No. 864,256. PATENTED AUG. 27, 1907.

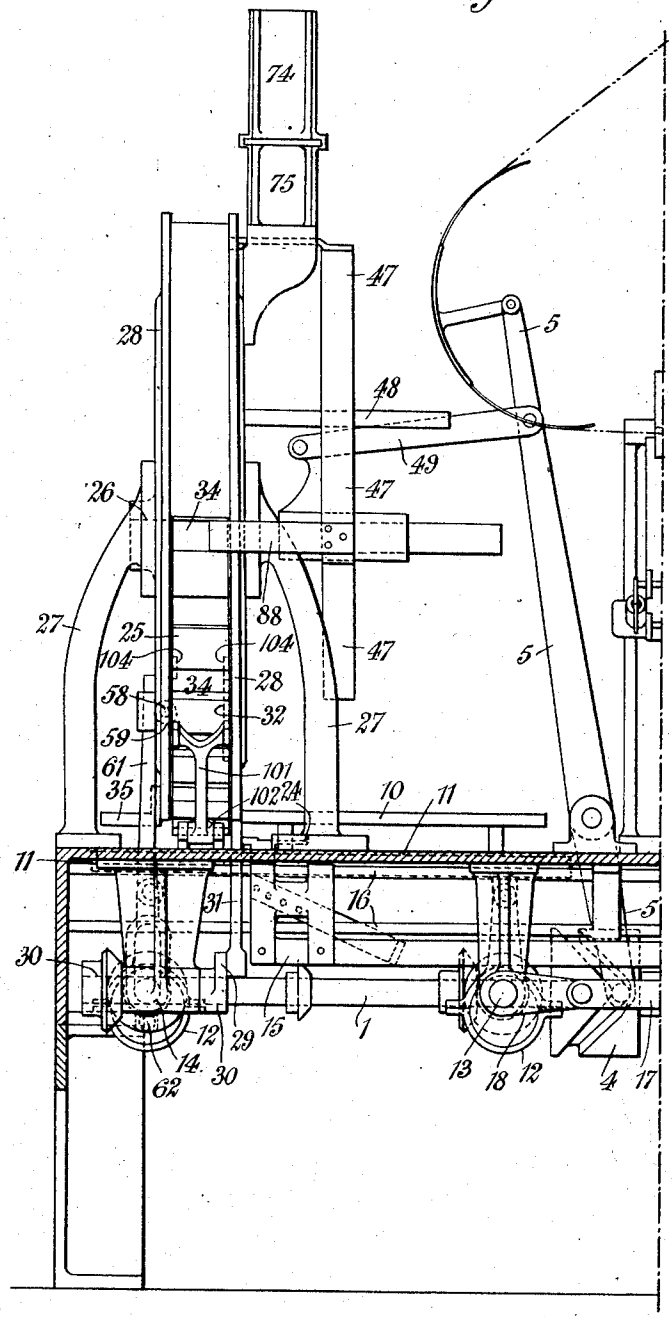
E. T. POLLARD & E. L. BEHRMANN.

CIGARETTE PACKING MACHINE.

APPLICATION FILED JAN. 9, 1906.

11 SHEETS—SHEET 1.

*Fig. 1.*




Witnesses

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Baldwin & Wright

No. 864,256. PATENTED AUG. 27, 1907.

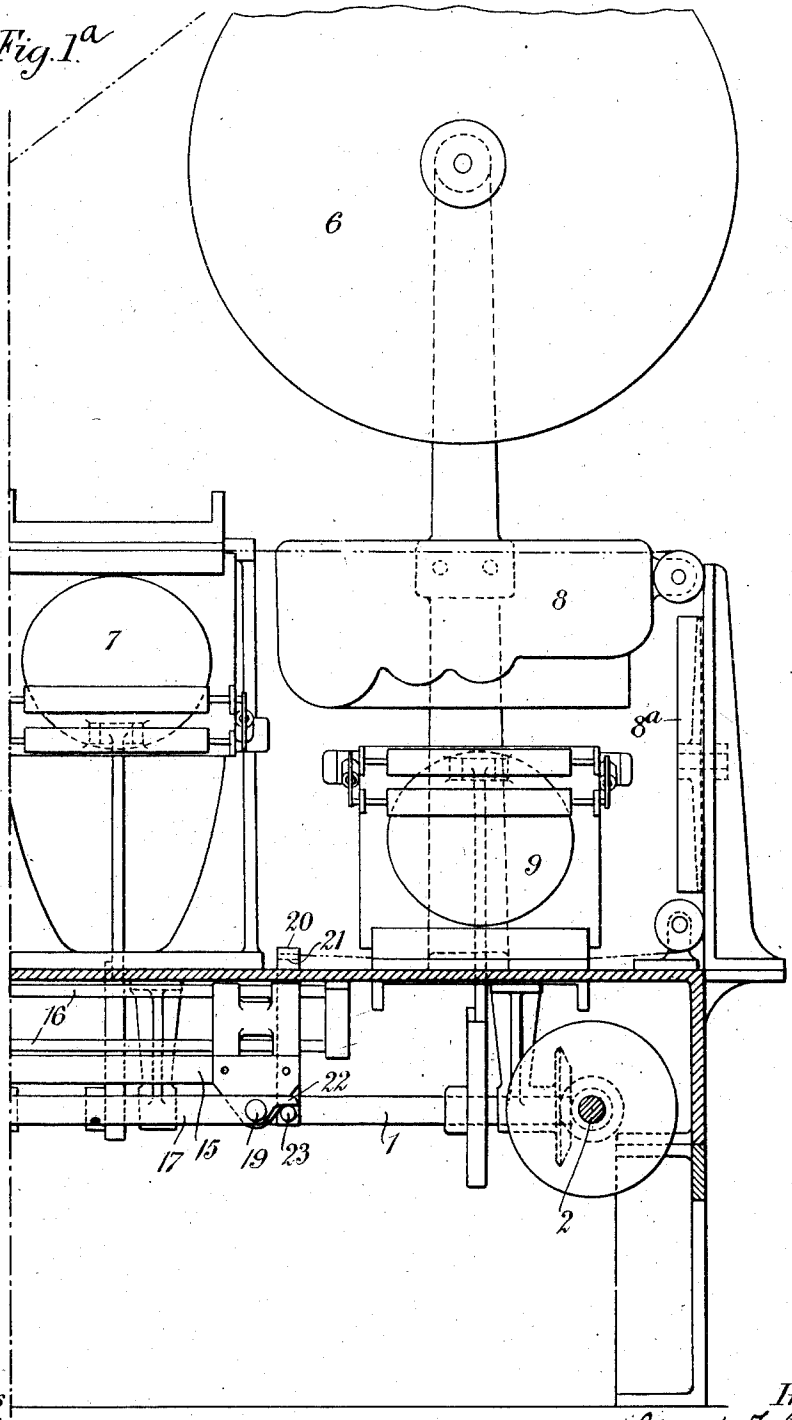
E. T. POLLARD & E. L. BEHRMANN.

