No. 868,191. PATENTED OCT. 15, 1907.

W. R. LANDFEAR.

PACKING AND LABELING MACHINE.

APPLICATION FILED MAR. 8, 1902.

8 SHEETS—SHEET 1.

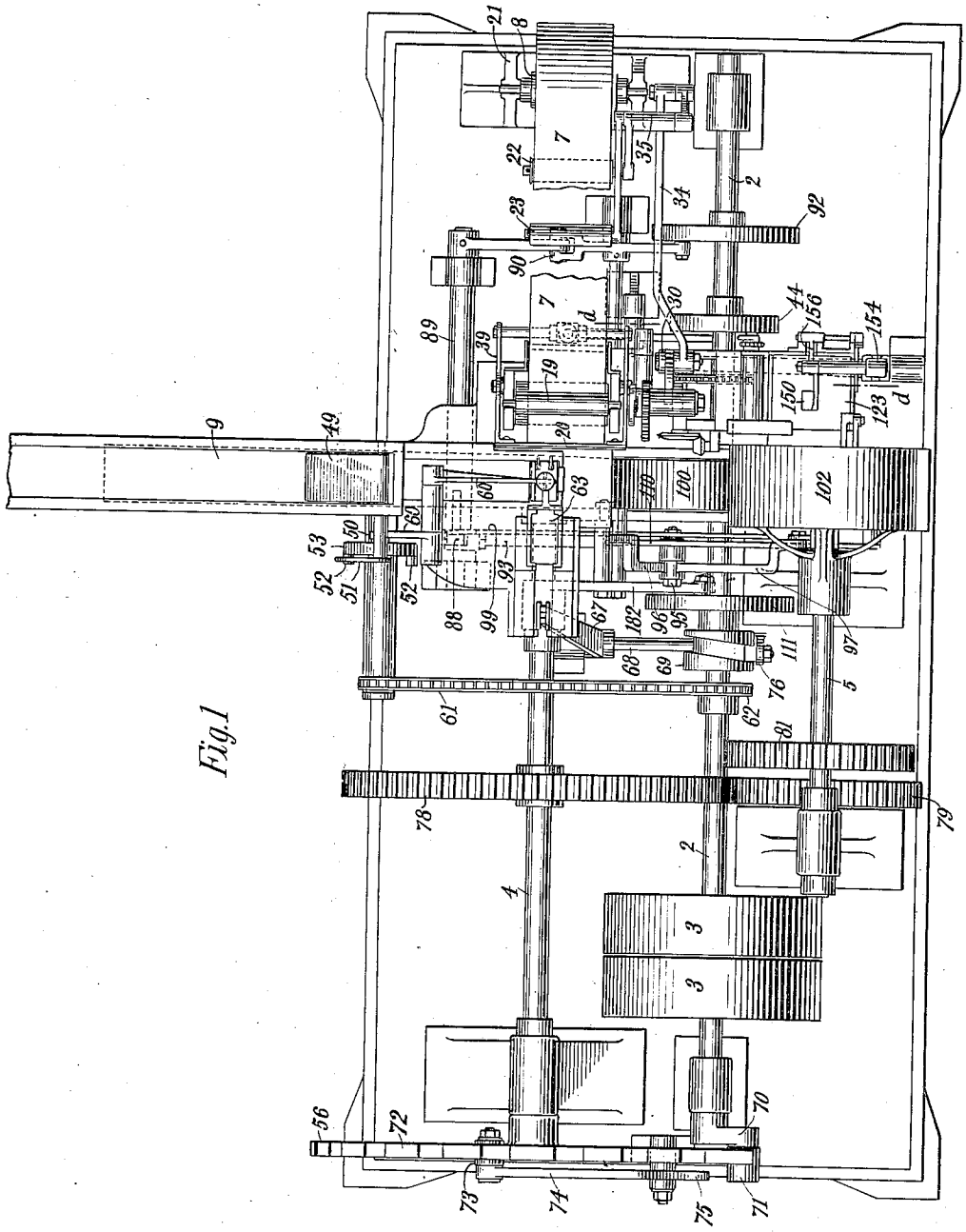


Fig. 1

Witnesses:
Raphael Netter
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Inventor
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by Robt. N. Duncan Atty

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8 SHEETS—SHEET 2.

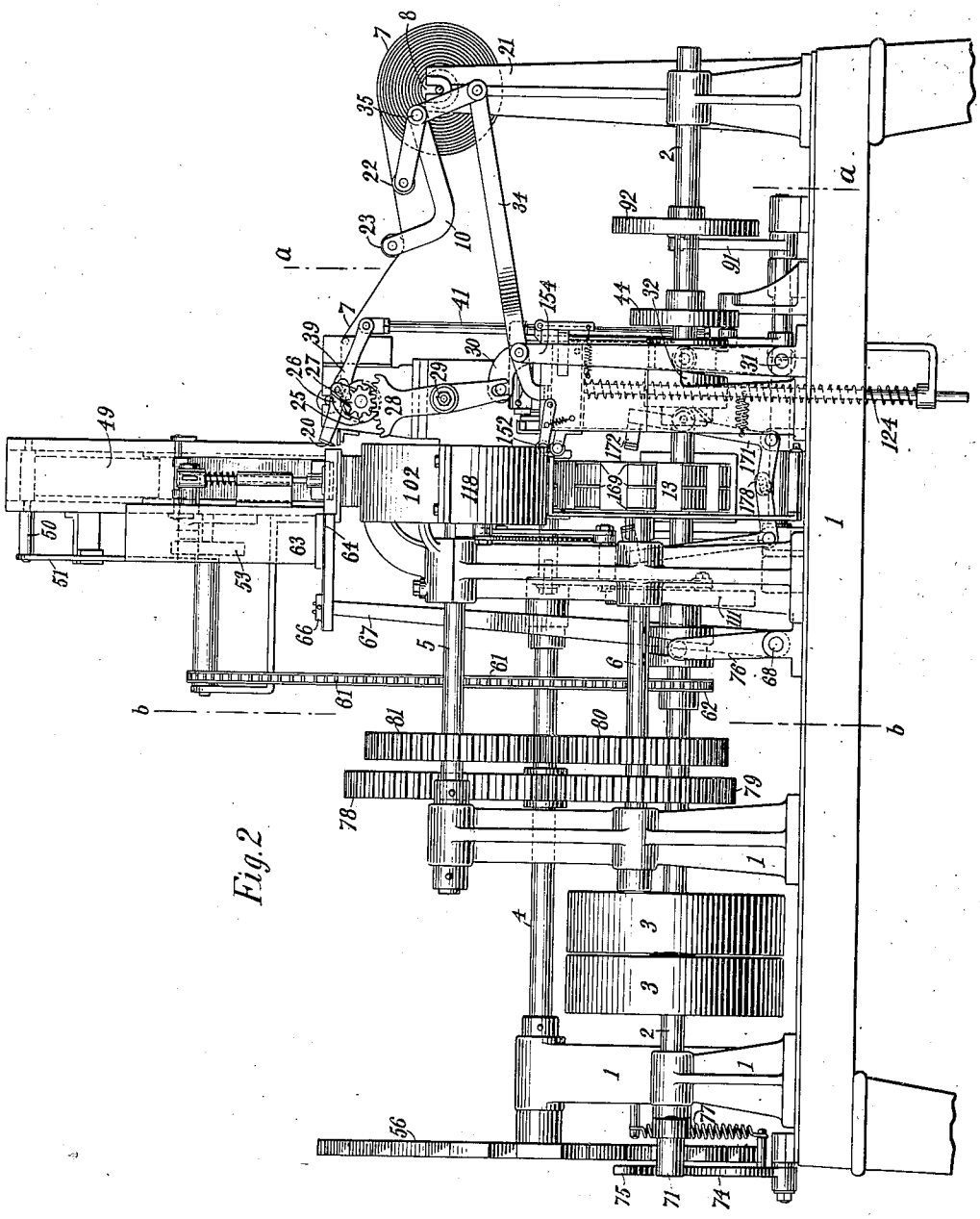


Fig. 2

Witnesses:
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PACKING AND LABELING MACHINE.

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8 SHEETS—SHEET 3.

Fig.9

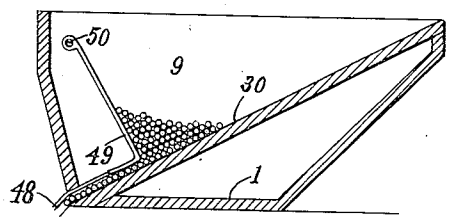


Fig.3

Witnesses:
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No. 868,191. PATENTED OCT. 15, 1907.

W. R. LANDFEAR.

PACKING AND LABELING MACHINE.

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8 SHEETS—SHEET 4.

