June 9, 1953 H. W. GRADY 2,641,265

CIGAR PERFORATING DEVICE

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Fig. 1.

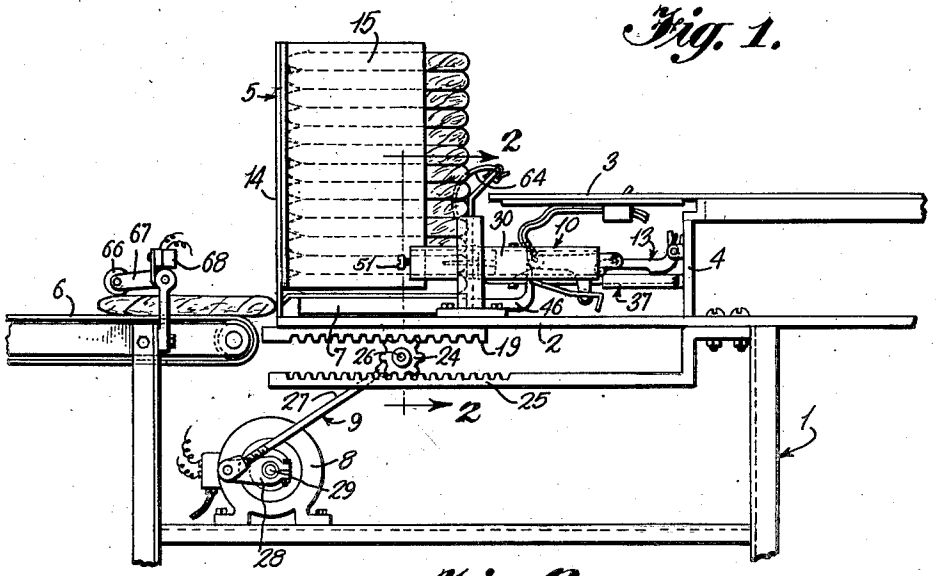


Fig. 2.

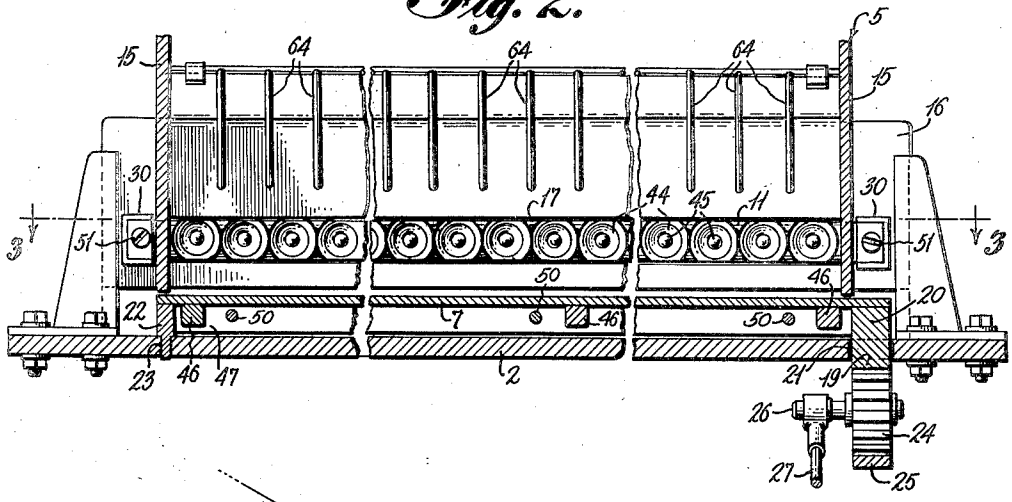
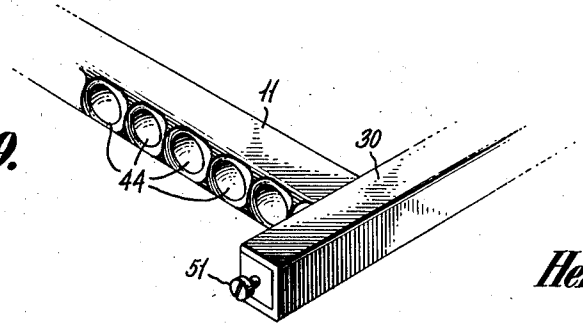


Fig. 9.



