March 11, 1941. J. JACKSON ET AL 2,234,175

PACKAGING MACHINE

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Fig.1.

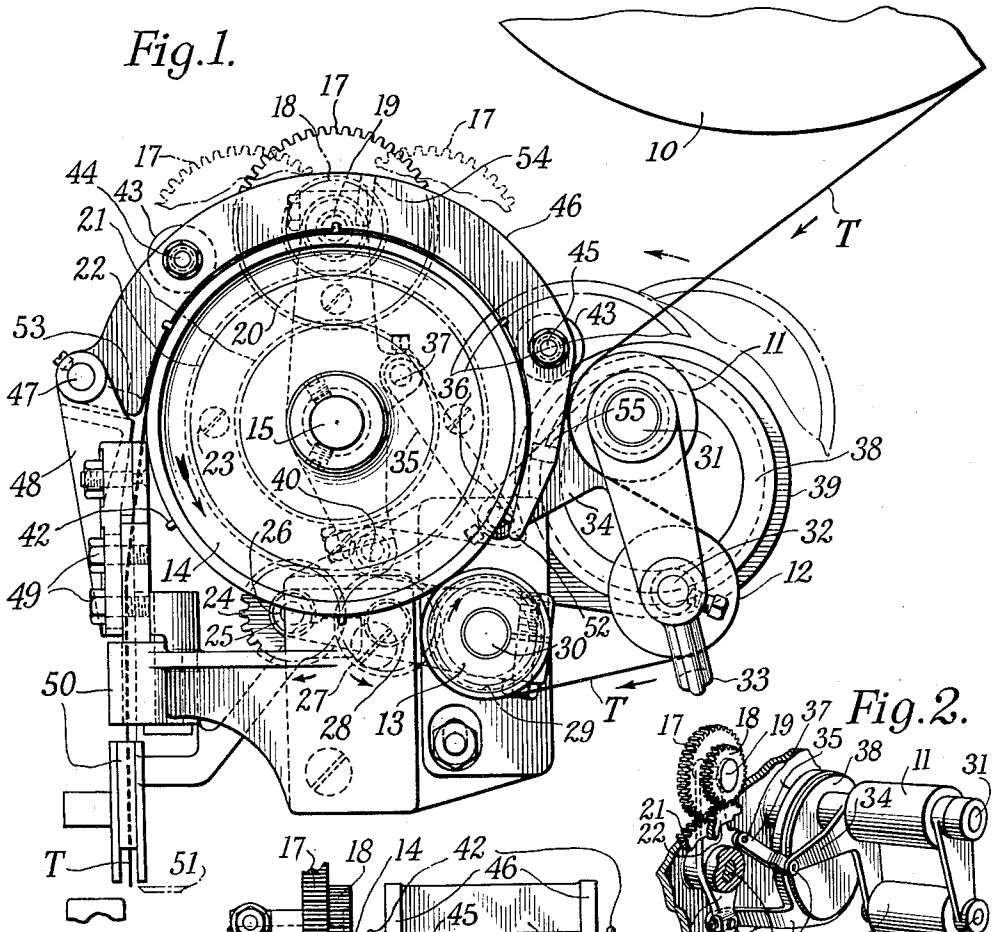


Fig.2.