Fig. 4

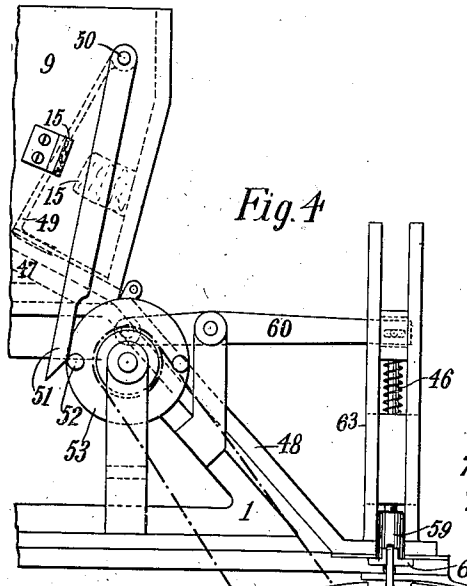
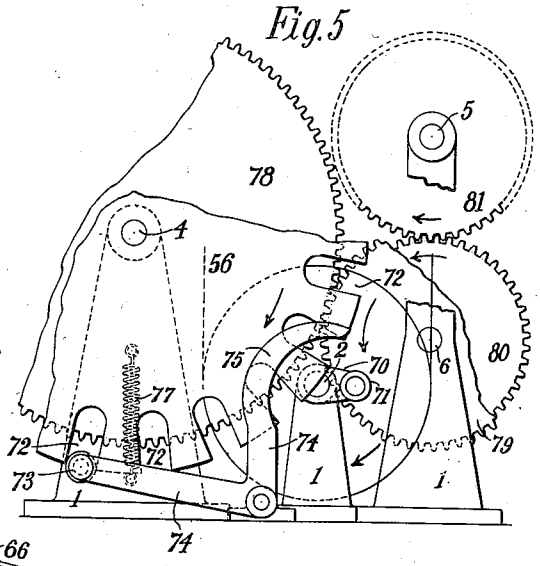
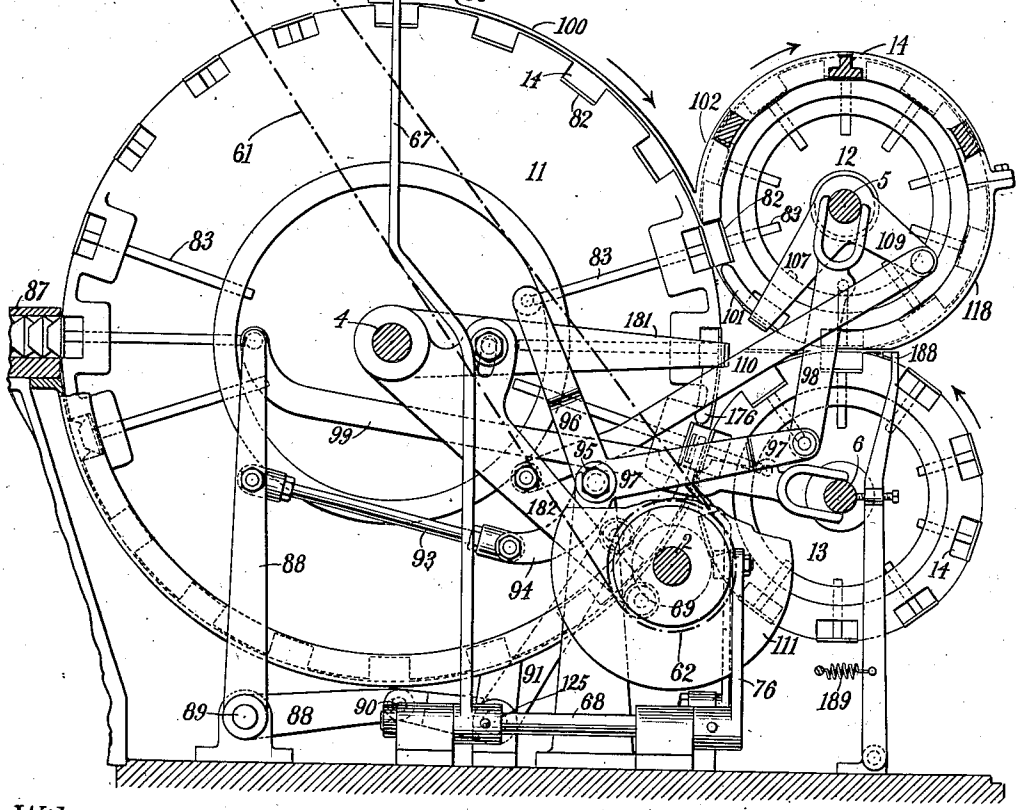


Fig. 5





Witnesses:

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No. 868,191. PATENTED OCT. 15, 1907.

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8 SHEETS—SHEET 5.

Fig. 6

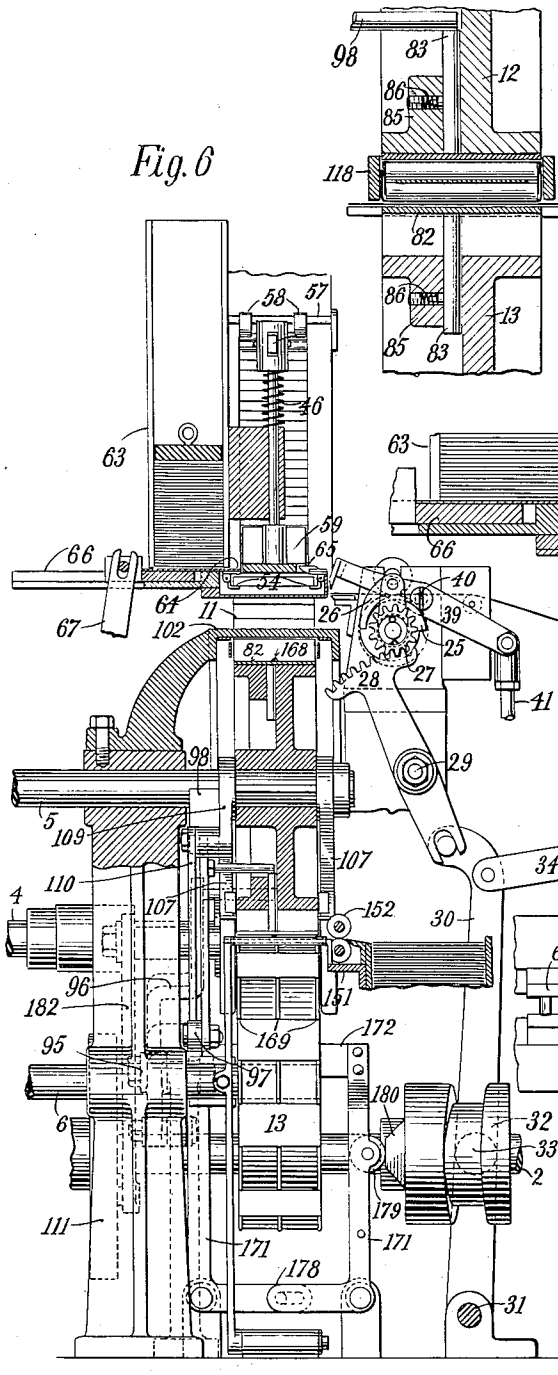


Fig. 14a

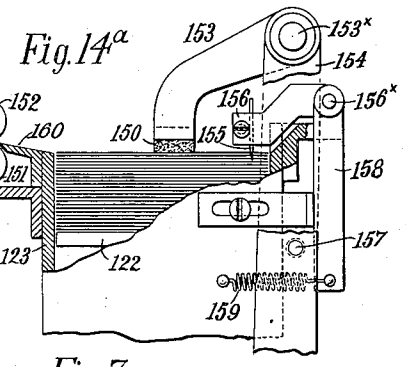


Fig. 7

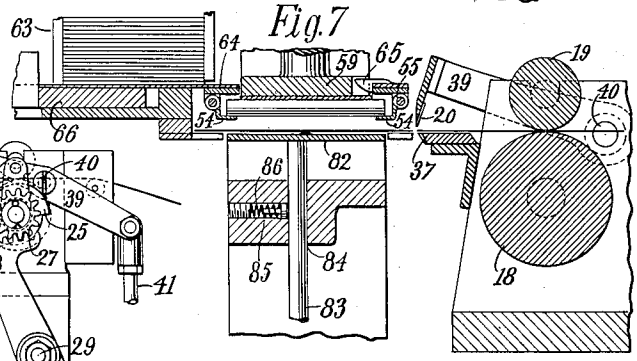


Fig. 8

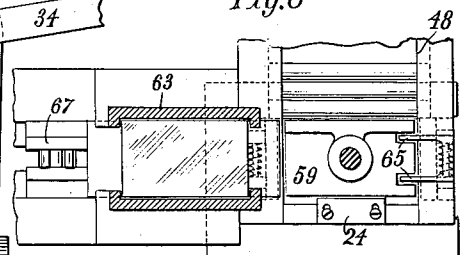
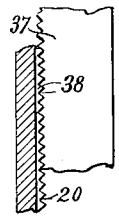


Fig. 29





Witnesses:
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No. 868,191. PATENTED OCT. 15, 1907.

W. R. LANDFEAR.

PACKING AND LABELING MACHINE.

APPLICATION FILED MAR. 8, 1902.