CIGARETTE PACKING MACHINE.

APPLICATION FILED JAN. 9, 1906.

11 SHEETS—SHEET 2.

Fig. 1a




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No. 864,256. PATENTED AUG. 27, 1907.

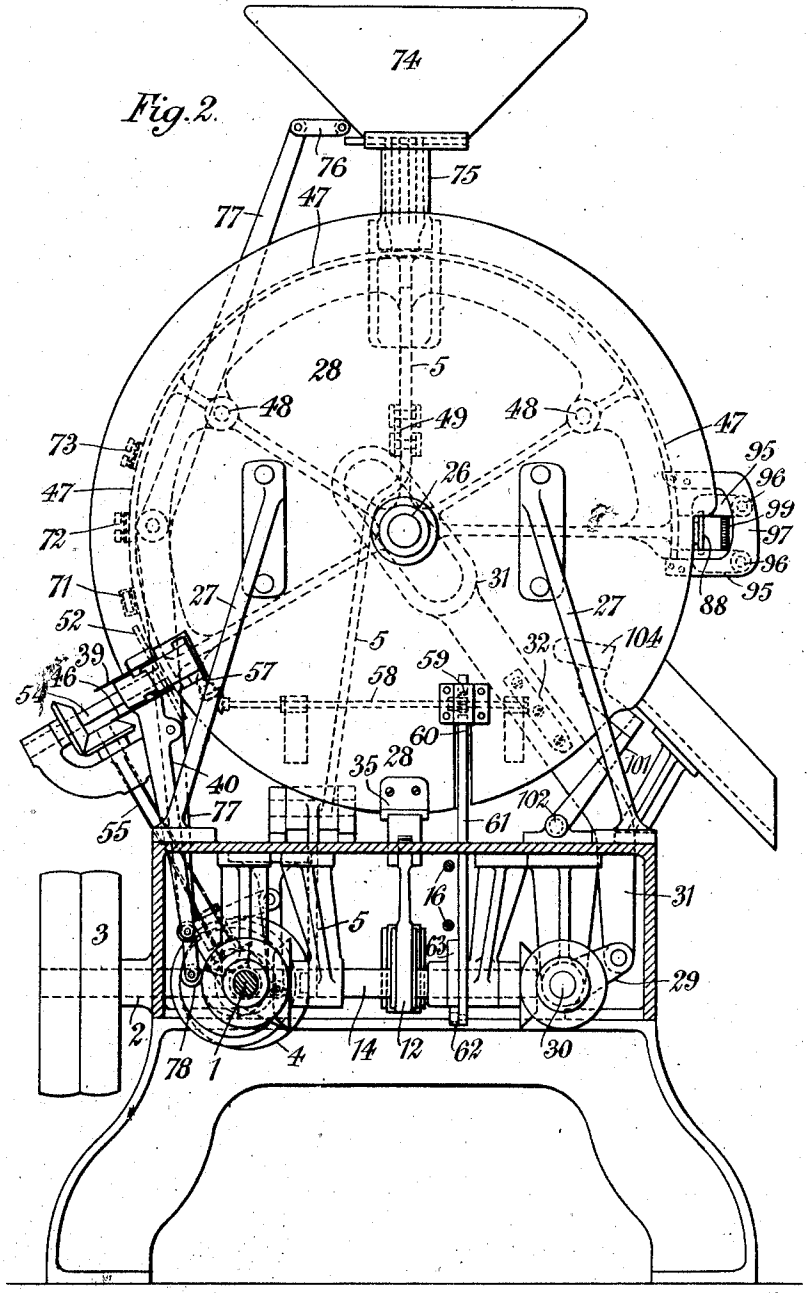
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CIGARETTE PACKING MACHINE.

APPLICATION FILED JAN. 9, 1906.

11 SHEETS—SHEET 3.

Fig. 2.




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11 SHEETS—SHEET 4.

Fig. 3.

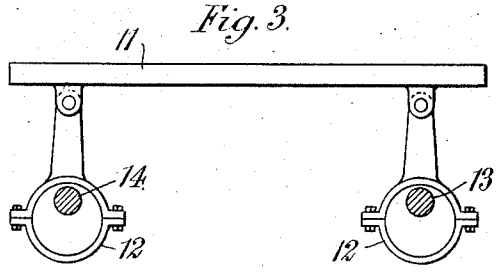



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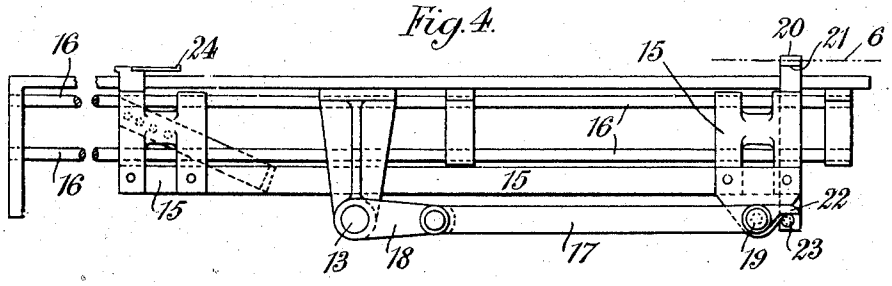
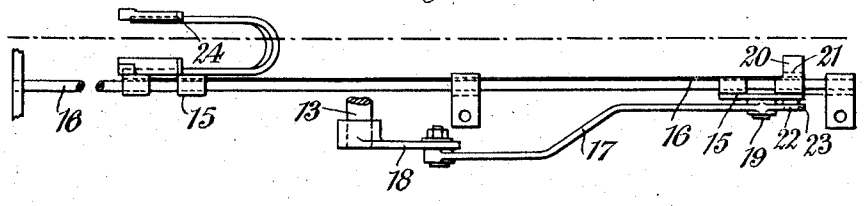



Fig. 5.