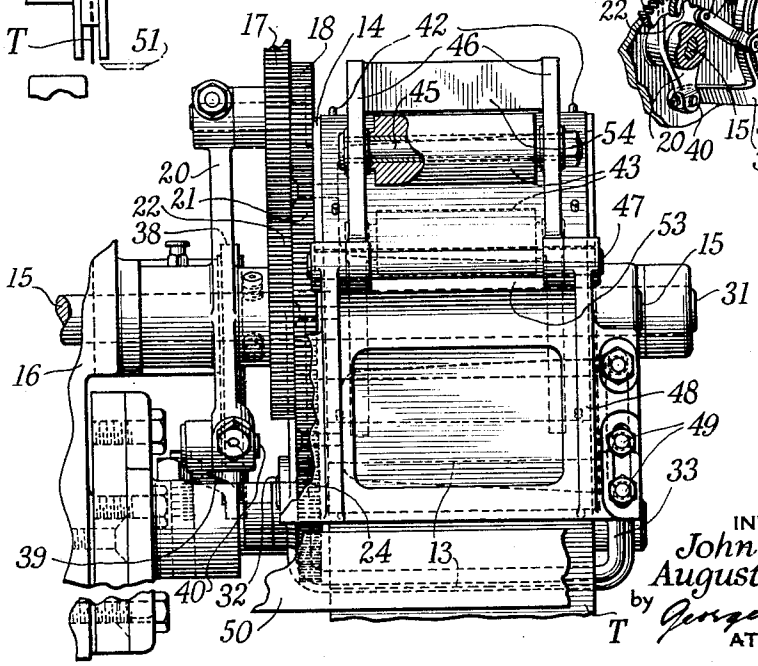


Fig.3.

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Fig.4.

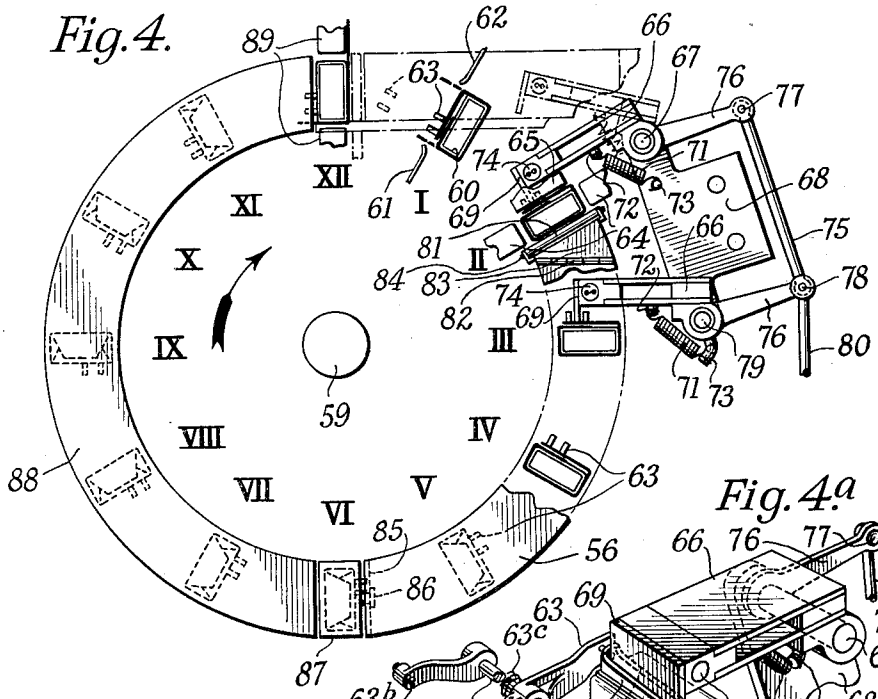


Fig.4a.

Fig.5.

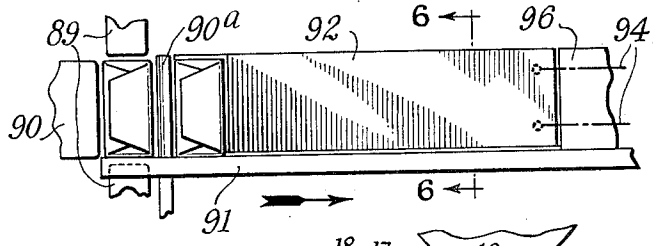


Fig. 6.

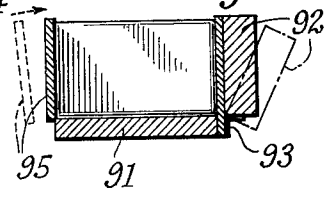


Fig. 7.