8 SHEETS—SHEET 6.

Fig.10

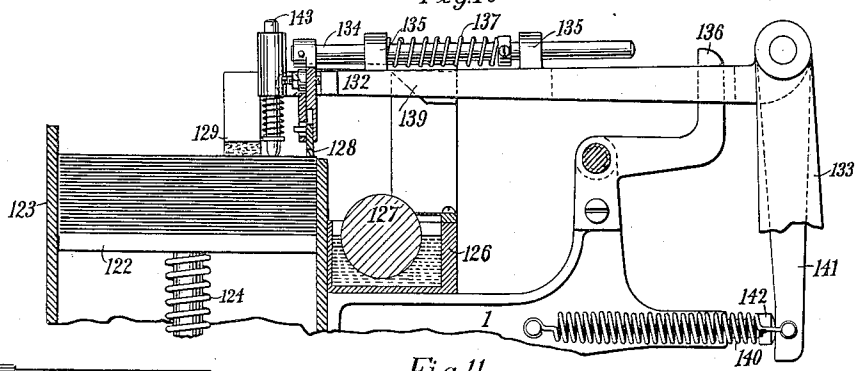


Fig.11

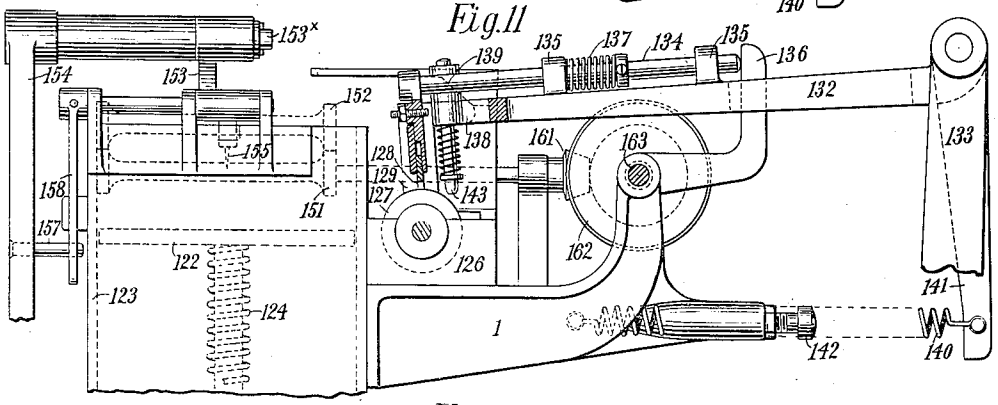


Fig.12

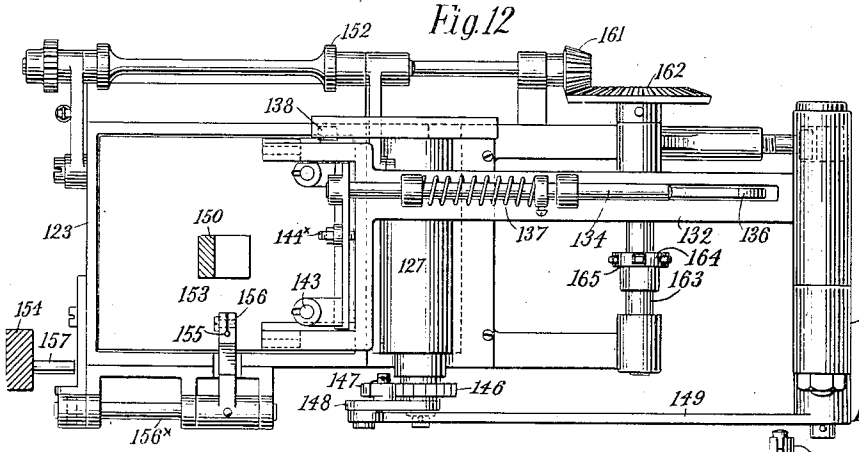


Fig.13

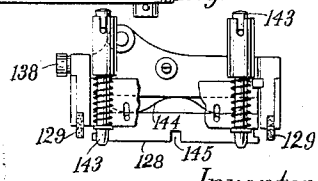
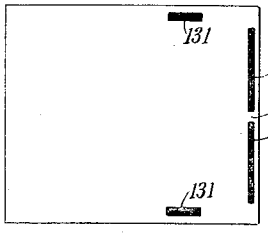


Fig.14



Witnesses:
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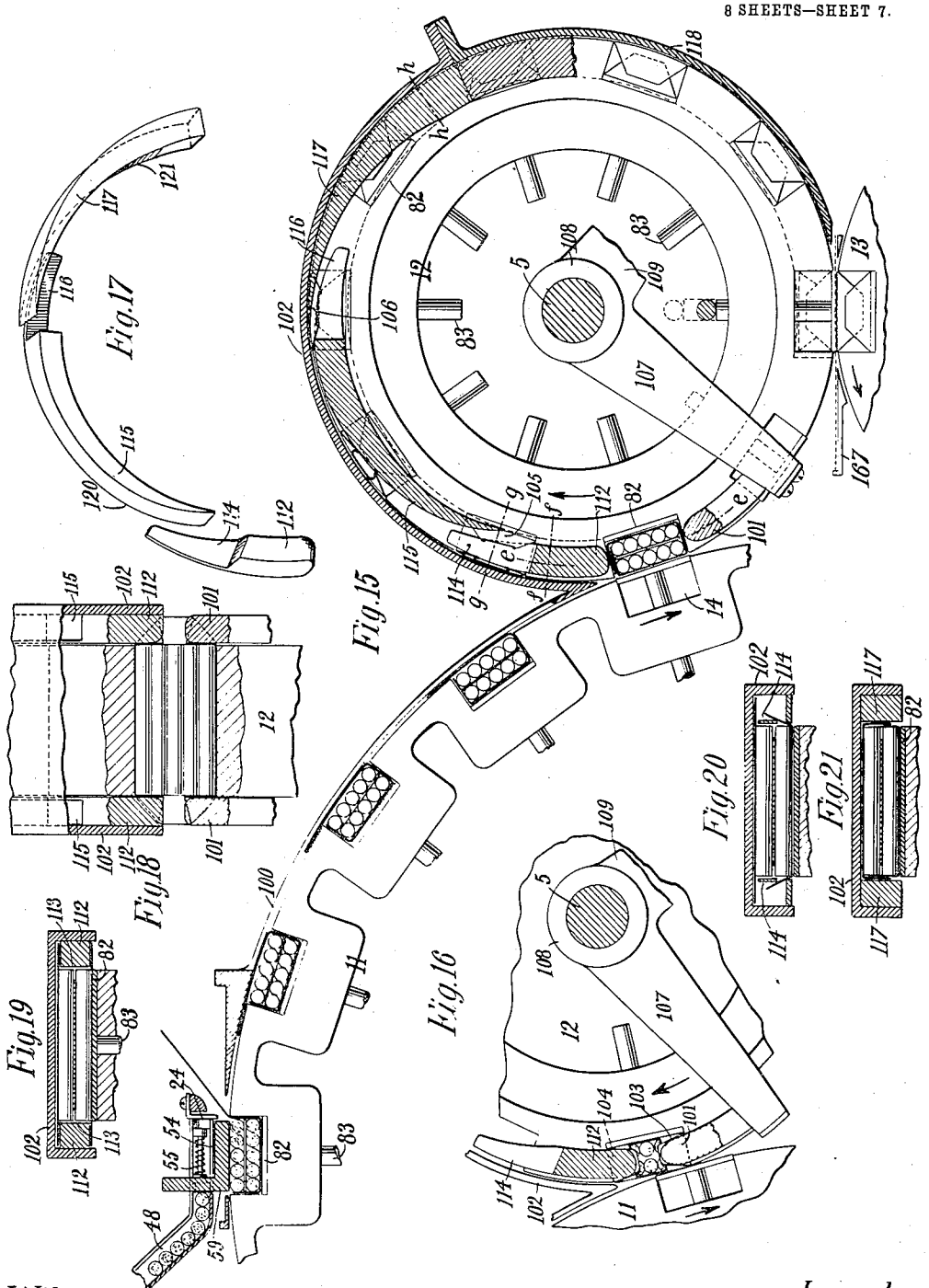
No. 868,191. PATENTED OCT. 15, 1907.

W. R. LANDFEAR.

PACKING AND LABELING MACHINE.

APPLICATION FILED MAR. 8, 1902.

8 SHEETS—SHEET 7.



Witnesses:
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Inventor
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No. 868,191. PATENTED OCT. 15, 1907.

W. R. LANDFEAR.

PACKING AND LABELING MACHINE.

APPLICATION FILED MAR. 8, 1902.

8 SHEETS—SHEET 8.

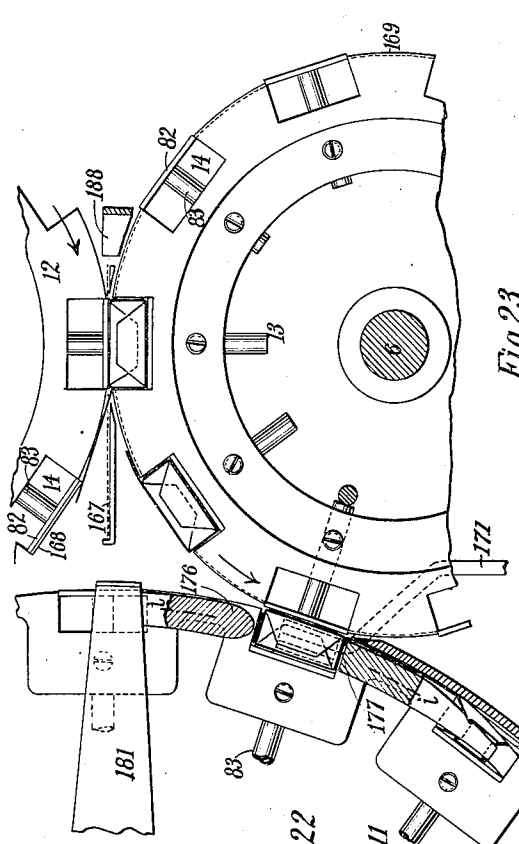


Fig. 22

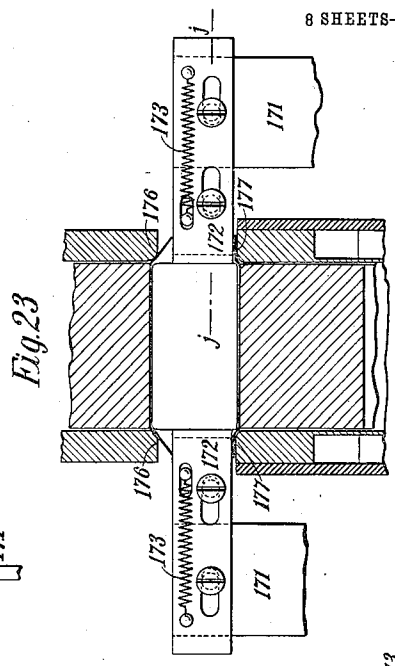


Fig. 23

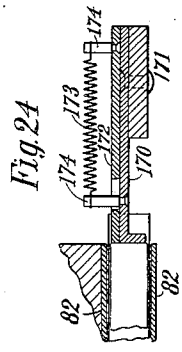


Fig. 24

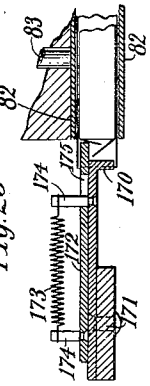


Fig. 25

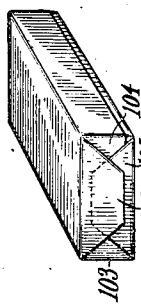


Fig. 26

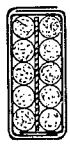


Fig. 28

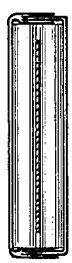


Fig. 27

Witnesses:

