175, thereby enabling the time of operation of the pressing fingers 166 to be adjusted as desired. For adjusting the amount of closing movement of the pressing fingers 166, an adjustable stop 177 is preferably provided on the lever 171 for limiting the movement of the downwardly extending end of the lever toward the slide.

Any suitable means may be provided for applying paste to the paster. As shown, a sliding and rotating paste brush 180 is provided carried by a shaft 181 which is reciprocated to carry the pasting brush from its paste receiving to its paste applying position by means of a lever 182, said lever being oscillated by means of a pitman 183 having one end pivoted to an arm of the lever and having its other end forked to embrace the shaft 75 and carrying a cam roll running in the groove of a cam 185 on said shaft. The shaft 181 is splined to slide in a sleeve 187 which is driven from a shaft 188 through beveled gears 189. The paste is supplied to the paste brush by means of a paste roll 190 mounted to rotate partly in a

fountain 191, said paste roll being continuously and slowly rotated from the vertical shaft 75 through shafts 192, 193, and 194 connected by beveled gears, as shown in Fig. 1, the shaft 194 being connected by beveled gears 195 with the shaft of the paste roll.

The pasting brush is preferably rotated intermittently, being given a partial rotation when in its outward or paste taking position to take paste from the roll 190 and a further partial rotation when in its inward or paste applying position to apply paste to the paster. For this purpose, the shaft 188 is shown as driven from a short shaft 196 through beveled gears, which shaft 196 is intermittently rotated by means of a stop gear 197, as shown in Fig. 1, from the shaft 165, such stop gear being formed to give the beveled gears 196 a partial rotation, then hold it stationary, then drive it to complete a single rotation and again hold it stationary. In the operation of this part of the machine, the pasting brush 180 having been given a partial rotation while in its outward position, shown in Fig. 30, to take paste from the pasting roll 190, the shaft 181 is moved endwise to carry the pasting brush to its paste applying position, and is then given another partial rotation to cause the brush to move against the pasting blade 160, as shown in Fig. 34. The slide 161 is then moved downward to carry the paster down into pasting position, as shown in Fig. 35, after the wrapping carrier has made one of its forward movements. As the slide reaches the end of its downward movement, the pressing fingers swing downward and against the paster to carry the edge of the upstanding side α' of the wrapper against the face of the paster, as shown in Fig. 36. The slide 161 then rises to carry the paster upward out of the pocket of the carrier, the edge of the wrapper wiping across the face of the paster as the latter rises away therefrom. The pasting brush is meanwhile carried back by the return endwise reciprocation of its shaft to its paste receiving position and is again partially rotated to take paste from the roll 190 before being again moved endwise to its paste applying position. As the wrapper carrier makes its next forward movement, the upstanding side α' of the wrapper is folded down by the folding plates 155, as shown in Fig. 38, and its pasted edge pressed against the previously folded side α'' of the wrapper. As the pasted edge of the wrapper moves against the plates 141 of the moving folder 140 when it is being folded down, as shown in Fig. 38, the forward edges of such plates are preferably beveled off, as indicated, so as to lessen the extent of surface with which the pasted edge of the wrapper will come in contact. After the upturned sides of the wrapper have been folded down over the cigarettes, the carrier

makes another movement and the package is brought into the position of rest of the pockets at which the ends of the wrapper are folded to complete the formation of the package. Any suitable folding means may be employed for this purpose, but the means shown, which are substantially the same as shown in my said application No. 125,419, are preferred.

Referring first to the devices for folding down the top portions of the extending ends of the wrappers and folding in the side portions, shown in Figs. 1, 2 and 40 to 49, such devices comprise a carrying plunger head 200 by which the folders are carried and an operating plunger head 201. The operating plunger head is carried by a hollow plunger stem 202 mounted to reciprocate vertically in a guide 203 (see Fig. 40), and the carrying plunger head is carried by a plunger stem 204 mounted to reciprocate vertically within the plunger stem 202. Pivoted folders 205 for folding down the top portions of the extending ends of the wrappers are carried by downward extensions 206 of the carrying plunger head. Such folders are normally held in their upturned or retracted position, as shown in Fig. 43, and are connected by links 207 to levers 208 pivoted to the carrying plunger head and formed with cam slots through which pass pins 209 carried by the operating plunger head. Such cam slots are formed so that when the operating plunger head moves downward relatively to the carrying plunger head the levers 208 will be swung downward to swing the folders 205 downward and inward to the position shown in Fig. 44, and the upper portions of the cam slots are formed so as to permit a considerable movement of the operating plunger head with relation to the carrying plunger head without affecting the position of the folders 205.