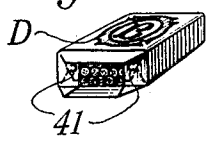


Fig.8.

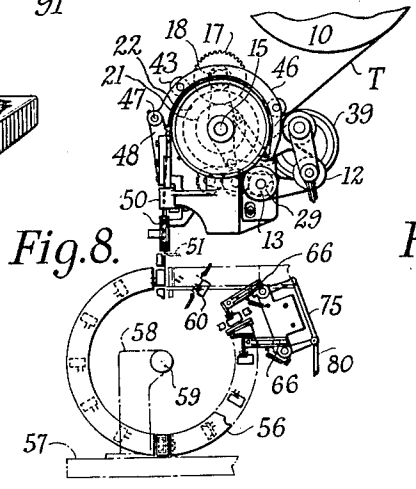
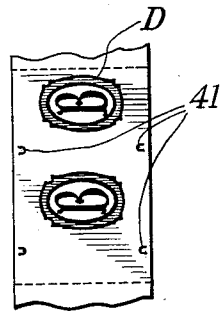


Fig.9.



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2,234,175

PACKAGING MACHINE

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Application March 25, 1937, Serial No. 133,021

10 Claims. (Cl. 93—7)

This invention relates to improvements in wrapping machines, more particularly to packaging machines. Its main object is to employ an improved method of feeding without slippage a printed foil and/or paper web, registering the indicia of the web with the package, and cutting the foil to the required length. The labels or designs on the wrappers will therefore occupy a uniform position on the packages enfolded therein.

Another object of our invention is to provide means for heat sealing the foil in the formation of the package, thereby eliminating the objectionable features of pasting and labeling and yet securing a moisture-proof and hermetically sealed package. For the accomplishment of these objectives there is provided an intermittently driven web-feeding drum provided with pins entering perforations provided in the web of foil or other printed material in a constant relation to the indicia on the web whereby slippage of the same is prevented and displacement of the indicia from the desired location on the package is avoided. For heat sealing the foil, in the illustrated embodiment of the invention, heated members may be arranged to engage the various seams and folds and fuse the same to effect a hermetic closure of the foil wrapper. With these and other objects not specifically mentioned in view the invention consists in certain constructions and combinations hereinafter fully described and claimed.

In the accompanying drawings which form a part of this specification and in which like characters of reference indicate the same or like parts:

Fig. 1 is a front elevation of a wrapping machine embodying the present invention, its parts being shown in the position occupied when the driven feed roll is moved into ineffective position whereby the feeding of the web is interrupted while it is cut;

Fig. 2 is a fragmentary perspective view showing the eccentric with its connections to the oscillating arm and take-up roller;

Fig. 3 is a side view of the parts shown in Fig. 1;

Fig. 4 is a front elevation of the turret heater plate and the swinging heater arms;

Fig. 4a is a perspective view showing one of the swinging heater arms and its operating connections;

Fig. 5 is a side elevation of the delivery guideway;

Fig. 6 is a cross-section taken on line 6—6 of Fig. 5;

Fig. 7 is a perspective view of a cigarette package with one end open showing the location of the perforations on the foil wrapper which are hidden, as indicated in dotted lines, when the package is sealed;

Fig. 8 is a side view of the foil feeding device and heat sealing elements in their relative location on a cigarette packaging machine shown at a reduced scale; and

Fig. 9 is a plan view of the perforated printed foil showing where it is cut to wrapper length by dotted lines and the location of two perforations near each edge of the foil wrapper.