Witnesses
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CIGARETTE PACKING MACHINE.

APPLICATION FILED JAN. 9, 1906. 11 SHEETS—SHEET 5.

Fig. 6a

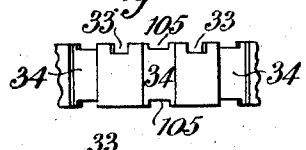
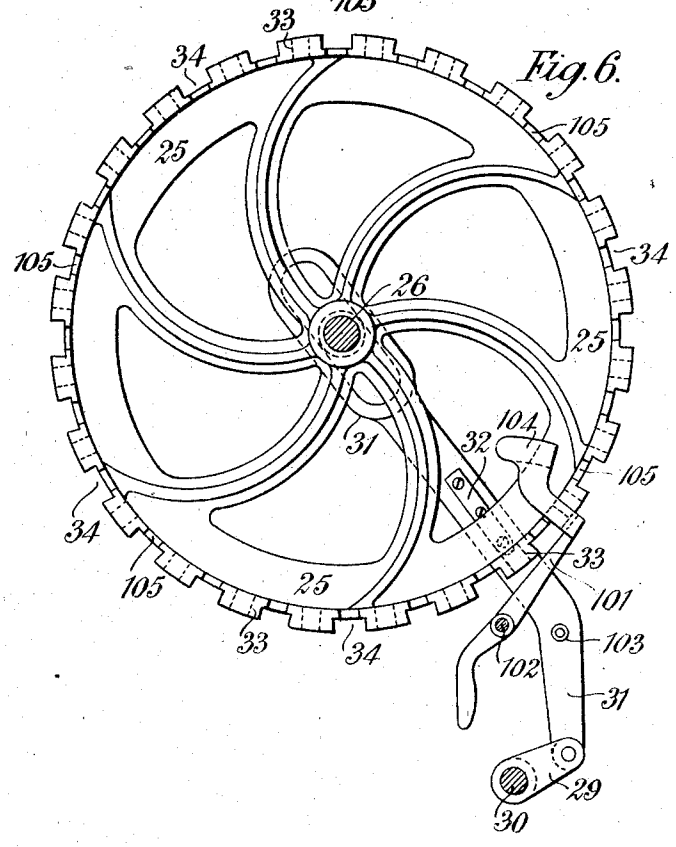



Fig. 6.




Witnesses
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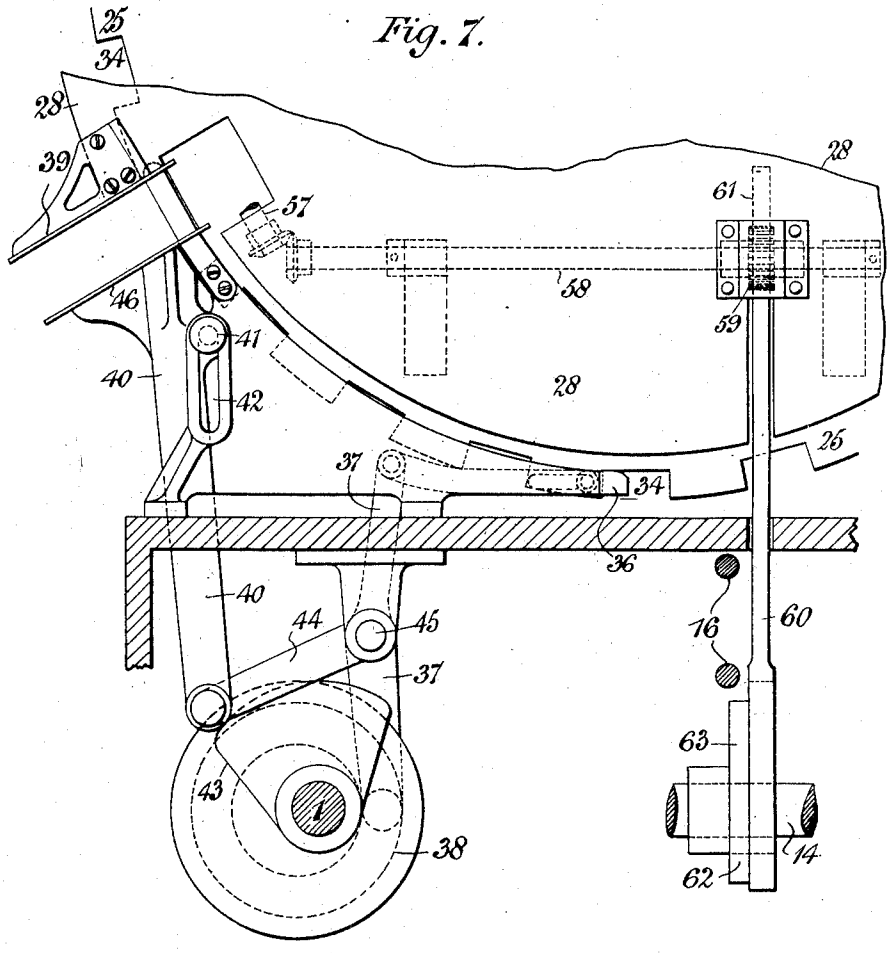
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E. T. POLLARD & E. L. BEHRMANN.