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James A. Barlow

Inventor

William R. Landfear

by Robt. H. Duncan Atty

UNITED STATES PATENT OFFICE.

WILLIAM R. LANDFEAR, OF NEW YORK, N. Y., ASSIGNOR TO RICHARD H. WRIGHT, OF DURHAM, NORTH CAROLINA.

PACKING AND LABELING MACHINE.

No. 868,191. Specification of Letters Patent. Patented Oct. 15, 1907.

Application filed March 8, 1902. Serial No. 97,291.

To all whom it may concern:

Be it known that I, WILLIAM R. LANDFEAR, a citizen of the United States, residing in the city of New York, in the county of Kings and State of New York, (post-office address being No. 13 Cambridge Place, Brooklyn, New York,) have invented certain new and useful Improvements in Packing and Labeling Machines, of which the following is a specification.

The present invention, stated generally, relates to machines for inclosing a definite number of cigarettes or similar articles in suitable wrappers to form convenient packages and applying labels or label wrappers to the packages.

The machine hereinafter described and shown in the accompanying drawings, taken as an entirety, comprises devices or mechanisms for attaining the following results, viz: Feeding a strip of tin foil and paper, or tinfoil or paper, over suitable molds or pockets and cutting therefrom wrapper lengths; separating from a mass of cigarettes the desired number for a package and feeding them to a wrapper over a mold, and forcing the wrapper and superposed cigarettes into the mold; separating an advertising card from a pile and feeding it to a partially formed package; folding the bodies and ends of the wrappers upon the cigarettes; applying labels or outside label wrappers to the packages and expelling the completed packages from the machine.

The invention consists generally stated in the construction of various devices and mechanisms hereinafter described, and in the arrangements, combinations and subcombinations thereof, by which the machine is adapted to produce the results named, or some of them, as hereinafter more fully described and claimed.

The accompanying drawings illustrate one form of machine embodying the several improvements, in which—

Figure 1 is a plan or top view of the machine as a whole; Fig. 2 is a front elevation thereof; Fig. 3 is a transverse vertical section on the line *a—a* of Fig. 2; Fig. 4 is a similar section on the line *v—v* of Fig. 2; Fig. 5 is a view in detail of the driving mechanism as seen from the left hand end of the machine; Fig. 6 is a view partly in elevation and partly in section on the broken line *c—c* of Fig. 3; Fig. 7 is an enlarged detail of the card and inner wrapper feed; Fig. 8 is a plan view of the mechanism of Fig. 7; Fig. 9 is a detail view of the cigarette hopper; Fig. 10 is a detail view of devices for applying paste to the label wrapper, showing the label box and paste wheel in section, on broken line *d—d* of Fig. 1; Fig. 11 is a view in elevation of the same, showing the operative parts in different position; Fig. 12 is a plan view of the same, showing the parts in same position as Fig. 10; Fig. 13 is an end view of the pasting devices; Fig. 14 is a plan view of a label wrapper with paste applied; Fig. 14ª is a detail view partly in section, showing the label box and the label holding and feeding devices; Fig. 15 is a detail view of the upper part of the large mold wheel and parts of the smaller mold wheels, showing the operation of the folders; Fig. 16 is a similar view showing some of the operative parts in different positions; Fig. 17 is a detail perspective view of the stationary folders; Fig. 18 is a sectional view on the line *e—e* of Fig. 15; Figs. 19, 20 and 21 are transverse sections on the respective lines *f—f*, *g—g* and *h—h* of Fig. 15; Fig. 22 is a detail view of the lower part of the large mold wheel and parts of the smaller mold wheels, showing the label wrapper folders; Fig. 23 is a section on line *i—i* of Fig. 22, showing detail of the fold holders of the inner wrapper; Figs. 24 and 25 are sectional views on line *j—j* of Fig. 23, showing the fold holders in different positions; Fig. 26 is a view in perspective of a package before the label wrapper is applied; Fig. 27 is a longitudinal section of a completed package; Fig. 28 is a transverse section of a completed package; and Fig. 29 is a detail view of the inner wrapper cutter.

General idea of the machine, including the location and functions of its principal parts.—Referring to the drawings, 1 represents the frame of the machine in which are journaled the main shaft 2, having driving pulley 3, and three parallel shafts 4, 5 and 6 which are driven by suitable connections to the main shaft. The strip 7, from which the inner package wrappers are cut, is fed over the molds or pockets from a spool 8 located at the right hand end of the machine. At one side of and at the top of the machine are located the hopper 9 and the devices for separating and feeding the cigarettes to the molds; also, the card box or holder and card feeding devices; and, on a lower plane on the respective shafts 4, 5 and 6, are three wheels or drums 11, 12 and 13, each provided with molds or pockets 14 in their peripheries into which the wrappers, the cigarettes and cards which form the packages are forced. The three mold wheels are arranged to rotate intermittently with their peripheries near each other, and when they are at rest a mold of each wheel will register with a mold in each of the other wheels, and means are provided to shift the packages from wheel to wheel to facilitate their formation and completion. At the right hand end of the machine are also located a box for holding a pile of label-wrappers and devices for applying paste thereto and feeding them over the molds of wheel 13. The inner wrappers, the desired number of cigarettes and cards are first forced into the molds of the larger wheel 11, in which the packages are only partially formed and from which they are forced into the molds of wheel 12, where the ends of the wrappers are folded, and thence into th

molds of wheel 13 where the label wrappers are partly applied, and thence back into the molds of wheel 11 where the ends of the label-wrappers are folded and sealed in place to complete the packages, and thence into a trough 87 and out of the machine.

Devices for feeding the inner wrappers to the cigarette molds.—The wrapper strip 7 is wound upon a spool 8 located at the right hand end of the machine and is fed to the proper position over the top mold of wheel 11 by passing between the feeding rollers 18 and 19 when the desired length of strip to form the width of a wrapper is severed by a cutting blade 20. The spool 8 is ournaled in standards 21, and the strip 7 passes over an idler 22 and under unwinding roller 23 and between feeding rollers 18 and 19. To insure a uniform eed of the rollers it is desirable that the unwinding of the strip from the spool be done by other devices than the rotation of the feed rollers and when the rollers are at rest and are holding the forward end of the strip between them. To accomplish this the roller 23 is arranged above the strip and to reciprocate up and down and unwind at each downward movement a length of strip for the width of a wrapper. The feed rollers rotate only in the direction to feed the strip forward, and for this purpose, as shown in Figs. 2 and 3, a ratchet wheel 25, secured to the shaft of roller 18, is rotated by a pawl 26 fast to a geared pinion 27 loose on the shaft, and this pinion is rotated back and forth by a meshing geared sector 28, pivoted at 29 and oscillated by its connection with lever 30 secured at its lower end to rock shaft 31 and operated to give the required oscillation to sector 23 to rotate rol er 18 by its engagement through roller 33 with cam groove in the periphery of wheel 32 on shaft 2. Roller 19 is preferably driven through gear connections with rol er 18 and these rollers are constructed and arranged in the usual way of feed rollers. The desired reciprocation of unwinding roller 23 is given by its connection with rock lever 30 through link 34 and bell crank lever 10 having stationary pivot at 35. By the devices just described the free end of the strip is fed over the top mold of wheel 11 as the wheel stops, so that its forward edge projects sufficiently beyond the mold to form laps or folds at one end of the package while one contiguous edge projects beyond the rear side wall of the mold to form a longitudinal edge fold nearly equal to the edge of the package and its opposite edge projects beyond the forward wall of the mold sufficiently to wrap around two edges and one side of the package as seen by reference to Fig. 28, and when in this position a blade 20 descends upon an opposing blade or anvil 37 and severs the strip far enough from the mold for the folds on the other end of the package.

The strip 7 for the inner wrappers is preferably compound, made up of a thin strip of tin foil, or other nonporous material, and paper pasted, or otherwise secured, together, although a simple strip either of tin foil or paper may be used. If a strip of tin foil or similar material, or a compound strip is used, it is desirable to have a cutter of peculiar construction to sever it c'eanly and leave even edges. For this reason both the upper and lower cutting edges are formed with saw teeth 38 which mesh as they come together and make a clean even cut. The upper blade 20 is removably and adjustably fixed in the forward edge of frame 39 which is pivoted at 40 and is operated by its connection through rod 41 to lever 42 which is rocked by its connection with cam groove in wheel 44 on main shaft through friction roller 45.