For folding inward the side portions of the extending ends of the wrapper, two pairs of folding wings 210 are provided pivoted to extensions 211 of the carrying plunger head, the folding wings 210 of each pair carrying plates formed with oppositely inclined grooves 212 into which project cam studs on levers 213 pivoted to the carrying plunger head and provided with gear segments each of which meshes with a gear segment 214 carried by a lever 215 also pivoted to the carrying plunger head. The levers 215 are formed with cam slots through which pass pins on arms 216 of the operating plunger head. The upper portions of these cam slots are formed so that when the operating plunger head moves upward with relation to the carrying plunger head and with the pins in the upper portions of these slots, the levers 215 will be swung upward thereby swinging the levers 213 inward and carrying the folding wings 210 from the po-

sition shown in Figs. 45 and 46 to that shown in Figs. 47 and 48. The lower portions of the cam slots in the arms 215 are extended in a direction such, that after the folding wings 210 have been returned to their normal or outer position by a downward movement of the operating plunger head with relation to the carrying plunger head the operating plunger head may then make a considerable further downward movement with relation to the carrying plunger head without producing any movement of these folding wings.

The carrying and operating plunger heads are normally held in a raised position so as to leave a clear way for the projecting ends of the wrapper as a pocket 66 containing a package comes into the position of rest beneath these folding plungers, and are reciprocated for carrying the folders into operating position and for giving them their folding movements by the following means.

The plunger stem 202 is reciprocated by means of a lever arm 220 carried by a short shaft which also carries an arm 221 to which is connected one end of a pitman 222 the other end of which is forked to embrace the cam shaft 165 and carries a cam roll running in the groove of a cam 223 on said shaft; and the plunger stem 204 is reciprocated by means of one arm of a lever 225 the other arm of which carries a cam roll running in the groove of a cam disk 226 on the shaft 165. The cams 223 and 226 are formed and timed to give the plunger stems the required movements to actuate the folders as follows.

After a package in one of the pockets 66 of the wrapping carrier has been brought into position to have the projecting ends of the wrapper folded, the plunger stems 202 and 204 are moved downward together to carry the carrying and operating plunger heads downward to the position shown in Fig. 43. The stem 204 then continues its downward movement to move the operating plunger head down relatively to the carrying plunger head, and thereby cause the end folders 205 to swing inward to the position shown in Fig. 44, folding the upper portions of the ends of the wrapper down and inward, as shown in Fig. 44^a. The operating plunger head is then moved upward while the carrying plunger head remains stationary and the folders 205 are swung back to their normal position, and the upward movement of the operating plunger head continuing, the folding wings 210 are swung inward from the position shown in Figs. 45 and 46 to that shown in Figs. 47 and 48, thereby folding in the side portions of the extending ends of the wrapper, as shown in Fig. 48^a. Then the carrying plunger head is moved upward, thereby causing the folding wings 210 to be swung outward to their normal

position, and the parts are returned to the raised position shown in Figs. 40 and 41.

For folding upward the bottom portions of the extending ends of the wrappers, the wrapping carrier is provided with pivoted folders 230, a pair for each of the pockets 66, which folders normally lie with their folding faces flush with the surface of the carrier, as shown in Figs. 40, 43 and 44, in which position they are held by means of springs 231. After the top and side portions of the extending ends of the wrapper have been folded, as shown in Fig. 48^a, the folders 230 are swung upward to the position shown in Fig. 49 thereby folding the bottom portions of the extending ends of the wrapper upward against the ends of the package, as shown in Fig. 49^a. The folders 230 are operated by means of a wedge cam 232 arranged beneath the carrier and in position to engage downwardly extending arms 233 of the folders.