CIGARETTE PACKING MACHINE.

APPLICATION FILED JAN. 9, 1906. 11 SHEETS—SHEET 6.

*Fig. 7.*




*Witnesses.*

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No. 864,256. PATENTED AUG. 27, 1907.

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CIGARETTE PACKING MACHINE.

APPLICATION FILED JAN. 9, 1906.

11 SHEETS—SHEET 7.

Fig. 8.

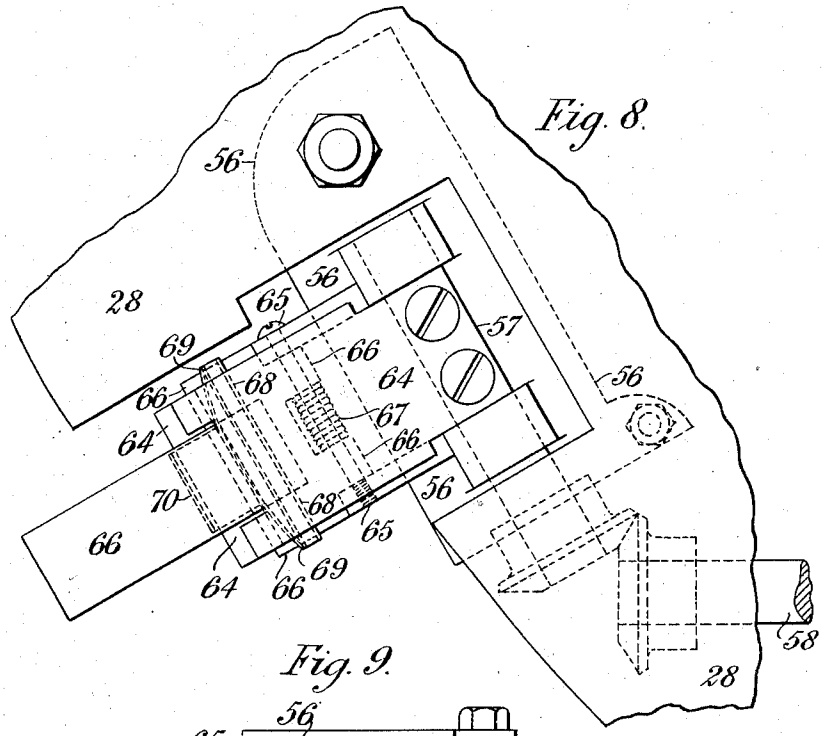



Fig. 9.

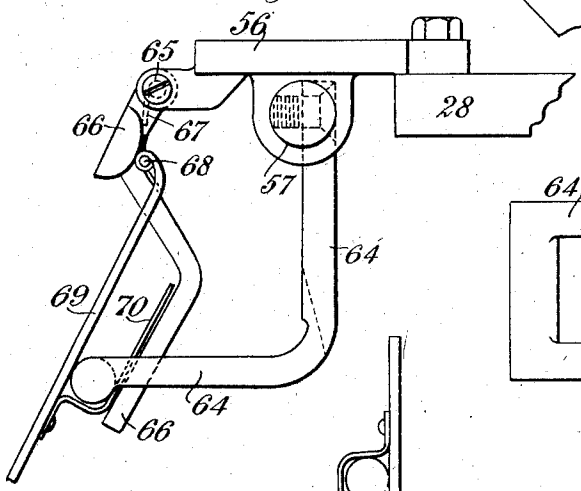



Fig. 11.

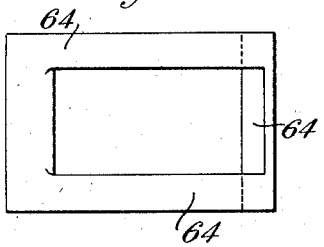
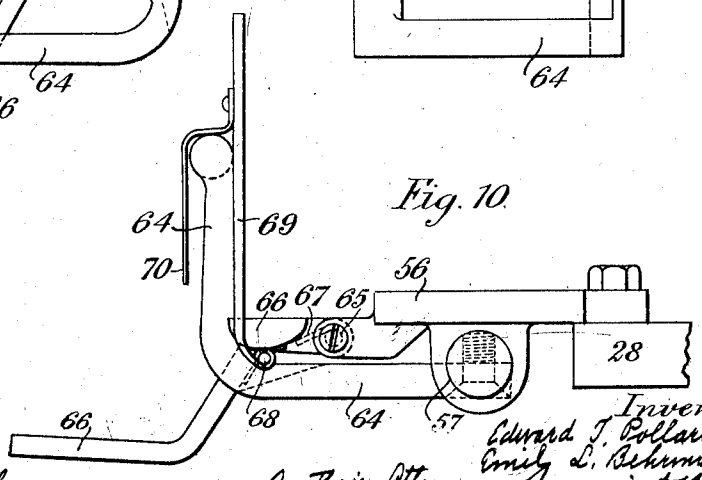



Fig. 10.




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CIGARETTE PACKING MACHINE.

APPLICATION FILED JAN. 9, 1906.

11 SHEETS—SHEET 8.

Fig. 12.

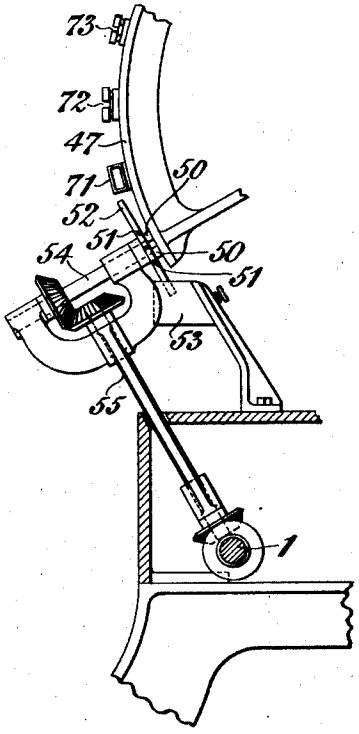
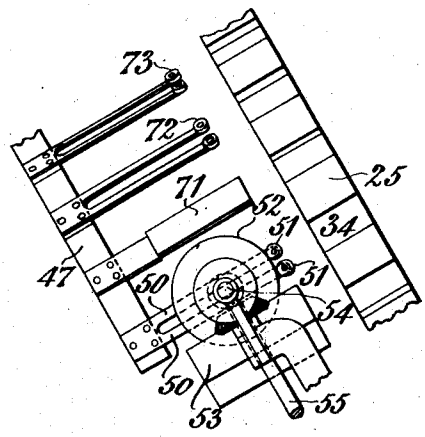



Fig. 13.