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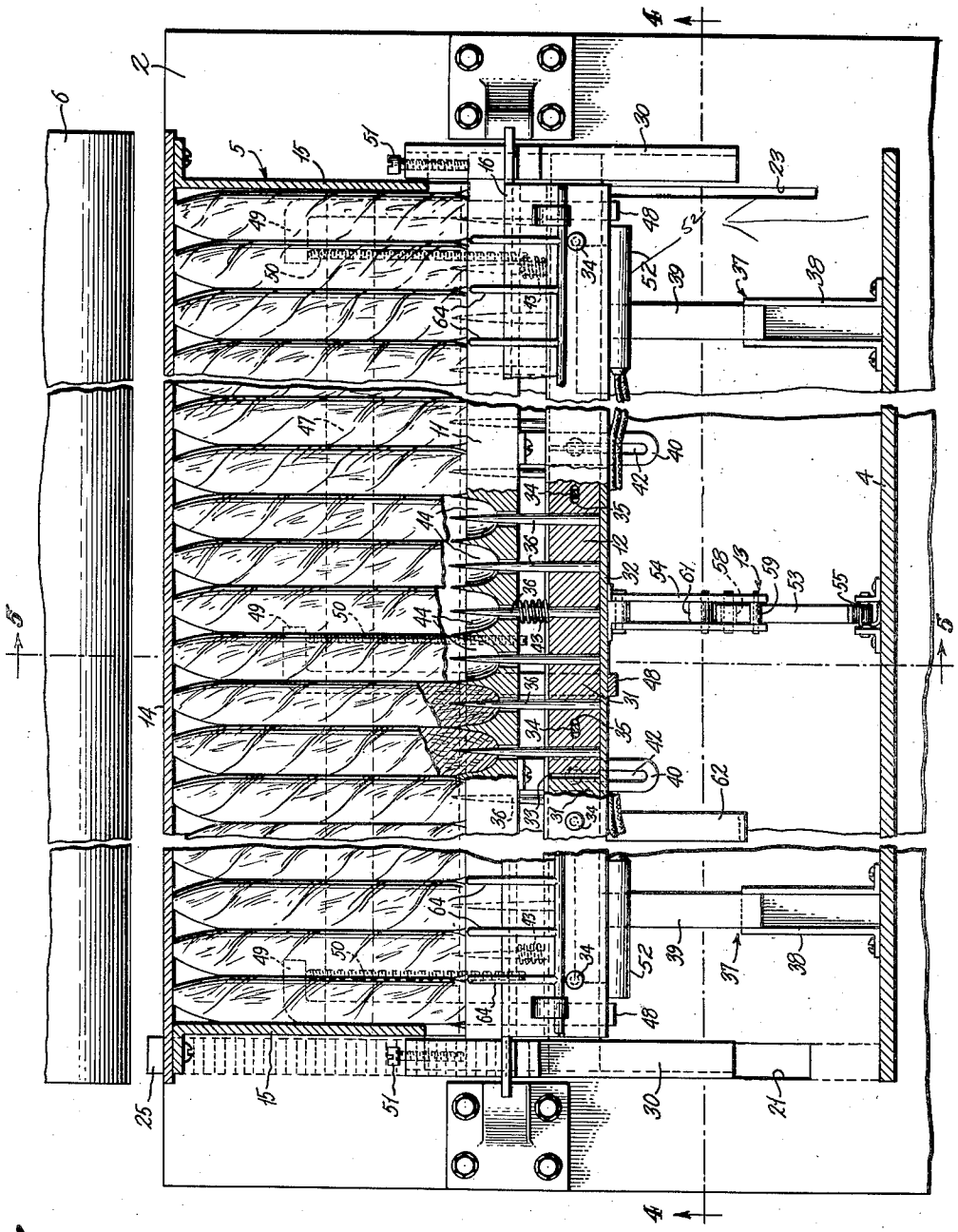


Fig. 3.