In order that the folding movement of the folders 230 shall follow closely the withdrawing movement of the folding wings 210 so as not to give time for the side folds to spring out, the cam 232 is moved in a direction contrary to the movement of the wrapping carrier to cause it to actuate the folders 230 before the carrier begins its next movement after the folding of the top and side portions of the extending ends of the wrapper. For this purpose, the cam 232 is carried by an arm 234 supported by means of a collar 235 to swing concentrically with the wrapping carrier, and the outer end of the arm carries a segment gear which meshes with a similar gear 236 carried by a shaft 237 which also carries an arm connected to one end of a pitman 238, the other end of which is forked to embrace the shaft 75 and carries a cam roll running in the groove of a cam disk 239 on the shaft 75. The cam 239 is formed to cause the wedge shaped cam 232 to be moved forward after the folding wings 210 have operated, and thereby to actuate the folders 230 to fold up the bottom portions of the extending ends of the wrapper, and the cam 232 is extended, as shown in dotted lines in Fig. 50, so as to hold the folders 230 in their upturned position as the carrier makes its next movement, and during such movement the cam 232 is given its return movement in the direction of the movement of the carrier so as to retract its wedge shaped end to permit the folders 230 of the next pocket to come into folding position without engaging the cam 232. By having the folders 230 maintained in their upturned position during the movement of the carrier following their operation, the folded ends of the package are held in place and a partial set is given to the folded ends of the wrapper.

The up-folded bottom portions of the ends of the wrapper are secured in their folded position by means of paste or other suitable adhesive to permanently close the folded ends of the package. The paste is preferably applied after the pocket of the carrier containing the package has been moved to its next position of rest beyond the position at which the ends of the wrapper are folded, the last folded or bottom portions of the ends of the wrapper being allowed to spring outward when the pocket is in this position for the purpose of having the paste applied, and such portions are thereafter folded up again and pressed against the ends of the package and held in such position for a sufficient time to allow the paste to set sufficiently. The cam plate 232 is preferably extended to and beyond the position of rest of the pockets at which the paste is applied, and is formed with a narrowed portion 240 of such width that as the carrier comes to rest the folders 230 are allowed to swing outward to an intermediate position, as shown in Figs. 60 and 61, thereby permitting the last folded portions of the ends of the wrapper to spring outward away from the ends of the package, as shown in said figures. Paste is then applied to the ends of the package, and as the cam plate 232 is moved in the direction of the arrow on Fig. 50 for folding upward the bottom portions of the ends of the wrapper of the package then in folding position, the folding plates 230 of the pocket now in the end pasting position will be swung back again against the ends of the package to return the bottom portions of the extending ends of the wrapper to their folded position and press them against the pasted portions of the ends of the package, thereby completing the formation of the package. The cam plate 232 extends for a suitable distance beyond the narrowed portion 240 for the purpose of holding the folders in their up-turned position and the last folded portions of the ends of the wrapper pressed against the ends of the package as the carrier makes its next forward movement.

Any suitable means may be employed for applying paste to the ends of the package, but the means shown is preferred and forms a part of the invention. Such pasting means comprises a pair of pasting plates or pasters 250 carried by arms 251 pivotally mounted on a plunger head 252 which forms a carrier for the pasters and is arranged to reciprocate both horizontally and vertically, being for this purpose carried by a hollow plunger stem 253 mounted to reciprocate vertically in a horizontally moving carriage 254. The paster arms 251 are oscillated between the positions shown in Figs. 60 and 61 by means of slides 255 mounted in the plunger head and held normally in their outward position

against the tension of a spring 256 by means of the head or end 257 of a plunger stem 258 mounted to reciprocate vertically in the hollow plunger stem 253, the plunger head 257 being of double wedge shape as shown.