In the particular embodiment of the invention illustrated herein the web feeding and registering device is located above the intermittently rotated turret of a cigarette packaging machine of the general type disclosed in Patent No. 1,926,192, issued September 12, 1933. Referring to Figs. 1, 2 and 3 of the accompanying drawings, a printed tinfoil web T is intermittently drawn from a reel 10 over an idler roller 11 and a take-up roller 12 by the coaction of a rubber covered roller 13 with a feed drum 14 loosely mounted on a continuously rotating shaft 15 journaled in the frame 16 and driven by gearing (not shown). Planetary gears 17 and 18 pivotally mounted at 19 to one end of an oscillating arm 20 loose on the shaft 15, mesh with sun gears 21 and 22 respectively, mounted on shaft 15. Gear 21 is fixed to the shaft 15, and gear 22 is suitably secured to one end of the feed drum 14, as by screws 23. A gear 24 is supported from a bracket 25 by a stud 26 and meshes with the gear 22 and in turn drives the rubber covered roller 13 in synchronism with the feed drum 14, through a gear train comprising gear 27 on stud 28 and a gear 29 fastened by stud 30 to roller 13 on the arm 25. The idler roller 11 and the take-up roller 12 are loosely mounted on shafts 31 and 32, respectively, and a bail bracket 33 which is suspended from the shaft 31 carries the shaft 32. One arm 34 of the bail bracket 33 is connected to one end of a link 35 by a pin 36 and the other end of the link is connected to the arm 20 by a pin 37. An eccentric 38 fixed to the shaft 31 and continuously driven by gearing, not shown, has an eccentric strap 39 loosely fitted thereon and provided with an integral arm which is pivotally connected by a pin 40 to the arm 20, thereby vibrating it together with the gears 17 and 18 mounted at its opposite end. When the arm 20 is swung in one direction by the eccentric 38 the planetary gear 17 will be driven in such a direction by the gear 21 that the planetary gear 18 will drive the gear 22 counterclockwise together with the drum 14, and the roller 13 will

be driven in the same direction. During the opposite movement of the arm **20** the planetary gears cease revolving and the feeding of the web by the drum and roll is interrupted.

The printed foil T is provided with regularly spaced perforations **41** (Fig. 9) located near each edge to fit similarly spaced pins **42** on the feed drum **14** whereby slippage of the web is prevented. The web T is provided with recurrent printed labels or designs D which occupy a predetermined relation with respect to the perforations, and is fed over the drum **14** and under guide rollers **43** rotatably mounted at **44** and **45** on the supporting bracket arms **46** which are hinged on the shaft **47** journaled in a bracket **48** adjustably secured by bolts **49** to a guide bracket **50**. The foil T is then brought through the guide brackets **50** secured to the frame **16**, into position for cutting the required lengths by a knife **51** (indicated by dot and dash lines in Fig. 1) when the revolving drum **14** has come to a stop. The free ends **52** of bracket arms **46** pivoted on the shaft **47** are rounded sufficiently to clear the roll **11** to prevent damage to the foil when the arms are swung out to make an adjustment, and are joined by the cross members **53**, **54** and **55**. The rubber covered roller **13** which is slightly larger in circumference than the length of foil required, coacts with the periphery of roll **13** to feed the printed foil T so that the pull will not come directly on the pins **42** of the feed drum **14** and hence tearing of the web will be avoided. The roller **12** takes up any slack in the foil as the feed drum **14** slows down and stops for cutting, even though the foil reel **10** continues to revolve by reason of its inertia.

In the operation of the packaging machine the free end of the web of printed foil is fed across the path of hollow mandrels supported by the intermittently rotated turret whereby the printed designs or labels are registered in predetermined relation with the mandrels, and the severed lengths are folded about the mandrels as will be presently described.