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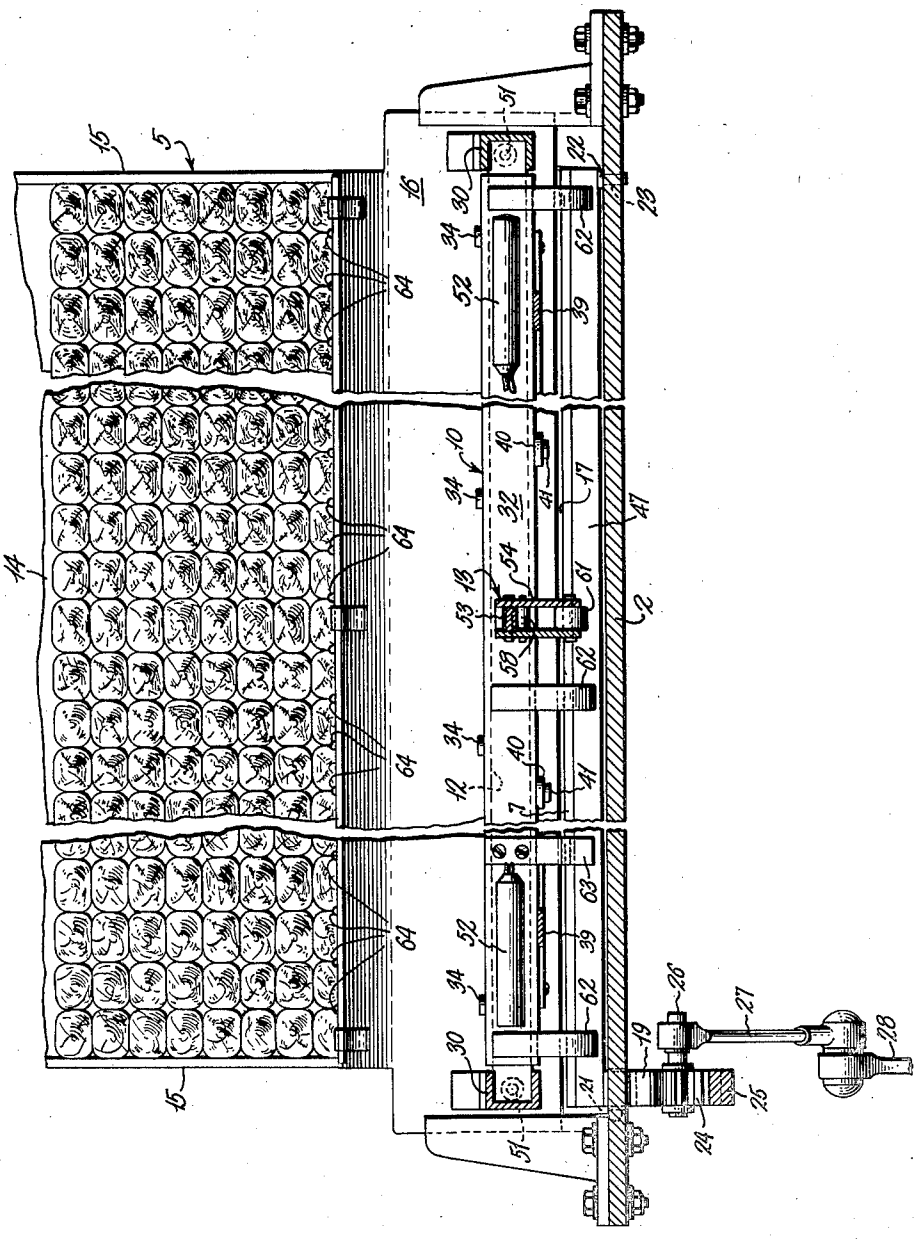
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CIGAR PERFORATING DEVICE

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Fig. 4.



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Fig. 5.