The carriage 254 is mounted to slide on shafts 260 and 261, which shafts have splined thereon, but free to move with the carriage, pinions 262 and 263 respectively. The pinion 262 is in position to engage a rack 264 on the plunger stem 258, and the pinion 263 is in position to engage a rack 265 on the hollow plunger stem 253. The plunger stems may thus be reciprocated independently of each other by the rocking of the shafts 260 and 261, while at the same time the carriage is free to slide on the shafts for moving the plunger head and pasters horizontally.

As shown, the shafts 260 and 261 carry pinions which mesh with segment gears 266 and 267 respectively, and these segment gears are oscillated through connecting rods 268 and 269 by levers 300 and 301 respectively. The lever 301 is fast on a rock shaft 302 which carries at its other end an arm 303 which carries a cam roll running in the groove of a cam disk 304 on the shaft 165; and the lever 300 is fast to a sleeve mounted on the shaft 302 and free to rock thereon and which carries an arm 305 having a cam roll running in the groove of a cam disk 306 on the shaft 165. The carriage 254 is reciprocated by means of a lever 307 connected to the carriage by a link and having a cam stud running in the groove of a cam disk 308 on the shaft 75.

The cams 304, 306 and 308 are timed so as to rock the shafts 260 and 261 and reciprocate the carriage to operate the plunger heads and pasters as follows:—The wrapping carrier having been moved to bring a package into position to have the paste applied to the ends thereof, and the pasting mechanism being in the position shown in Fig. 53, the plunger heads 252 and 257 are first moved downward together until the pasters are in position horizontally in line to the ends of the package to which the paste is to be applied. Then the plunger head 257 is given a further downward movement to allow the slides 255 to move inward under the tension of the spring 256, thus swinging the arms 251 inward to carry the pasters into contact with the portions of the wrapper folded against the ends of the package, as shown in Fig. 61, the bottom or last folded portions of the ends of the wrapper being at this time in the position shown in Figs. 60 and 61. The plunger head 257 then moving farther downward, the slides 255 are again forced outward to swing the arms 251 and the pasters 250 outward again to the position shown in Fig. 59. The plunger heads 252 and 257 are then raised together

and the carriage is caused to slide outwardly to bring the pasting device into position over the paste supply means by which paste is supplied to the pasters. The plunger head 252 is then moved downward while the plunger head 257 remains stationary, the slides 255 being thus allowed to move inward again to swing the arms 251 to carry the pasters into contact with the paste supplying surfaces. The plunger head 257 then moves upward to force the slides 255 and the arms 251 outward again and the two plunger heads then move upward together and the carriage is then caused to slide inward to return the pasting device to the position shown in Figs. 53 and 60.

For supplying paste to the pasters 250, a paste supply roll or cylinder 310 is provided to rotate partly in a fountain 311. The pasters take paste from the end surfaces of the roll 310, and in order to secure a layer of paste of proper thickness on the ends of the roll, adjustable plates 312 are mounted in position to be adjusted toward or away from the ends of the roll, as shown in Fig. 56. Such scraper plates 312 are also preferably adjustable in a direction parallel with the end faces of the roll, as by being carried by an adjustable plate 313, as shown in Figs. 56 and 57. The pasting roll is preferably rotated intermittently, being given a partial rotation at each movement and being stationary while the pasters 250 are taking paste therefrom. As shown, the pasting roll is driven from the shaft 75 by means of beveled gears 315, shaft 316, stop gear 317, shaft 318, beveled gears 319, shaft 320 and beveled gears 321. Paste having been applied to the ends of the package while the last folded portions of the ends of the wrapper are partially unfolded, such last folded portions are, as before stated, again folded against and pressed against the ends of the package by the folders 230 and the wrapping carrier again makes a forward movement to bring another package into position to have paste applied to the ends thereof and to advance the completed package toward the ejecting device by which the packages are delivered from the carrier. As shown, the ejecting device is located at the second position of rest of the carrier pockets beyond the end pasting devices.