Cigarette and card separating and feeding mechanisms.—The cigarettes to be made into packages are placed in a hopper 9, Figs. 1, 3, 4 and 9, whose width is slightly greater than the length of the cigarettes, either by hand or otherwise. The hopper is provided with a bottom 47 which supports the cigarettes and is arranged in a single plane as distinguished from hopper bottoms arranged in different planes and slanting in several different directions toward the hopper exit. The single hopper bottom 47 is inclined, preferably at an angle of about 30 degrees, towards the exit which is only slightly deeper than the diameter of a cigarette. This single inclined hopper bottom is considered an important feature of the machine as it causes the cigarettes to constantly move by gravity towards the exit and does away with the various devices heretofore employed to move them, and together with the vibrator presents the cigarettes in a single row or layer to the mouth of the race 48 and to the swinging platforms at the bottom of the race. To prevent the cigarettes from clogging at the mouth of the race 48, which forms the exit of the hopper, a vibrator or agitator 49, Figs. 3 and 4, fixed to a shaft 50 passing through the hopper, which shaft is rocked by the contact of its downwardly projecting arm 51 with pins 52 on wheel 53 and its release therefrom, operates to throw or push the upper layers of cigarettes backward from the mouth of the race so that those of the lower layer are free to enter it. Buffers 15 may be attached to the outer and inner wall of the hopper to receive the strokes of the vibrator and arm 51. The race 48 extends from within the hopper downward over the top mold of wheel 11 and is sufficiently steep to press the cigarettes close together at its lower end over the mold wheel where it is level and is provided with an end wall or abutment to stop the cigarettes. The bottom of the race over the mold wheel is divided into two parts or platforms 54 which are hinged to the adjacent parts so as to swing downward and outward under proper pressure to uncover the mold and permit the cigarettes whose opposite ends rest on these swinging platforms to be forced into the mold, the platforms being controlled by springs 55, or other means, to return them to their normal position as soon as the pressure is removed.

The lower end of the race may be provided with an adjustable stop 24 to diminish or increase the length of the platforms 54 to compensate for slight variations in the size of the cigarettes.

In front of the hopper and over the race is located a straightener, Fig. 3, which consists of a light transverse spindle 57 provided with hooks or projections 58 resting on the cigarettes as they pass beneath them down the race. These projections touch the cigarettes lightly near their ends and bring them into a position at right angles to the line of the race, and the straightener is operated solely by the impact of the cigarettes against the projections 58. The top of the race is provided with overhanging flanges which prevent the cigarettes from being forced out and the race is only deep enough for a single layer of cigarettes and in its normal condition it is filled throughout its length.

When a wrapper is in proper position over the top 13

mold of wheel 11 and the swinging platforms above the wrapper and the mold are filled with a layer of cigarettes; both the wrapper and cigarettes are forced simultaneously into the mold by the operation of a vertically reciprocating plunger 59, arranged to make as many downward movements during each stop of the mold wheel as there are layers of cigarettes to be forced into the mold. The plunger 59 (see Figs. 1, 3 and 4) is preferably cushioned by spring 46 around its stem and is secured to pivoted lever 60 which is rocked by its connection with cam groove in the face of wheel 53 rotated by a chain or belt 61 passing over wheel 62 on main shaft 2, (Figs. 1, 2 and 3), the cam groove being shaped to give the plunger the desired reciprocations. In the machine shown in the drawings, as only two layers of cigarettes are included in the packages, the wheel 53 is arranged to make only two revolutions and the plunger only two full reciprocations during each stop of mold wheel 11. In the present machine, (Figs. 1, 2, 3 and 6), means are provided to introduce an advertising card into each package. For this purpose an open top box 63 adapted to contain a pile of cards, having a cross area slightly greater than the surface of a card, is fixed at one side of the top mold of wheel 11, and the bottom card of the pile is pushed by a reciprocating pusher 64 through a narrow opening in the front of the box over a layer of cigarettes on platforms 54, and then is forced by the plunger 59 into the mold with the cigarettes. A guide 65 is arranged upon the farther side of the race to direct the forward end of the card under the overhanging flange of the race. The pusher is attached to a slide 66 moving in suitable ways which is reciprocated by its connection with lever 67 fast to shaft 68 which is rocked by the engagement of arm 76 with cam groove in the periphery of wheel 69 on main shaft 2, (Figs. 1, 2 and 3). A light weight may be placed on top of the pile of cards to bring the bottom card in position to meet the pusher 64.

Mold wheels, their connections and movements; construction of molds, devices for shifting packages from wheel to wheel and devices for folding the ends of the wrappers.—The mold wheels 11, 12 and 13, carrying their respective molds 14, are constructed, arranged and rotated so that when the wheels are stationary or at rest the top mold of wheel 11 will register with plunger 59, and two molds of each wheel will register with molds in the other two wheels as shown in Figs. 1, 2, 3, 4, 5, 15 and 22. Wheel 11 is intermittently rotated and dogged or held stationary through the engagement with star wheel 56 fast to shaft 4 of a roller 71 on crank 70 fixed to main shaft 2 near its end, the roller 71 taking into the notches 72, while the dogging roller 73 on bell crank lever 74 is arranged to be removed from the notches 72, as soon as the roller 71 enters them, by the action of the latter roller on the curved arm 75 of the bell crank lever 74, and is thrown into the next notch as soon as roller 71 has left its notch, by the action of spring 77, as shown in Fig. 5. The mold wheels 12 and 13 are rotated by connecting gear wheels 78 on shaft 4 and 79 on shaft 6, and by gear wheel 80 on shaft 6 and 81 on shaft 5, as seen in Figs. 1, 2 and 5.

The molds 14 of wheels 11, 12 and 13 are open at their opposite ends, and each is provided with a movable bottom 82, Fig. 14ª, having a stem 83 projecting therefrom towards the center of the wheels and devices for holding the bottom stationary in whatever position in the mold it may be forced and left. Conveniently the stem 83 may pass through a hole 84 in a stationary enlargement 85 and be forced into frictional holding contact by spring 86, as seen in Fig. 14ª, or any other suitable holding device may be used. By this arrangement whenever a completed package is expelled from wheel 11 by moving the bottom of the mold to its top or mouth, the bottom will remain in that position to receive the wrapper and the first layer of cigarettes and support them as they are forced downward into the mold by the plunger 59, and as the plunger only moves downward to the top of the mold, the bottom will continue its support until it is forced down step by step by the forcing contact of a subsequent layer or layers of cigarettes. So, whenever the packages are shifted from wheel to wheel, Figs. 15 and 22, the bottoms of the discharging molds are forced outward and those of the receiving molds inward, and the bottoms which have been forced outward remain in that position until they are forced inward by the entrance of the next package and are thus always in place to support the packages and prevent the wrappers from being displaced and wrinkled.

The packages are shifted from wheel to wheel simultaneously, that is, a package is shifted from wheel 11 to wheel 12, another from wheel 12 to 13 and another from wheel 13 to wheel 11, and still another is discharged from wheel 11 into the expelling trough 87, all at the same time and by devices actuated by a single cam, as follows, Figs. 1, 2, 3 and 4: Bell crank lever 88 fast on shaft 89 is rocked by its connection through toggle joint 90 and bell-crank lever 91 with cam groove in face of wheel 92 on main shaft 2. To lever 88, Fig. 4, is pivoted a rod 93 which is connected by link 94 to rock shaft 95 on which are fixed two arms 96 and 97, the end of arm 96 being arranged to take against the end of the stems 83 of the bottoms of molds of wheel 11 to push the movable bottoms outward and shift the packages to the molds of wheel 12. The end of arm 97 is pivoted to another arm 98 yoked over shaft 5 and provided with a projection to take against the stems 83 of the bottoms of molds of wheel 12 and force them outward to shift the packages into the registering molds of wheel 13, and to the upper end of lever 88 is pivoted a rod 99 whose opposite end is yoked over shaft 6 of wheel 13 and is provided with means to take against the stems of the bottoms of the molds of wheel 13 and shift the packages therefrom into the molds of wheel 11, while the upper end of lever 88 strikes against the ends of the stems of the bottoms of the molds of wheel 11 and discharges the completed packages into trough 87. The rocking of lever 88 towards the left as seen in Fig. 4 gives the requisite movements to produce the results just described.

The folding of the wrappers around the cigarettes is effected by the following means, Figs. 15 to 21: When a wrapper is disposed over the top mold of wheel 11 as previously described, the forcing of the cigarettes into the mold causes the wrapper to be folded over the two long edges and one side of the package by the contact of the wrapper with the side walls of the mold, and as the wheel rotates the forward unfolded part of wrapper is brought into contact with the rear edge of the curved retaining folder 100, Fig. 15, and is folded over upon

the top layer of cigarettes in a mold, the extreme edge of the wrapper resting on the periphery of the mold wheel, and when a package is shifted from a mold of wheel 11 to a mold of wheel 12, this extreme edge of the wrapper is folded over upon its opposite edge by contact with the side wall of the mold.