Witnesses.
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No. 864,256. PATENTED AUG. 27, 1907.

E. T. POLLARD & E. L. BEHRMANN.

CIGARETTE PACKING MACHINE.

APPLICATION FILED JAN. 9, 1906.

11 SHEETS—SHEET 9.

Fig. 14.

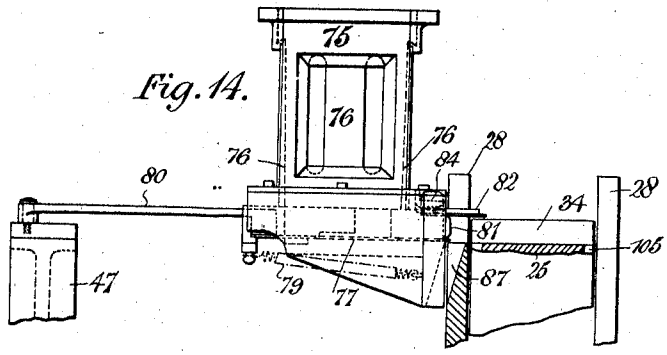



Fig. 15.

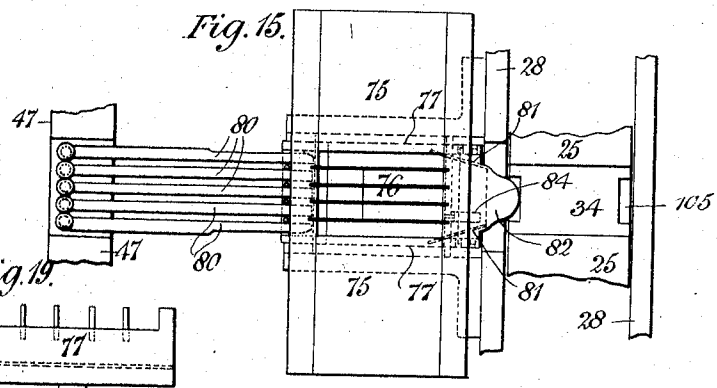



Fig. 19.




Fig. 16.

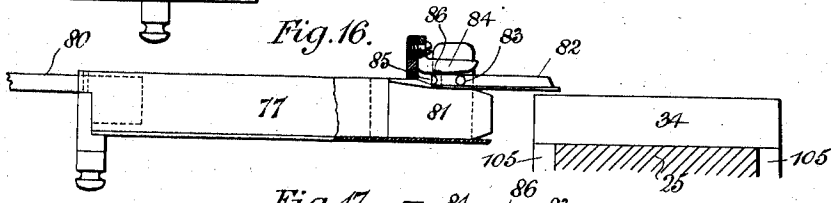



Fig. 17.

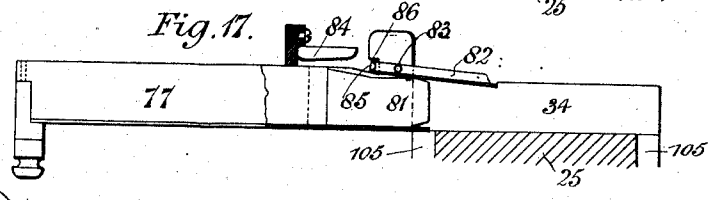



Fig. 20.

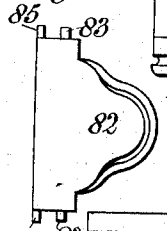
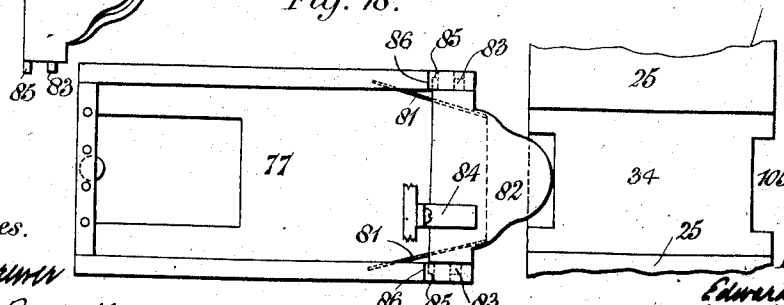



Fig. 18.




Witnesses.

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No. 864,256. PATENTED AUG. 27, 1907.

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CIGARETTE PACKING MACHINE.

APPLICATION FILED JAN. 9, 1906.

11 SHEETS—SHEET 10.

Fig. 21.

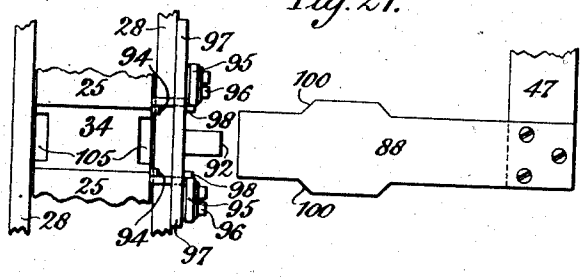



Fig. 24.

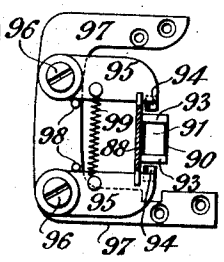



Fig. 22.