Any suitable means may be provided for delivering the packages from the wrapping carrier, but the preferred means shown consists of a pusher carried by a slide 320 mounted to slide radially of the carrier on a slide way 321. The pusher 322 is preferably pivotally connected to the slide 320 so that when in its normal retracted position shown in Fig. 62, it will ride freely over the strengthening ribs 323 shown on the upper side of the wrapping carrier. The pusher is given its delivery and return

movements by means of a segment gear 324 engaging a rack on the slide 320 and operated by a pitman 325 pivotally connected at one end to an arm of the gear segment and having its other end forked to embrace the shaft 25 and provided with a cam roll running in the groove of a cam 326 on the shaft 25. The cam 326 is timed to give the slide 320 and pusher 322 an outward and return movement during each period of rest of the wrapping carrier, and by such outward movements, the packages in the carrier pockets which come to rest in line with the pusher are successively delivered from the carrier. Any suitable means may be provided for receiving the packages when thus delivered from the carrier.

The shaft 165 is shown as driven by means of a driving pulley 340 mounted free to rotate thereon and adapted to be clutched to a sleeve 341 also mounted free to rotate on the shaft 165. The sleeve 341 carries a gear meshing with a gear 342 on a short shaft which also carries a gear meshing with a gear 343 on the shaft 165. For clutching the sleeve 341 to the driving pulley, it is shown as mounted to slide on the shaft and provided with a clutching disk 344, the sleeve being moved to carry the clutching disk into and out of clutching position by means of a lever 345 suitably connected with a treadle 346. The shaft 25 is driven from the shaft 165 by beveled gears, as shown in Fig. 2, and the shaft 75 is also driven from the shaft 165 by beveled gears, as shown in Fig. 2.

The general operation of the machine will be understood from the description already given and need not be further set forth.

It will be understood that various changes and modifications may be made in the construction and arrangement of the parts as shown and to which the foregoing description has been mainly confined, and that the invention is not to be limited to the exact constructions, arrangements and combinations shown but includes various changes in and departures therefrom within the claims. It will be understood, also, that parts of the machine shown may be used independently of other parts or in connection with other machines.

What is claimed is:—

1. In a packaging machine, the combination of means for presenting charges of articles or material with wrapper sheets folded about three sides of the charges and the sides of the wrapper upstanding, means for folding the upstanding sides of the wrappers down to overlap over the charges, means for applying paste to one of the sides of the wrappers while it is upstanding, means for folding the extending ends of the wrappers to close the ends of the packages, and means for applying paste to portions of the ends of

the wrapper folded against the partially closed ends of the package for securing the last folded portions of the extending ends of the wrappers, substantially as described.

5 2. The combination of a carrier having a plurality of pockets for receiving charges of articles or material with wrapper sheets folded about three sides of the charges and the sides of the wrapper upstanding, means
10 for folding the upstanding sides of the wrappers down to overlap over the charges, means for applying paste to one of the sides of the wrapper while it is upstanding for securing the overlapping sides of the wrap-
15 pers, means for folding the extending ends of the wrappers to close the ends of the packages, and means for applying paste to portions of the ends of the wrapper folded against the partially closed ends of the pack-
20 age for securing the last folded portions of the extending ends of the wrappers, substan- tially as described.

3. The combination of a carrier, a feed- way from which articles are received by the
25 carrier, means for moving the carrier past the end of the feed-way, a holding device having an inclined bearing face for engaging the end article in the feed-way to crowd it back slightly into the feed-way, and means
30 for controlling the operation of said hold- ing device to cause it to be moved into op- erative position and held in operative posi- tion during the movement of the carrier past the end of the feed-way, substantially as
35 described.

4. The combination of a carrier, a feed- way from which articles are received by the carrier, means for moving the carrier past
40 the end of the feedway, a reciprocating hold- ing block 55, and means for reciprocating the block 55 to engage the end article in the feedway as the carrier moves past the end of the feedway, said block having an inclined
45 engaging face for crowding the end article back into the feedway, substantially as de- scribed.

5. The combination of a depositing plun- ger formed to carry a plurality of cigarettes or similar articles arranged in a layer side
50 by side, an inclined feedway through which the cigarettes move sidewise and from which they are received by the depositing plunger, a reciprocating holding block 55, and means for reciprocating the block to engage the end
55 cigarette in the feedway as the plunger moves past the end of the feedway, said block having an inclined engaging face for crowding the end cigarette back into the feedway, substantially as described.