The portion of the foil projecting beyond the free end of the mandrel is tucked inwardly, and the flaps so formed are lapped on each other and heat sealed by the customary heater plate **56** which is shown in Fig. 8. On a table **57** are fastened pedestals **58** which support a shaft **59** about which the turret revolves. As is described in Patent No. 1,926,192, various stations in the intermittent rotation of the turret are designated by Roman numerals, the arrangement corresponding to the numerals on the dial of a clock. After the printed foil T is fed at station XII (Fig. 4) over the side of a hollow mandrel or support **60**, it is held thereagainst by a clamp (not shown) while the foil T is cut. Thereupon, while the turret advances to station I, the overhanging flaps of the printed foil wrapper are bent up over the sides of the mandrels by stationary members (not shown). The bent up flaps are then folded into overlapping relation on the back of the mandrel by two resilient folding plates **61** and **62**, and the seam so formed is held closed by a forked clamp **63** provided on each of the mandrels. Each of the mandrels **60** also has provided thereon a clamp not shown herein but described in the above mentioned Patent No. 1,926,192, opposite the clamp **63** to hold the foil against the front of the mandrel. The clamps **63**, unlike the corresponding members in the machine disclosed in the above mentioned patent have a bifurcated configuration for a purpose hereinafter described. Otherwise their construction is the same, and they are fixed to shafts **63***a* carried by the turret. The seam clamps are successively opened against the tension of springs **63***c* by the engagement of levers **63***b* on shafts **63***a* with a cam-actuated member (not shown) as fully described in the cited patent. The ends of the springs **63***c* are anchored to shafts **63***a* and turret and normally press the clamps against the supports **60** to hold the flaps which have been folded over underneath the opened clamps.

The printed foil thus wrapped about the support **60** and clamped is next brought to station II. Side tuckers **64** are now operated by mechnism not shown but described in the Patent No. 1,926,192 and the inner end flap is folded down by a swinging folder indicated at **65**. A pair of swinging heater arms **66** (Figs. 4 and 4*a*), fixedly mounted on shafts **67** journaled in a block **68**, are operated to swing down with their attached heater plate **69** passing between the two prongs **70** of the forked clamps **63** into engagement with the seam, whereupon springs **71** anchored at pins **72** and **73** on the block **68** and arms **66**, respectively, yieldingly press the heater plates against the longitudinal seams of the wrappers on two adjoining mandrels. A cartridge heater **74** is suitably located directly behind the heater plate **69** of each of the two heater arms **66** which are linked by a rod **75** connected to arms **76** by pins **77** and **78**, the arms **76** being fixed on shafts **67** and **79**. A rod **80** pivoted on the pin **78** of one of the arms **76** is operated from the main cam shaft (not shown) to actuate both swinging heater arms **66** and swing them clear of the mandrel during the intermittent movement of the turret between stations. The printed foil T, which has been treated with a suitable heat plastic on either or both faces, is thus sealed by the heater arm **66** along the longitudinal seam at the back of the package. A folding roller **81** folds the remaining flap down over the inner flap and side tucks, and during the continued movement of the mandrel toward station III the closed bottom end is brought into the range of action of the heater plate **56**.

At station III the other swinging heater arm **66** repeats the step of heating the longitudinal seam just described, thereby assuring a perfectly sealed back seam. The tucked and folded bottom end of the foil wrapper is moved along the heater plate **56**, through stations III, IV, V and to station VI. The heater plate **56** may be disposed out of contact with the bottom end of the foil wrapper to heat the same by radiation, or it may be hinged at **82** to a bracket **83** which supports the journals **84** of the folding roller **81**. The flanged end **85** of the heater plate is notched to receive a pin **86** secured to a rubber pressure pad **87**. As the foil wrapper travels between stations II and III, the pressure pad **87** is in its retracted position, the pin **86** maintaining the hinged heater plate **56** out of contact with the wrapper to avoid marring the same. The heater plate melts the fusible coating on the bottom end of the foil wrappers so that when the rubber pressure pad **87** at station VI impacts the heated folds to flatten them, heat sealing of the same to each other is assured.

If desired, the entire face of the foil wrapper may be coated with a thermoplastic film of material such as nitrocellulose, although it will be understood that only a portion of the face need be coated. The formation of tabs **41**, instead of completed perforations on the web to admit the

pins **42** is advantageous in that it permits the tabs to close up the opening after the pins are withdrawn therefrom.