The ends of the wrapper which project beyond the open ends of the mold are folded during the rotation of wheel 12, Figs. 15 to 21, by the action of oscillating fingers 101 and stationary folders fixed in or made a part of the curved holder or case 102, secured to the frame to fit over the periphery of wheel 12, the end folds or laps thus formed being designated as rear edge folds 103, forward edge folds, 104, bottom end folds 105 and top end folds 106, as seen in Fig. 26. The oscillating fingers 101 form the rear edge folds 103 on both ends of the package, and for this purpose they are arranged to operate on each side of the wheel 12 simultaneously by attaching them to arms 107 which are connected together and arranged to rock on shaft 5, and they are oscillated through the connection of arm 109 fixed to one of arms 107 with link 110 attached to arm 182 which engages with cam groove in face of wheel 111 on main shaft 2, the arm 182 being adjustably fixed to arms 181 carrying another pair of oscillating folders hereinafter referred to, as shown in Figs. 1, 4 and 6, and the cam groove being shaped to move the fingers 107 forward more rapidly than wheel 12 moves so as to form folds 103 before that part of the package enters the stationary holder or case 102.

The holder 102 and its folders are preferably of a single piece of metal wrought into the desired shape, and of sufficient width to locate the folders at its edges and just outside the line of the ends of the molds, thus leaving the molds free to pass beneath the middle of the holder and between the folders, as shown in Figs. 15 to 23. Near each edge of the holder are three folders and two retaining fingers which are located and operate as follows: At the entrance of the holder are the folders 112 which form the forward edge folds 104 as a mold carrying a package with projecting wrapper ends enters the holder 102, the folds being formed by the contact of the wrappers with the edges 113 of the folders which are preferably slightly rounded, and the folds 104 and 103 are held in place by the thin extended fingers 114 until they are caught and held by the upturned bottom folds 105 which are formed by the upwardly inclined folders 115, whose rear ends overlap the retaining fingers 114 and whose forward ends are cut away to form similar retaining fingers 116 to hold the upturned bottom folds in place until the top folds 106 are turned down upon them by the overlapping rear ends of downwardly inclined folders 117 which operate to form folds 106. When the wrapper ends are thus folded the holder is narrowed to the length of the completed package, or a retaining section 118 is added, and in either case the side walls hold the folds in place until the point to shift the packages to molds of wheel 13 is reached. The oscillating fingers 101 swing close to the entrance of the holder 102 and hold the folds 103 in position, Fig. 16, so that they readily pass the edges of folders 112 without wrinkling. As the packages are passing the folders 112, the outstanding parts of the wrappers which form the folds 105 and 106 move along the bottom and top edges of folders 112, Fig. 19, until they are brought in contact with the respective folders 115 and 117 which form these outstanding parts into folds 105 and 106, the folding edges being 113, 120 and 121 respectively. (See Figs. 15 to 23).

Devices for applying paste to outside or label wrappers and for feeding such wrappers over the molds.—When the packages have passed by the folding devices of wheel 12 and through the curved retaining section 118 and are brought to register with molds of wheel 13 but before they are shifted thereto, label wrappers are fed over the top of the receiving molds of wheel 13 to occupy substantially the same position thereto as the wrappers occupied to the top molds of wheel 11 as heretofore described. The label wrappers cut to the proper size are placed in a pile upon a vertically movable bottom or platform 122, Fig. 10, in an open topped box 123, the platform being constantly pressed upward by a spring 124 to force the upper wrapper against a sharp point 155 located at the rear side of the pile.

The pasting devices, Figs. 10 to 15, are located at one end of the box 123 and consist of a paste reservoir 126, a delivery roll 127, paste taker and applying fingers 128 and 129, and devices for moving the fingers to and from the paste roll and the top wrapper of the pile. The paste fingers operate to apply a line of paste 130 with a central break or opening $130^{\times}$ to one end of the wrappers to seal the overlapped longitudinal seam and two shorter lines 131 on the sides of the wrapper to seal the end folds of the package in place is shown in Fig. 14. The paste fingers are carried on arm 132 which is pivoted to top of rock lever 133 fast at its lower end to shaft 125 which is rocked by lever 91 connected to cam groove in face of wheel 92 to give the desired backward and forward movement to arm 132. The fingers 129 are attached directly to arm 132 but, in order that both sets of fingers, may be brought in contact with the upper part of the paste roll at the same time, the finger 128 is attached to arm 132 through rod 134 which passes closely through guide holes in lugs 135 on the fixed arm 132, and as this arm is moved backward the end of rod 134 abuts against the stationary stop 136 and contracts spring 137. The backward movement of the arm 132 is continued until the fingers 129 are brought into line with finger 128 when the fingers are over the axis of the paste roll and are pressed upon it to take paste. As the paste roll is located below the top of the wrapper pile the arm 132 is moved downward by the contact of roller 138 with an inclined guide 139, the roller being held to the incline by spring 140 fixed at one end while its other end is fastened to arm 141 which forms with arm 132 a bell crank lever. When the fingers have taken paste from the roll and the arm 132 moves forward, the rod 134 remains in contact with the stop 136 until the expansion force of spring 137 is expended, at which time the fingers have resumed their normal relative position and then they move together over the upper wrapper of the pile and are brought down into applying contact therewith by the abutting of the lower end of arm 141 against adjustable stop 142 just before the forward movement of arm 132 ceases. To prevent the contact of the fingers with the wrapper before they reach their applying position, spring controlled pins 143 with rounded ends project slightly below the fingers and by riding over the wrapper keep the paste fingers out of contact therewith

until they are forced down to apply paste, and when they are lifted up from the wrapper the pins 143 act as strippers. The fingers 129 are preferably of yielding material, as spongy rubber which will conform to the surface of the paste wheel, and finger 128 is preferably cushioned by a spring 144, this finger being formed with a central notch 145 to cause a break or interruption $130^{\times}$ in the line of paste, as seen in Fig. 14. The paste wheel may be rotated by the engagement with ratchet 146 fast on wheel shaft of pawl 147 pivoted to arm 148 arranged to rock on wheel shaft at one end while to its other end is pivoted arm 149 attached to and operated by rock lever 133, see Figs. 3 and 12.

The label wrappers are fed individually from the top of the pile in box 123 over the molds of wheel 13 by the operation of the pusher 150 and the feed rollers 151 and 152. The pusher is preferably of spongy rubber, or similar material, secured to arm 153 on pin $153^{\times}$ and is operated through connecting arm 154 on rock shaft 31 which is rocked as heretofore described, to give the pusher a downward and forward movement to feed the top label into the bite of the feed rollers and then an upward and backward or return movement. A needle, or other sharp point, 155, carried on the end of arm 156 fast to rock shaft $156^{\times}$ is thrust into the labels at the rear of the pile by the contact of pin 157 on rock arm 154 with arm 158 fast on shaft $156^{\times}$, and the point 155 is raised up or partly out of the labels by the action of spring 159, in order to clear it of accumulated fibers and enable it to pierce the same number of labels at each stroke or downward thrust, the office of this point being to hold the lower sheets of the pile in place while the top sheet is fed forward by which movement a short slit is torn or cut in its rear edge. It is not essential to the effective operation of this device that the point be positively raised, since its downward thrust will be resisted by the spring controlled platform 122 and will cause the pile of sheets to vibrate vertically over the point and will clear it of any clinging fibers. The forward movement of the pusher 150 is sufficient to feed the forward end of the top sheet of the pile over the bridge 160 and into the bite of the rollers 151 and 152, which are mounted upon their respective shafts and arranged in the usual manner of such rollers, the lower roller being rotated by the mesh of a beveled gear 161 on its shaft with a corresponding gear 162 on shaft 163 which is driven by connecting chain or belt 164 passing over wheels 165 on shaft 163 and wheel 166 on shaft 2, while the upper roller is rotated by meshing gears on the respective roller shafts. The feed rollers are shaped to take hold of the labels only near their ends, and one upper roller is arranged to bear upon the label between the lines of paste 130 and 131 so as not to disturb them; an adjustable label regulator 188 is arranged to deliver light strokes upon a label when out of proper position on platform 167, the stem of the regulator being pivoted at its lower end, and is rocked back and forth to deliver its strokes by contact of end of rod 99, or other projection on shaft 6, and by spring 189, see Figs. 4, 11, 12 and 22. A label is fed over a mold of wheel 13 just before a package is shifted from wheel 12 to the label covered mold of wheel 13, the part of the label carrying the paste projecting beyond the mold in the direction of the rotation of the wheel as shown in Fig. 22.

Devices for folding the label wrappers around the packages and expelling the completed packages from the machine.—As the packages are shifted from wheel 12 into the molds of wheel 13, the labels will be folded around the two edges and one side of the packages, and as the wheel advances the projecting and pasted ends of the labels will be folded back and held in place by the stationary retaining platform folder 167. To prevent wiping the paste from this part of the labels by their contact with the movable bottoms of the molds of wheel 12 from which the packages were shifted, these bottoms are provided with central projections or ribs 168 which pass through the breaks or openings $130^{\times}$ in the lines of paste and hold them out of contact with such bottoms while the forward half of the label is turned backward. Ribs 169 are also preferably formed on wheel 13 between the molds to keep the lines of paste intact while the packages are in wheel 13 as shown in Figs. 2, 6 and 22. As the packages are forced from the molds of wheel 13 into the registering molds of wheel 11, the extreme pasted edge of the label through its contact with the side wall of the receiving mold is turned back upon the edge of the package to overlap the opposite edge of the label and is pressed into sealing contact therewith, as shown in Fig. 22. While the end side folds of the label or outer wrapper are being made, it is important to press and hold the end folds of the inner wrapper against the ends of the package, since they are liable to spring away either during or before this operation. For this purpose a pair of oscillating pressing and holding fingers, called fold holders, are arranged to operate at the ends of the receiving mold of wheel 11. Each member of the pair consists of a plate or holder 170 secured to arm 171 and of a plate or holder 172 elastically and slidingly secured to holder 170 to have a conjoint and independent movement therewith by means of a spring 173 secured to pins 174 fixed in the respective holders, the pin fixed to holder 170 passing through a slot 175 in holder 172, the said pin and slot being so arranged relatively to the working ends of the holders that when the spring 173 pulls holder 172 forward against the head of the slot its working end will be in advance of the end of holder 170, which may be regarded as their normal positions, as shown in Fig. 25. When both holders are pressed against the end of the package, as shown in Fig. 24, holder 170 will be moved away first and holder 172 will be moved as soon as the pin strikes the head of the slot. Figs. 24 and 25 show the position of the fold holders relatively to the edge or thickness of the package and Fig. 23 shows their position relatively to the width of the package and to the edge folders 176 and 177 by which edge folds of the label wrapper are brought down upon and overlap the top and bottom folds of the inner wrapper and hold them in place until the last end fold is made and sealed to complete the package. The arms 171 are pivoted at their lower ends and are connected together by toggle joint 178 and are moved to and from each other by engagement of roller 179 with cam 180 on shaft 2 to give the required movement to the fold holders.