6. In mechanism for feeding cigarettes or similar articles, the combination of a hopper
60 10 having a forwardly and downwardly in- clined stationary bottom, an oscillating sep- arator 21, a feedway leading from the hop- per, and a feeding device acting on the arti-

cles in the feed-way, substantially as de- scribed.

7. In mechanism for feeding cigarettes or similar articles, the combination of a hopper
70 10 having a forwardly and downwardly in- clined stationary bottom, an oscillating sep- arator 21, a feedway 12 leading from the hop- per and having a downwardly inclined por- tion, and a substantially horizontal portion between its downwardly inclined portion
75 and the hopper friction feeding means for engaging articles in a portion only of the horizontal portion of the feedway, and a carrier for receiving the articles from the feedway intermittently, substantially as de-
80 scribed.

8. The combination of a hopper 10 having a forwardly and downwardly inclined bot- tom, an oscillating separator 21, a feedway 12 leading from the hopper and having a
85 downwardly inclined portion, friction feed- ing means for engaging articles in a portion only of that part of the feedway between its inclined portion and the hopper, a carrier for receiving the articles from the feedway
90 intermittently, and means for holding the end article in the feedway out of contact with the carrier as the carrier moves past the end of the feedway, substantially as de-
95 scribed.

9. The combination of a hopper 10, feed- way 12 extending from the hopper and hav- ing a downwardly inclined portion, feed-
100 belt 14, and supports 19 and 20 for holding the articles out of contact with the belt ex- cept for a portion only of that part of the feedway between its inclined portion and the hopper, substantially as described.

10. The combination of a carrier having a plurality of pockets for receiving charges
105 of articles or material with wrapper sheets partially folded about the charges, a folder reciprocating longitudinally of the direction of movement of the carrier for folding down the rearward sides of the wrappers,
110 means for raising the reciprocating folder to cause it to clear the upturned sides of the wrappers as it is moved backward, means for applying paste to the forward sides of the wrappers, and a folder for folding down
115 the forward sides of the wrapper as the pockets are advanced, substantially as de- scribed.

11. The combination of the pasting blade 160, reciprocating slide 161 carrying the
120 blade 160, pressing fingers 166 pivoted on the slide 161, lever 171 pivoted on said slide and connected with the pressing fingers 166, and means for actuating said lever to cause the pressing fingers to move toward the
125 pasting blade when the slide has moved to carry the pasting blade into pasting position and to move away from the pasting blade to permit paste to be applied thereto,
130 substantially as described.

12. The combination of the pasting blade 160, reciprocating slide 161 carrying the blade 160, pressing fingers 166 pivoted on the slide 161, lever 171 pivoted on said slide and connected with the pressing fingers 166, a cam 173 for moving said lever as the slide moves upward to cause the pressing fingers to be moved away from the pasting blade, a latch 174 for holding the lever 171 as the slide moves downward, means for throwing the latch to release the lever when the slide has moved to carry the pasting blade into pasting position, and means for causing the pressing fingers to move toward the pasting blade when the lever 171 is released, substantially as described.

13. The combination of the reciprocating pasting blade 160, rotary pasting brush 180 for applying paste to the pasting blade, means for supplying paste to the pasting brush, means for reciprocating the pasting brush longitudinally of its axis between the pasting blade and the paste supply means, and means for rotating the brush to take paste from the paste supply means and supply paste to the pasting blade, substantially as described.

14. The combination of the reciprocating pasting blade 160, rotary pasting brush 180 for applying paste to the pasting blade, means for supplying paste to the pasting brush, means for reciprocating the pasting brush longitudinally of its axes between the pasting blade and the paste supply means, and means for intermittently rotating the brush to apply paste to the pasting blade and to take paste from the paste supply means, substantially as described.

15. The combination of a carrier having a plurality of pockets for receiving charges of articles or material with wrapper sheets partially folded about the charges, means for folding the upstanding sides of the wrappers to overlap on the articles, a paster reciprocating transversely to the direction of movement of the carrier for applying paste to one of the sides of the wrapper before it is folded, a pasting device reciprocating transversely to the direction of movement of the paster for applying paste thereto, and means for supplying paste to the pasting device, substantially as described.