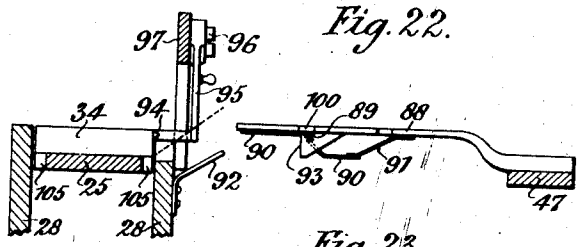
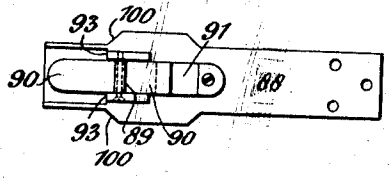



Fig. 23.




Witnesses

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PATENTED AUG. 27, 1907.

E. T. POLLARD & E. L. BEHRMANN.

CIGARETTE PACKING MACHINE.

APPLICATION FILED JAN. 9, 1906.

11 SHEETS—SHEET 11

Fig. 25.

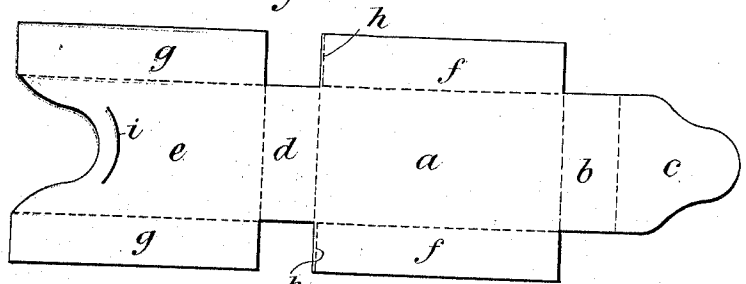



Fig. 26

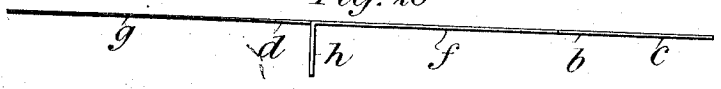



Fig. 27.

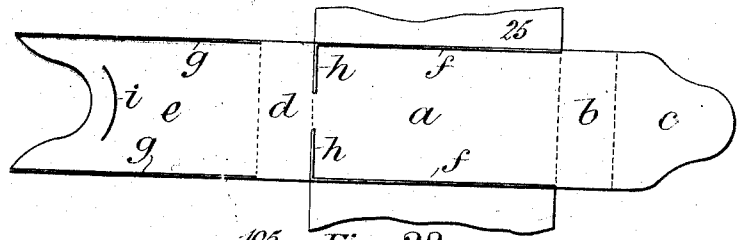



Fig. 28.

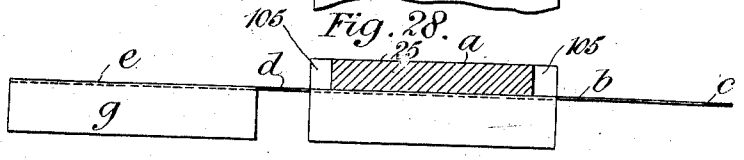



Fig. 29.

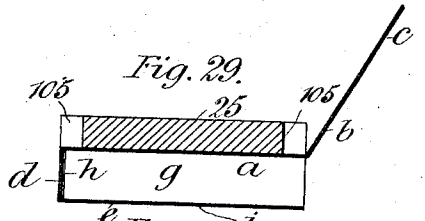



Fig. 30.

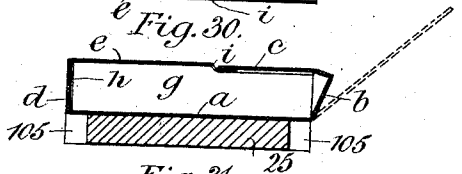
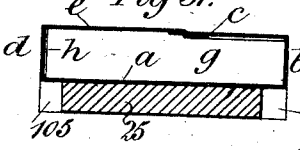



Fig 31.




Witnesses

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By their Attorneys

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# UNITED STATES PATENT OFFICE.

EDWARD THOMAS POLLARD AND EMIL LEO BEHRMANN, OF LONDON, ENGLAND, ASSIGNORS TO THE BRITISH-AMERICAN TOBACCO COMPANY, LIMITED, OF LONDON, ENGLAND.

## CIGARETTE-PACKING MACHINE.

No. 864,256. Specification of Letters Patent. Patented Aug. 27, 1907.

Application filed January 9, 1906. Serial No. 295,275.

*To all whom it may concern:*

Be it known that we, EDWARD THOMAS POLLARD, engineer, a citizen of the United States, and EMIL LEO BEHRMANN, engineer, a subject of the King of Roumania, both residing at 36 Featherstone street, London, England, have invented a certain new and useful Cigarette-Packing Machine, of which the following is a specification.

This invention relates to improvements in machines for making boxes or cases from a web of paper or card and filling them with cigarettes or other articles, the paper of a width sufficient to make the box required being drawn off, printed in one or more colors, and then scored and cut by a die which forces it into one of a series of molds formed transversely across the circumference of an intermittently rotated wheel, in which the box is formed, filled and closed.

Figure 1 of the drawings is a side view of part of the machine; and Fig. 1ª is a side view of the other part thereof. Fig. 2 is an end view of the machine. Figs. 3, 4 and 5 show details of the die and the paper feed mechanism. Fig. 6 shows the method of driving the mold wheel. Fig. 6ª is an edge view of a portion of this wheel. Figs. 7 to 11 show details of the first folding mechanism. Figs. 12 and 13 show details of the mechanism for pasting the sides of the box. Figs. 14 to 20 show details of the mechanism for filling the box with cigarettes. Figs. 21 to 24 show details of the mechanism for closing the box, and Figs. 25 to 31 show the box in its various stages. Of these figures 1 to 6, 6ª, 12 and 13 are to one scale, Figs. 7, 14, 15 and 21 to 24 are to a larger scale, Figs. 16 to 20 and 25 to 31 are to a larger scale, and Figs. 8 to 11 are to a scale again larger.