After leaving station VI the sealed wrapper continues traveling to station XII while contacting a cooling plate **88**, a group of cigarettes being inserted within the support **60** at station IX by suitable mechanism described in the above mentioned Patent No. 1,926,192. At station XII tuckers **89** and folders **90** and **90***a* form tucks in and fold down the inner flap of the open end of the package ejected from the mandrel by a plunger (not shown) which enters the mandrel and removes the cigarettes therefrom together with the foil wrapper. The package now rests on the bottom plate **91** of the delivery guideway and is advanced into the guideway by a member, not shown but fully described in the above mentioned patent, whereby its outer top flap is folded down over the top end of the package to complete the folding of the wrapper. The top end of the wrapper is then heat sealed by a top heater plate **92** forming a section of one side of the delivery guideway and provided with a cartridge heater (not shown) to which conductors **94** lead from a suitable source of energizing current. The plate **92** is hinged at **93** to swing away from the packages during the delivery of a package to the guideway, and is provided with lead-in wires connected to the cartridge heater. The swinging of the plate **92** may be accomplished by any suitable means. A hinged plate **95** forming the other side of the delivery guideway is operated by means not shown herein but fully described in Patent No. 1,926,192, to intermittently engage the bottom ends of the packages in the guideway following the delivery of the next package thereto and thereby press the top end of the package against the heater plate **92** and effectively seal it. If desired, the mechanism for swinging the plate **92** may be similar to that provided for the plate **95**. The sealed package is finally brought to a cooling plate **96** which engages the top ends of the packages after they leave the plate **92**.

The indicia of the printed foil has thus been registered with the package, and the required wrapper length has been carried through its several stages of wrapping operation to receive the effective application of heat to its seams for the perfect sealing of a moistureproof package in the most simple manner. While the invention has been exemplified in conjunction with a cigarette packaging machine, it will be understood that it is applicable to the wrapping of various other articles including cigars. It will be understood that instead of using thermoplastic coated material, thermoplastic adhesive may be applied to the web after it is drawn from the reel and before it reaches the web-feeding mechanism.

What is claimed is:

1. In a wrapping machine, the combination with means for wrapping a fusible wrapper about a group of cigarettes, and to form folds at the top end thereof, of mechanism for heat sealing the folds of the wrapper on the top end of the package, said mechanism including a movable heated plate arranged to engage and heat seal the folds of the wrapper at the top end of the package, and a movable member arranged to engage the bottom end of the package and thereby press its top end against the heated plate to heat seal the same, means to withdraw said enwrapped and partly heat-sealed package and to present it at a station for heat-sealing the bottom end, means to form said bottom folds, and means to heat-seal said bottom end folds.

2. In the process of wrapping which includes the steps of severing a wrapper from a web provided with indicia at regular intervals and recurrent perforations at its margins intermediate said indicia, the line of severance lying between alternate indicia and the adjacent perforations, folding the wrapper about the girth of a group of cigarettes so that the indicia on the wrapper will be disposed on opposite faces of the package so formed, heat sealing the longitudinal seam thus formed; the step of tucking the perforated sections of the wrapper over the top and bottom end of the package and the further steps of folding the top and bottom end folds thereover, to cover the perforations, and sealing the top and bottom end of the package.

3. In the process of wrapping which includes the steps of severing a wrapper from a web provided with indicia at regular intervals and recurrent perforations at one margin thereof intermediate alternate indicia, the line of severance lying between said perforations and the adjacent indicia, folding the wrapper about a group of cigarettes so that the indicia thereon will be disposed on opposite faces of the package so formed; the step of tucking in the perforated section of the wrapper over the top end of the package, and the further steps of folding the top end folds thereover to cover the perforations and heat sealing the same.