16. The combination of means for advancing a package with the wrapper ends unfolded, end folders for folding the portions of the wrapper ends extending from three sides of the package, pasting means located beyond said folding means for supplying paste to portions of the ends of the wrapper folded against the partially closed ends of the package and to which the package is advanced from said end folders, and folders for folding the remaining portions of the ends of the wrapper against the

pasted ends of the package, substantially as described.

17. The combination of means for advancing a package with the wrapper ends unfolded, end folders for folding portions of the extending ends of the wrapper, pasting means located beyond said folding means for applying paste to portions of the ends of the wrapper folded against the partially closed ends of the package and to which the package is advanced from said end folders, and folders for folding the remaining portions of the ends of the wrapper against the pasted ends of the package, substantially as described.

18. The combination of means for supporting a package with the wrapper ends unfolded, end folders for folding portions of the extending ends of the wrapper, means for folding the remaining portions of the ends of the wrapper against the ends of the package then allowing said last folded portions to spring outward from the ends of the package and finally again folding said portions against the ends of the package, and pasting means for applying paste to the partially closed ends of the package when said last folded portions of the wrapper ends have been allowed to spring outward, substantially as described.

19. The combination of means for supporting a package with the wrapper ends unfolded, end folders for folding portions of the extending ends of the wrapper, means for folding the remaining portions of the ends of the wrapper against the ends of the package then allowing said last folded portions to spring outward from the ends of the package and finally again folding said portions against the ends of the package, and pasting means for applying paste when said last folded portions of the wrapper ends have been allowed to spring outward for securing said portions to the ends of the package, substantially as described.

20. The combination of a carrier for advancing a package with the wrapper ends unfolded, end folders for folding the portions of the wrapper ends extending from three sides of the package, end folders moving with the carrier for folding the remaining portions of the wrapper ends against the ends of the package, means for actuating said last mentioned folders whereby after being given a folding movement they are partially retracted to allow the last folded portions of the wrapper ends to spring away from the ends of the package and are then given a second folding movement to again fold said portions of the wrapper ends against the ends of the package, and pasting means for applying paste while said folders are partially retracted for securing the last folded portions of the wrapper ends to the

ends of the package, substantially as described.

21. The combination of a carrier for advancing a package with the wrapper ends unfolded, end folders for folding the portions of the wrapper ends extending from three sides of the package, pasting means located beyond said end folders for applying paste to portions of the ends of the wrapper folded against the partially closed ends of the package, and end folders for folding the remaining portions of the wrapper ends against the pasted ends of the package, substantially as described.

22. The combination of a carrier for advancing a package with the wrapper ends unfolded, end folders for folding the portions of the wrapper ends extending from three sides of the package, pasting means located beyond said end folders for applying paste to the partially closed ends of the package, end folders moving with the carrier for folding the remaining portions of the wrapper ends, and means for actuating said last mentioned folders to fold said portions of the wrapper ends against the pasted ends of the package and to hold said portions pressed against the ends of the package as the package is advanced from the pasting means, substantially as described.

23. The combination of a carrier for advancing a plurality of packages with the wrapper ends unfolded, end folders to which the packages are advanced by the carrier for folding the portions of the wrapper ends extending from three sides of the package, pasting means located beyond said folders for applying paste to the partially closed ends of the package, a plurality of sets of folders carried by the carrier for folding the remaining portions of the extending ends of the wrapper, means for actuating said last mentioned folders to fold said remaining portions of the wrapper ends then to allow said portions to spring away from the ends of the package for the application of paste to the ends of the package and then to again fold said portions of the wrapper ends against the ends of the package, substantially as described.