1 is the main shaft driven from the shaft 2 fitted with a belt pulley 3. On the shaft 1 is a cam 4 rocking a lever 5 which draws off paper from the roll 6. In the machine illustrated the paper passes through a printer 7, bronzer 8, polisher 8×, and printer 9 by which it is printed in two colors and bronzed. All these are of ordinary construction and need no description; they are all driven from the shaft 1. The paper thus printed passes beneath a fixed plate 10 against which it is pressed by a die 11 which receives a vertically reciprocating movement from a pair of eccentrics 12 (see Fig. 3) on cross shafts 13 and 14 driven from the shaft 1 by bevel gear.

The blank for forming a box (see Fig. 25 which is a plan of the blank before it is forced into the mold, and Fig. 26 which is an edge view) consists of a front *a*, top *b*, top flap *c*, bottom *d*, back *e*, sides *f*, back flaps *g* and bottom flaps *h*. In the back *e* is cut a slit *i* into which the tongue of the top flap *c* is inserted when the box is finally closed.

It is essential to the working of the machine that the paper should be fed forward with great precision just the length of a blank for each movement of the mold wheel and this is effected as follows:—A slide 15 moving on guide rods 16 receives a to and fro horizontal movement from a link 17 one end of which is connected to a pin on a crank 18 on the shaft 13 while its other end is pivoted to the slide at 19. The web 6 is gripped between a fixed jaw 20 and a jaw 21 held up to the jaw 20 by a spring during half the revolution of the crank 18 but at the proper time owing to the rotation of the crank whose throw is equal to the length of a blank the link 17 turns on the pivot 19 and a finger 22 on the link presses on a roller 23 carried by the jaw 21 and pulls the jaw down to release the paper. The forward end of the slide carries a pair of hooks 24 which catch hold of the leading blank behind the back flaps *g* and pull it forward.

The scoring, cutting and folding operations are precisely the same as those shown and described in U. S. Patent No. 775,148, granted to Edward T. Pollard November 15, 1904.

The die 11 (which is of the kind shown in said patent) is so formed that it does not sever the top flap of the leading blank from the back of the next until the leading blank is in position beneath the mold wheel 25.

On each upward stroke of the die the leading blank is severed from the second and thrust into a mold while the second blank is scored and cut but not severed from the web. This mold wheel turns on trunnions 26 supported by brackets 27 which also carry a shrouding 28 which covers in the wheel.

The wheel is moved round clockwise when viewed as in Fig. 2 by means of a crank 29 on a way shaft 30 driven off the shaft 14. The crank is connected to a link 31 whose upper end is slotted and embraces the inner trunnion 26. On the link is a pawl 32 which enters slots 33 on the inner face of the wheel and turns it one step for each revolution of the main shaft see Figs. 6 and 6ª.

The upward movement of the die forces the blank into that mold 34 which is at the bottom of the wheel, the mold being just large enough for the front *a* of the box to lie flat against its bottom while the sides *f* lie against its sides. The back flaps are also bent slightly by the back being forced into a shallow mold 35 carried by the shrouding, the flaps thus assuming positions approximately at right angles to the back. As the die comes down a blade 36 is slidden horizontally to the right see Fig. 7 to hold the blank in its mold and prevent its following the die. Movement is imparted to the blade by a bell crank 37 and cam groove 38 on the shaft 1.

When the wheel has turned through an angle of 60° the blank arrives at the folding mechanism shown in

Figs. 7 to 11 and the leading back flap *g*, which as already stated, is in a position approximately at right angles to the back, comes against a fixed plate 39. A link 40, a pin 41 on which moves in a slot 42 in the framing is reciprocated by a cam 43 on the shaft 1. The lower end of the link is connected by a rod 44 to a fixed pivot 45 and its upper end carries a plate 46 which comes against the following back flap *g* and bends it also at right angles to the back, the plate 46 coming sufficiently near to the plate 39 to pinch as it were the back *e* and flaps *g* together so that the blank is now in the position shown in Figs. 27 and 28. At this point the sides *f* are pasted on their insides as follows:—A saddle 47 reciprocated on guide rods 48 by a link 49 from the lever 5 (see Fig. 1) carries a pair of arms 50 (see Figs. 12 and 13) having at their ends rollers 51. These rollers normally rest against the rim of a wheel 52 dipping into a paste box 53 and carried by a stud axle 54 rotated by a shaft 55 driven by the shaft 1. As soon as the paste has been applied to the sides by the rollers 51 the bottom *d* and back *c* of the box are folded over by the mechanism shown in Figs. 8 to 11. A plate 56 secured to the shrouding carries a stud axle 57 rocked by bevel gear from a spindle 58 on which is a pinion 59 (see Fig. 7) gearing with a rack 60 on a rod 61 carrying a bowl 62 running on a cam 63 on the shaft 14. Fast with the axle 57 is a wiper 64 consisting of two parts at right angles the outer part being cut away as shown in Fig. 11 which is a view of the wiper in the position in which it appears in Fig. 9 looking as in Fig. 2. Pivoted at 65 to the plate 56 is a folder 66 constantly urged to the position in which it appears in Figs. 8 and 10 by the coiled spring 67 against which it is pulled back by the wiper 64. Pivoted at 68 to the folder is a plate 69 which has upon it a hook 70 surrounding the end of the wiper 64. The first movement of the spindle from the position in Fig. 9 allows the spring 67 to turn the folder 66 on its pivot to the position in Figs. 8 and 10 where it is stopped by the plate 56. The folder in this movement has turned the bottom *d* from the position in Fig. 28 to that in Fig. 29 while the plate 69 has turned the back *c* through a similar angle and the further movement of the wiper 64 compels the plate 69 to continue its movement to the position shown in Figs. 8 and 10 which completes the movement of the back into the position shown in Fig. 29, the back flaps *g* passing by reason of the squeezing action of the plates 39 and 46 just inside the sides *f* to which they are held by the paste thereon while the bottom flaps *h* lie just inside the bottom see Fig. 29. The wheel now moves on one step and at its next stop an iron 71 carried by the saddle 47 and heated in its back position by a Bunsen burner or other convenient means enters the box to dry the paste. At the next stop a pair of pressing rollers 72 similar to the pasting rollers enter the box and press the back flaps against the sides. 73 is a further pair of pressing rollers. The box next arrives at the filling mechanism shown in Figs. 14 to 20.