The oscillating fingers or folders 176 which form folds of the label wrapper at one edge but on both ends of the package are carried on the ends of arms 181 and are of substantially the same construction and opera-

tion as the oscillating fingers 101 of wheel 12 which make corresponding folds in the inner wrapper and are similarly supported on shaft of wheel 1 and are oscillated through their adjustable connection with arm 182 which as before described is rocked by its engagement with cam groove in face of wheel 111 on main shaft.

The stationary edge folders 177 and the top and bottom end folders 184 and 185 are attached to and form a part of the curved holder 186 fixed to conform to the periphery of the wheel 11, and are substantially of the same construction and operate to form and hold their respective folds in the same way as the folders 112, 115 and 117 of holder 102 which form the corresponding folds of the inner wrapper when the packages are in the molds of wheel 12. After folder 185 has formed the last fold the walls of holder 186 are narrowed to conform to the length of the package and hold the end folds in place or an additional section 187 is used for this purpose, till the packages are discharged from the molds of wheel 11 into trough 87 through which they are moved by the pressure of the subsequent packages until they are expelled from the machine, the trough being sufficiently narrow so that its side walls will cause the end folds of the packages to be forced inwardly and held in sealing contact throughout the length of the trough as well as throughout section 187 after the final end fold is made.

In view of the statements of the operation of the several devices and groups of devices or mechanisms hereinbefore made in connection with the descriptions of their construction and arrangement with each other and other parts, it is not considered necessary to further describe the operation of the machine.

It is of course, understood that the several operative parts are so timed that they will perform their work in proper succession and during such periods as not to interfere with each other, and that the cams and other actuating parts are so shaped and arranged as to give to the devices operated thereby the movements requisite to do the work herein ascribed to them.

It is not intended to limit the present invention to a machine of the exact or special construction shown in the drawings and hereinbefore described by reference thereto, or to a machine embodying all the devices and combinations, or equivalents therefor as shown and described, inasmuch as it is evident that a machine may in some particulars be of radically different construction, while in other particulars it contains not only the principle of the invention, but the devices and combinations, or some of them, as herein fully described and claimed.

Having now particularly described and ascertained the nature of the special invention and in what manner the same is to be performed, what is claimed as new is:—

1. In wrapping machines, three coöperating mold wheels mounted to intermittently rotate in the same plane, each wheel being provided with molds to register with the molds of the other two wheels and means to shift articles into and out of the molds of each of said wheels simultaneously.

2. In wrapping machines, three coöperating mold wheels mounted to intermittently rotate in the same plane, each wheel being provided with molds to register with the molds of the other two wheels, movable mold bottoms mounted in said molds, means to simultaneously move the bottom of a discharging mold outward and that of a receiving mold inward to shift an article from the mold of one wheel to the registering mold of another and means to hold the movable mold bottoms in position into which they are moved.

3. In wrapping machines, three coöperating mold wheels mounted to intermittently rotate in the same plane, each wheel being provided with molds to register with the molds of the other two wheels, means to rotate said wheels intermittently, means to partially wrap an article in a mold of the first wheel, means for shifting said partially wrapped article into a mold of the second wheel, means for forming the end folds around said article while it is in said second wheel, means for feeding a label between the registering molds of the second and third wheel, means for forcing the wrapped article in the said second wheel and said label into a mold of the third wheel, means for forcing said wrapped article and said label from said third wheel into said first wheel and means for completely folding said label around said wrapped article.

4. In wrapping machines, three coöperating mold wheels mounted to intermittently rotate in the same plane, each wheel being provided with molds to register with the molds of the other two wheels, means to force an article and a wrapper into a mold of the first wheel, means to transfer said article and wrapper to a mold of the said second wheel, movable end folders and stationary end folders on either side of said second mold wheel to form the end folds in said wrapper, means to feed a label between the molds of the second and third wheels, means to force the article and the said folded wrapper in the mold of said second wheel and said label into a mold of the third wheel, means to transfer said article, said folded wrapper and said label from said third wheel into said first wheel and movable and stationary end folders to coöperate with said first wheel to form end folds in said label.

5. In wrapping machines, means for separating a series of cigarettes, means for inclosing said cigarettes in a wrapper and folding the ends of said wrapper upon said cigarettes, means for applying an inclosing label to said wrapped cigarettes and means for folding and sealing the ends of said label over the ends of said wrapper.

6. In wrapping machines, a mold, movable platforms adjacent said mold, a plunger above said platforms, a card receptacle above said platforms and on one side of the same, a curved card guide above said platforms opposite said card receptacle, means to feed a wrapper to said mold, means to feed a series of cigarettes to said platforms and to operate said plunger to force said cigarettes and said wrapper into said mold, a pusher to force a card from said card receptacle into engagement with said card guide and upon said platforms, means to feed a second series of cigarettes to said platforms and means to operate said plunger to force said series of cigarettes and said card into said mold.

7. In wrapping machines, a mold, movable platforms adjacent said mold, a card receptacle adjacent said mold, a plunger coöperating with said mold, means to feed a wrapper to said mold, means to feed a series of cigarettes to said platforms, means to operate said plunger to force said cigarettes and said wrapper into said mold, means to feed a card and a second series of cigarettes to said platforms and means to operate said plunger to force said card and said cigarettes into said mold.

8. In wrapping machines, a movable mold, movable platforms adjacent said mold, means to feed a wrapper to said mold, means to feed a series of cigarettes to said platforms, means to force said cigarettes and said wrapper into said mold, means to feed a card and a second series of cigarettes to said platforms and means to force said card and said cigarettes into said mold.

9. In wrapping machines, a movable mold, movable supports adjacent said mold, means to feed a series of cigarettes to said supports and force the same into said mold, means to feed a card and a second series of cigarettes to said supports and to force the same into said mold upon said first series of cigarettes.

10. In wrapping machines, a movable mold, means to feed a wrapper to said mold, means to force a series of cigarettes and said wrapper into said mold, means to simul-

taneously force a card and a second series of cigarettes into said mold upon said first series of cigarettes and means to fold said wrapper around said card and said cigarettes.

11. In wrapping machines, a movable mold, means for feeding a wrapper to said mold, supports adjacent said mold, means for feeding a series of cigarettes and a card to said supports and for forcing them into said mold, and means for folding said wrapper around said card and said cigarettes.

12. In wrapping machines, a mold wheel provided with molds, means for forcing a wrapper and a series of cigarettes into one of said molds, means for forming the longitudinal fold of said wrapper, a receiving wheel provided with molds, means to transfer said cigarettes and said wrapper from said mold wheel into said receiving wheel, means for forming end folds in said wrapper while it is being moved in said receiving wheel and means for intermittently rotating said wheels to cause the molds therein to register.

13. In wrapping machines, a movable mold, means for feeding a wrapper to said mold, supports adjacent said mold and means for feeding a series of cigarettes and a card to said supports and for forcing them into said mold.

14. In wrapping machines, means to fold a wrapper around an article to form unsealed end folds, means to supply a pasted label to said article, means to hold said end folds of said wrapper in position and to simultaneously form and seal the superimposed end folds of said label.

15. In wrapping machines, means for folding a wrapper around an article to form unsealed end folds, means for applying a pasted label to said wrapped article, means to hold the end folds of said wrapper in place and means to form and seal the end folds of said label upon the end folds of said wrapper.

16. In wrapping machines, a mold, means to force an article inclosed in a folded wrapper and a label into said mold, means to form the longitudinal fold in said label, fold holders, means to move said fold holders to engage and retain the end folds of said wrapper and means for forming an end fold in said label while said fold holders engage said wrapper.

17. In wrapping machines, a mold, means to force an article inclosed in a wrapper and a label into said mold, a fold holder comprising a spring tip and a foot, means to move said fold holder into contact with the end folds of said wrapper to bring said spring tip into engagement with the lower end fold to depress and hold the same and to subsequently bring said foot into engagement with the outer end fold to depress and hold the same firmly against said inner fold and means to form an end fold in said label upon said wrapper.

18. In wrapping machines, a mold, means to supply an article inclosed in a wrapper and a label to said mold, a fold holder comprising a spring tip and a foot and means to bring said fold holder into engagement with the end folds in said wrapper to successively depress and retain the same.