24. The combination of a carrier for advancing a plurality of packages with the wrapper ends unfolded, end folders to which the packages are advanced by the carrier for folding the top and side portions of the extending ends of the wrapper, pasting means located beyond said folders for applying paste to the partially closed ends of the package, pivoted folders 230 carried by the carrier for folding up the bottom portions of the extending ends of the wrapper, and means for actuating said folders to fold the bottom portions of the extending ends of the wrapper after the top and side portions have been folded then to allow said bottom

portions to spring outward for the application of paste to the ends of the package and then to again fold said portions against the ends of the package and to hold said portions pressed against the ends of the package as the package is carried beyond the pasting means, substantially as described.

25. The combination of a carrier for advancing a plurality of packages with the wrapper ends unfolded, end folders for folding the top and side portions of the extending ends of the wrapper, pasting means located beyond said folders for applying paste to the partially closed ends of the package, pivoted folders 230 carried by the carrier for folding up the bottom portions of the extending ends of the wrapper, and a cam 232 for actuating the folders 230, said cam being formed with a narrowed portion 240 to allow the folders to swing outward and permit the bottom portions of the ends of the wrapper to spring outward during the application of paste to the ends of the package, substantially as described.

26. The combination of means for advancing a package with the wrapper ends unfolded, end folders for folding portions of the extending ends of the wrapper, pasters for applying paste to the partially closed ends of the package, a carrier for said pasters, means for moving the paster carrier to carry the pasters into operative position, means for moving the pasters inward into contact with the ends of the package, and end folders for folding the remaining portions of the extending ends of the wrapper against the pasted ends of the package, substantially as described.

27. The combination of means for advancing a package with the wrapper ends unfolded, end folders for folding portions of the extending ends of the wrapper, pasters for applying paste to the partially closed ends of the package, a carrier for said pasters, means for reciprocating the paster carrier to carry the pasters into and out of operative position, means for moving the pasters inward into contact with the ends of the package, means for reciprocating the paster carrier horizontally, means for applying paste to the pasters, and end folders for folding the remaining portions of the extending ends of the wrapper against the ends of the package, substantially as described.

28. The combination with means for presenting an article to have paste applied to opposite sides thereof, of paste applying mechanism comprising a pair of pasters, a carrier for said pasters, means for moving the carrier to carry the pasters into operative position, and means for actuating the pasters when in operative position to apply paste to the sides of the article, substantially as described.

29. The combination with means for presenting an article to have paste applied to opposite sides thereof, of paste applying mechanism comprising a pair of pasters, a carrier for said pasters, means for moving the carrier to carry the pasters into operative position, means for actuating the pasters when in operative position to apply paste to the sides of the article, means for reciprocating the carrier horizontally to carry the pasters into position to have paste applied thereto, and means for applying paste to the pasters, substantially as described.

30. The combination with means for presenting an article to have paste applied thereto, of paste applying mechanism comprising a horizontally reciprocating carrier, a paster carried by the carrier, a paste supply means, means for reciprocating the carrier vertically in one position of its horizontal movement to carry the paster into operative position for applying paste to the article, and in another position of its horizontal movement to carry the paster into position for receiving paste from the paste supply means, and means for actuating the paster when in operative position to apply paste to the article, substantially as described.

31. The combination with means for presenting an article to have paste applied thereto, of paste applying mechanism comprising a horizontally reciprocating carrier, a paster carried by the carrier, a paste supply means, means for reciprocating the carrier transversely to the direction of its horizontal movement to carry the paster into operative position to apply paste to the article when the carrier is in one position of its horizontal movement and to carry the paster into position to take paste from the paste supply means when the carrier is in another position of its horizontal movement, and means for actuating the paster when in operative position to apply paste to the article, substantially as described.

32. The combination with a pair of pasters 250 having their pasting surfaces facing each other, of a paste supply cylinder 310, and means for moving the pasters into engagement with the ends of the cylinder to take paste therefrom, substantially as described.

33. The combination with a pair of pasters 250 having their pasting surfaces facing each other, of a paste supply cylinder 310, means for moving the pasters into engagement with the ends of the cylinder to take paste therefrom, and means for regulating the amount of paste carried on the ends of the cylinder, substantially as described.

In testimony whereof, I have hereunto set my hand, in the presence of two subscribing witnesses.

BENJAMIN W. TUCKER.

Witnesses:

A. L. KENT,
W. H. KENNEDY.