74 is a hopper filled with cigarettes and reciprocated to prevent the cigarettes sticking above a filler 75 by a link 76 (see Fig. 2) from a long bell crank 77 whose lower end carries a bowl 78 moved by a cam on the shaft 1. The filler 75 is divided into five or other number of chambers each wide enough to hold one cigarette by vertical partitions 76 the bottoms of which are cut away in front as seen in Fig. 14 to allow the cigarettes to close up as they are pushed forward.

Beneath the filler 75 is a tray 77 seen in section in Figs. 16 and 17 in plan in Fig. 18 and from the rear in Fig. 19 and constantly pulled towards the mold wheel or box holder by a spring 79 but drawn back while the wheel is moving by a series of pushers 80 carried by the saddle 47. The front of the tray carries light blade springs 81 at each side which enter the box while a flap 82 is pivoted at 83 to the tray so that when the tray is back it is held up as seen in Fig. 16 owing to its back edge passing beneath a fixed incline 84; as the tray moves forward the flap is released from this incline and tilts forward by its own weight as shown in Fig. 17 being stopped by lugs 85 coming against shoulders 86 on the tray. The front of the flap thus enters the box beneath the back *e* and prevents the front ends of the cigarettes catching thereon. The whole action is as follows:—The chambers of the filler are kept filled with cigarettes owing to the shaking of the hopper. When the wheel stops the parts are in the position shown in Fig. 16 but on the saddle moving forward the pushers allow the spring to draw the tray forward to the position in Fig. 17 and the springs and flap enter the mouth of the box; the continued movement of the pushers pushes say the lowest two cigarettes in each chamber into the box and the pushers and tray then recede. The outer sides of the two outer pushers are formed of a wedge shape so as to cause the forward ends of the pushers to close up as they advance so as to exactly follow the cigarettes which are brought together by the springs 81. The bottom of the tray is cut away as shown and a channel 87 is provided for the escape of any tobacco dust which might clog the mechanism. The filled box now comes to the mechanism for closing the box and tucking the end of the top flap into the slit *i* in the back. This is shown in Figs. 21 to 24, 21 being a side elevation *i. e.* a view similar to Fig. 1, 22 an underside view, 23 a view of the far side of part of the mechanism seen in Fig. 21. 88 is a pusher carried by the saddle 47 and having pivoted to it at 89 a lever 90 whose tail is held in the position shown in Fig. 22 by a blade spring 91 on the pusher. As the pusher advances the tail of the lever encounters a projection 92 carried by the shrouding of the mold wheel which causes the lever to turn slightly on its pivot. On each side of the lever is a shoulder 93 fixed to the pusher. The pusher in its forward movement meets the top flap *c* and pushes it towards the left as in Figs. 21 and 22. Supposing however that the top *b* were to close in at right angles to the front *a* at once the top flap would miss the slit *i*. It is therefore necessary to hold back the top *b* as shown in Fig. 30. This is effected by two small lugs 94 carried by a pair of jaws 95 pivoted at 96 to a plate 97 (see Figs. 2 and 24) carried by the shrouding of the mold wheel. These jaws are normally held up to stops 98 by a spring 99 but as the pusher 88 advances inclines 100 upon it cause the jaws to open against the spring 99 so as to withdraw the lugs 94 from the mouth of the box. The action is as follows:—The box stops opposite the pusher with its top and top flap occupying the position shown in dots in Figs. 22 and 30 these parts having been brought into this position by a slot in the far side of the

shrouding of the mold wheel. The pusher 88 moves towards the mold pushing the top flap and top before it; the top is however arrested by the lugs 94 and the top flap is pressed down onto the back. As the pusher continues its movement the lever 90 is turned on its pivot and presses the top flap down onto the back which is thus bent opening the slit *i*, the jaws 95 are opened withdrawing the lugs 94 and the shoulders 93 press the top *b* home as shown in Fig. 31, the end of the top flap *c* entering the slit *i* and closing the box.

The box is ejected from the mold by a forked lever 101 pivoted at 102 see Figs. 1, 2 and 6 and rocked on its pivot by a roller 103 on the link 31 so as to cause the upper ends 104 of the lever 101 to pass through the apertures 105 in the bottom of the mold and eject the box.

What we claim is:—

1. In a cigarette packing machine, the combination with a filler of a cigarette supporting tray capable of moving to and fro beneath the filler, a box holder adapted to support the boxes to be filled, a spring tending to pull the tray forward towards the holder, pushers engaging the rear of the tray, and means for imparting a to and fro movement to the pushers.

2. In a cigarette packing machine, the combination with a filler of a tray capable of moving to and fro beneath the filler, a box holder adapted to support the boxes to be filled, a spring tending to pull the tray forward towards the holder, spring blades carried by the front of the tray, pushers engaging the rear of the tray, and means for imparting a to and fro movement to the pushers.

3. In a cigarette packing machine, the combination with a filler of a tray capable of moving to and fro beneath the filler, a box holder adapted to support the boxes to be filled, a spring tending to pull the tray forward towards the holder, a flap pivoted to the front of the tray, pushers engaging the rear of the tray, and means for imparting a to and fro movement to the pushers.

4. In a cigarette packing machine, the combination with a hopper having a vibratory movement of a filler beneath the hopper, vertical partitions in the filler, a tray beneath the filler, a box holder adapted to support the boxes to be filled, a spring tending to pull the tray forward towards the holder, pushers engaging the rear of the tray, and means for imparting a to and fro movement to the pushers.

5. In a cigarette packing machine, the combination of a mold wheel, means for imparting a step by step movement of rotation thereto, means for forming and filling boxes in the molds of the wheel, a pusher adapted to turn over and close the top and top flap of the box, a pair of pivoted jaws adapted to hold back the top of the box, and means carried by the pusher for opening the jaws.

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Witnesses:
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