19. In wrapping machines, a mold, means to supply an article inclosed in a folded wrapper to said mold, a fold holder comprising a yielding tip and a foot, means to move said fold holder against said wrapped article, said tip engaging a lower end fold to depress and hold the same and said foot engaging an outer end fold to depress and hold the same against said lower end fold, and means to permanently hold said end folds in position.

20. In wrapping machines, a folder holder comprising a yielding tip and a foot and means to move said fold holder into contact with a wrapped article, said tip engaging a lower fold to depress and hold the same and said foot subsequently engaging an outer fold to depress and hold the same upon said lower fold.

21. In wrapping machines, a label bed, a paste roll adjacent said label bed, a lever, a spring-pressed arm pivoted to said lever, a longitudinally yieldable rod mounted on said arm, paste fingers secured to said rod, paste fingers secured to said arm, yielding stripper pins adjacent said paste fingers and secured to said arm, a stop in the path of said rod to force said rod and the paste fingers secured thereto into alinement with the paste fingers secured to said arm and to force said paste fingers into contact with said paste roll and an adjustable stop to engage said arm to force said paste fingers into contact with said label bed.

22. In wrapping machines, a movable arm carrying paste fingers, a yieldable rod mounted on said arm and carrying paste fingers, a stop in the path of said rod and means to move said arm to bring said paste fingers into alinement and means to apply paste to said fingers.

23. In wrapping machines, a movable arm carrying paste fingers, a spring-pressed rod mounted on said arm and carrying paste fingers, a stop in the path of said rod, and means to actuate said arm to move said paste fingers and to simultaneously cause a relative movement between them.

24. In wrapping machines, a paste roll, a plurality of paste fingers and means to move said paste fingers into alinement and simultaneously into contact with said paste roll and means to move said paste fingers to separate them and to apply paste to an article.

25. In wrapping machines, registering molds, means to transfer an article from one mold to the other, means to feed a label between said molds and a movable regulator to engage said label and to bring it into proper alinement with respect to said molds.

26. In wrapping machines, a mold wheel provided with molds, a mold coöperating with said mold wheel, movable bottoms in the molds of said mold wheels, means to feed a label provided with lines of paste to said mold wheel, means to force an article in a mold of said mold wheel and said label into said coöperating mold, the bottoms of said molds in said mold wheel being provided with recesses to coöperate with said lines of paste and to prevent smearing.

27. In wrapping machines, mold wheels provided with molds, means to supply labels having lines of paste thereon to said mold wheels, bottoms operating in said molds, said bottoms and the peripheries of said mold wheels being provided with recesses to coöperate with said lines of paste to prevent smearing.

28. In wrapping machines, a mold wheel provided with molds, means to force an article and a wrapper having lines of paste into said mold wheel, a support coöperating with said mold wheel, means to force said article and wrapper out of said mold wheel into said support, the periphery of said mold wheel adjacent the molds therein being formed with depressions to accommodate lines of paste on said wrapper to prevent smearing.

29. In wrapping machines, a mold wheel provided with molds, means to form lines of paste on a wrapper and to feed it adjacent said mold wheel, means to force an article and said wrapper into said mold wheel, a folder adjacent said mold wheel to fold said wrapper around said article, a coöperating receiving wheel provided with molds adjacent said mold wheel and means to transfer said wrapper and article from said mold wheel to the said receiving wheel, the periphery of said mold wheel being formed with depressions adjacent the molds therein to accommodate the lines of paste on said wrapper to prevent smearing.

30. In wrapping machines, an intermittently rotating mold wheel provided with molds, means for forcing a wrapper and an article into a mold of said mold wheel, an intermittently rotating receiving wheel provided with registering molds, means to transfer said article and wrapper to a mold of said receiving wheel, movable folders mounted to oscillate concentrically with respect to said receiving wheel to engage the rear edge folds of said wrapper to fold the same and stationary folders mounted concentrically with respect to said receiving wheel to engage the projecting ends of said wrapper and to form the forward edge folds and the top and bottom folds therein.

31. In wrapping machines, an intermittently rotating mold wheel provided with molds, an intermittently rotating receiving wheel provided with registering molds, means to transfer a wrapper and article from a mold in said mold wheel to the registering mold in said receiving wheel and stationary folders arranged on each side of said receiving wheel to fold the ends of said wrapper as the wheel passes said folders.

32. In wrapping machines, a mold wheel provided with

a mold, means to force a wrapper and article into said mold, movable folders mounted to oscillate concentrically with respect to said mold wheel and to engage the rear edge folds of said wrapper to fold the same, and stationary folders arranged in series in the path of the projecting ends of said wrapper, said movable folders engaging said wrapper when it moves into engagement with the first stationary folders, said stationary folders being formed with retaining fingers projecting under the succeeding folders of the series.

33. In wrapping machines, a mold wheel provided with a mold, means to force an article and a wrapper into said mold and to form the longitudinal fold in said wrapper, a movable folder to engage a rear edge of said wrapper and to fold the same against said article, and a series of stationary folders in the path of said wrapper comprising a folder to engage the front edge of said wrapper while said movable folder is in engagement with said wrapper to form the front edge fold upon said rear edge fold, a bottom folder to subsequently form the bottom fold in said wrapper end, a retaining finger of gradually decreasing width to hold said bottom fold in place and gradually release the same and a final top folder to engage the wrapper end and to form the top fold therein against said held bottom fold.

34. In wrapping machines, a mold wheel provided with a mold, means to force an article and a wrapper into said mold and to form the longitudinal fold in said wrapper, a movable folder mounted to oscillate concentrically with respect to said mold wheel to form the rear edge fold in the end of said wrapper and a stationary folder in the path of the end of said wrapper to simultaneously engage the forward edge of said wrapper and to form the front edge fold therein against the held rear edge fold of the same.

35. In wrapping machines, a mold wheel provided with a mold, means to force an article and a wrapper into said mold and to form a longitudinal fold in the same, concentric oscillating fingers mounted on either side of said mold wheel to form an end fold in each end of said wrapper and a series of stationary concentric folders on each side of said mold wheels to engage the projecting ends of said wrapper and to form other end folds therein as said mold-wheel moves past said folders.

36. In wrapping machines, a mold wheel provided with a mold, means to force an article and a wrapper into said mold and to form the longitudinal fold in said wrapper and stationary folders mounted in series adjacent said mold wheel, said folders being provided with retaining fingers extending beneath the succeeding folders of the series.

37. In wrapping machines, stationary end folders mounted in series to engage a wrapper, said end folders being provided with retaining fingers of gradually decreasing width projecting under the succeeding folders.

38. In wrapping machines, a mold wheel provided with molds, stationary folders adjacent said wheel to form end folds in wrappers carried in said molds and a stationary fold holding section adjacent said wheel, a receiving wheel provided with molds registering with the molds of said mold wheel, means to feed labels between the registering molds of said wheels and means to transfer articles from said mold wheel to said receiving wheel.

39. In wrapping machines, a pair of oscillating folders mounted upon arms to form end folds in a wrapper, a second pair of oscillating folders mounted upon arms to form end folds in another wrapper and means to connect both pairs of said oscillating folders to operate them simultaneously.

40. In wrapping machines, a pair of oscillating folders mounted upon arms to form the end folds in a wrapper, a second pair of oscillating folders mounted upon arms to form end folds in another wrapper and means to adjustably connect said arms to regulate the relative movement of said folders and to actuate them simultaneously.

41. In a device for filling a box with two layers of cigarettes or similar articles, the combination of means for feeding a layer or set of cigarettes or similar articles into the box, devices for feeding a card or strip of suitable material over said layer, and means for feeding a second layer or set of cigarettes or similar articles upon said card or strip, whereby two layers of cigarettes or similar articles can be packed in a box, one over the other.

42. In wrapping machines, a mold, means for feeding a series of cigarettes or similar articles to said mold, means for feeding a card to said mold and means for feeding a second series of cigarettes or similar articles to said mold.

43. In wrapping machines, a mold, means for feeding two series of cigarettes or similar articles to said mold and means for feeding a card to said mold between said series of cigarettes or similar articles.

44. In wrapping machines, means to support a wrapper, means for feeding a series of articles to said wrapper, means for feeding a card to said wrapper and accurately positioning the same with respect to said series of articles and folding means to inclose said articles and said card in said wrapper.

45. In wrapping machines, a mold, means for feeding a series of articles to said mold, and means for feeding a card and accurately positioning the same in said mold with respect to said articles.

46. In wrapping machines, means to support a wrapper, means for feeding two series of cigarettes or similar articles to said wrapper and means for feeding a card to said wrapper between said series of cigarettes or similar articles.

47. In wrapping machines, means to support a wrapper, means for feeding a series of articles to said wrapper and means for feeding a card to said wrapper and accurately positioning the same with respect to said series of articles.

48. In wrapping machines, means for folding a wrapper around an article to form unsealed end folds, means for applying a label to said wrapped article, means to hold the end folds of said wrapper in place and means to form and seal the end folds of said label upon the end folds of said wrapper.

49. In wrapping machines, a mold, means for feeding a quantity of material to said mold and means for feeding a card and accurately positioning the same in said mold with respect to said material.

50. In wrapping machines, means to support a wrapper, means for feeding a quantity of material to said wrapper and means for feeding a card to said wrapper and accurately positioning the same with respect to said material.

51. In wrapping machines, means to support a wrapper, means for feeding a quantity of material to said wrapper, means for feeding a card to said wrapper and accurately positioning the same with respect to said material and folding means to fold said wrapper about said material and said card.

WILLIAM R. LANDFEAR.

Witnesses:
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ALEXANDER MITCHELL.