4. In a wrapping machine, the combination with a hollow mandrel, of means for folding a fusible wrapper about the mandrel and over one end thereof, members for heat sealing the seams of the wrapper so folded, while supported on the mandrel, said heat-sealing members acting to clamp against said mandrel the wrapper margins while activating the fusible portions thereof defining the seams, bifurcated clamping means, adapted to be engaged with the seam margins along the length of the seam, at both sides thereof, to hold the seam margin independently of the heat-sealing member during the operation of heat-sealing, means for inserting a group of cigarettes into said mandrel and ejecting them therefrom whereby the wrapper is removed from the mandrel together with the cigarettes, and mechanism for receiving each enwrapped, partially sealed packet, and for closing the open end of the wrapper and means for heat-sealing the same.

5. In a wrapping machine, the combination with a hollow mandrel, of means for folding a fusible wrapper about the mandrel and over one end thereof, members for heat sealing the seams of the wrapper so folded while supported on the mandrel, said heat-sealing members acting to clamp against said mandrel the overlapped wrapper margins while activating the fusible portions thereof defining the seams, bifurcated clamping means, adapted to be engaged with the seam margins along the length of the seam, at both sides thereof, to hold the seam margin independently of the heat-sealing member during the operation of heat-sealing, means for inserting a group of cigarettes into the wrapper, and mechanism for receiving each enwrapped, partially sealed packet, and for closing the open end of the filled wrapper, and means for sealing it.

6. The combination with an intermittently revolving turret, of a plurality of package supports in spaced relation on said turret, mechanism for

folding wrappers about successive package supports with their margins in overlapping relation, bifurcated members for clamping the folded wrappers along the length of the seam formed by the overlapped margins of each package at each side of the line of sealing of said seam and a plurality of heated members each disposed in position to engage the longitudinal seam of one of said wrappers so folded about successive supports, prior to its removal from its support, means to load and to remove each loaded and partially sealed package to a station for sealing the folds at the other ends of said packages in turn, and means at said last-named station for sealing said last-named end folds.

7. In a wrapping machine, the combination with means for wrapping a fusible wrapper about a group of cigarettes and to form folds at the ends thereof, of mechanism for sealing the folds of the wrapper on the bottom end of the package, and mechanism for sealing the folds of the wrapper at top end of the package, said last-named mechanism including a movable heated plate arranged to engage and heat the folds of the wrapper at the top end of the package, a movable member arranged to engage the bottom end of the package and thereby press its top end against the heated plate to heat seal the top end folds of the package, and means to transfer said enwrapped and partly sealed package, after sealing said bottom end folds, into the range of action of said means for heat-sealing the top end.

8. In a wrapping machine, the combination with means for wrapping a fusible wrapper about a group of cigarettes and to form folds at the ends thereof, of mechanism for sealing the folds of the wrapper at the bottom end of the package, and mechanism for heat-sealing the folds of the wrapper on the top end of the package, said mechanism including a heated plate arranged to engage and heat seal the folds of the wrapper at the top-end of the package, and a movable member arranged to engage and press against the bottom end of the package and thereby press its top end against the heated plate to heat-seal said folds at said top end of the package.

9. In the process of wrapping which includes the steps of severing a wrapper from a web having recurrent perforations in the form of outwardly pointing tabs struck from the web, and the folding of said wrapper about the girth of a package; the further steps of tucking the perforated sections in over the ends of the package whereby said tabs will close the perforations, and folding down the flaps over the ends of the package.

10. Apparatus for wrapping packages, of the class including an intermittently revolving turret, a plurality of package supports on said turret, and mechanism for feeding intermittently severed sections of fusible wrapping material so that each section will be stopped adjacent to a package support at one station of said turret, said apparatus being characterized by mechanism for folding each such section of material about the adjacent package support, and clamps for holding the seam forming margins of each wrapper so formed against the support, and a heated member movable into position to engage and fuse together the margins of each folded wrapper along its seam while the seam is engaged by said clamps, said heated member acting also to clamp the seam between the heating member and the support as it activates the fusible wrapping material.

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