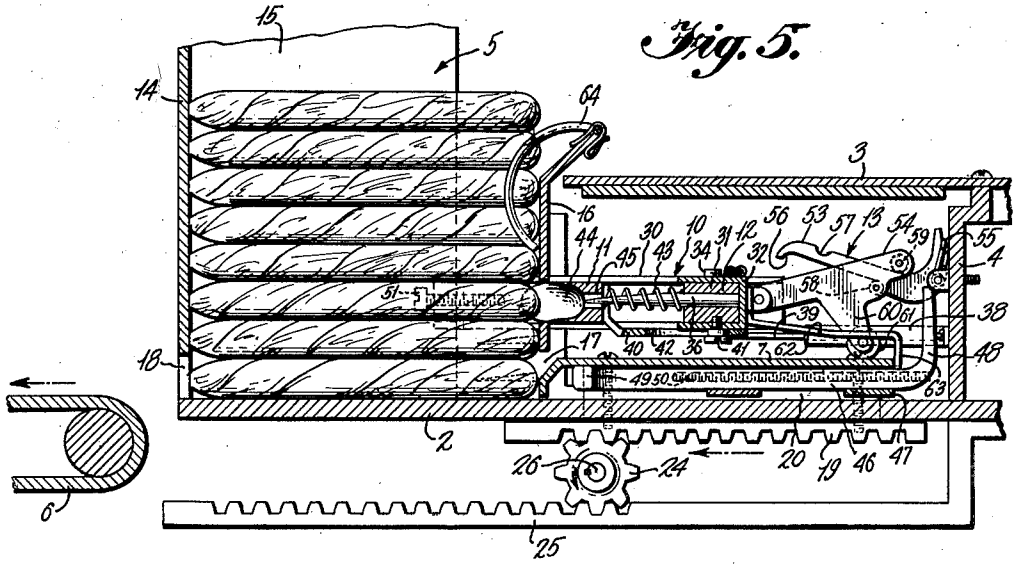
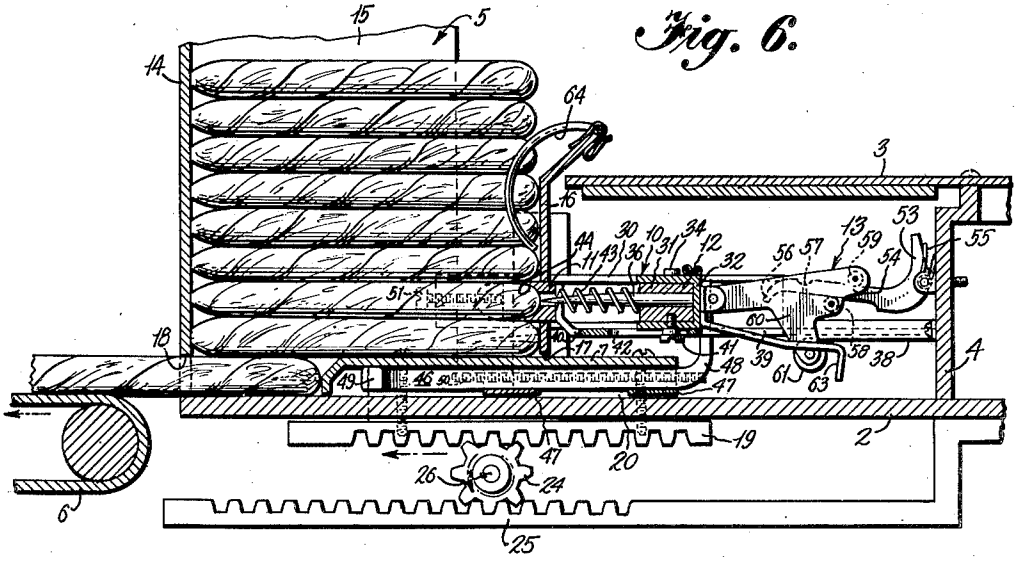


Fig. 6.



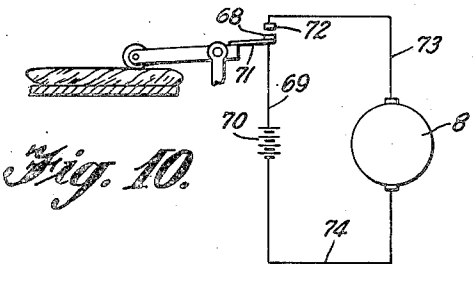


Fig. 10.

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CIGAR PERFORATING DEVICE

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Fig. 7.

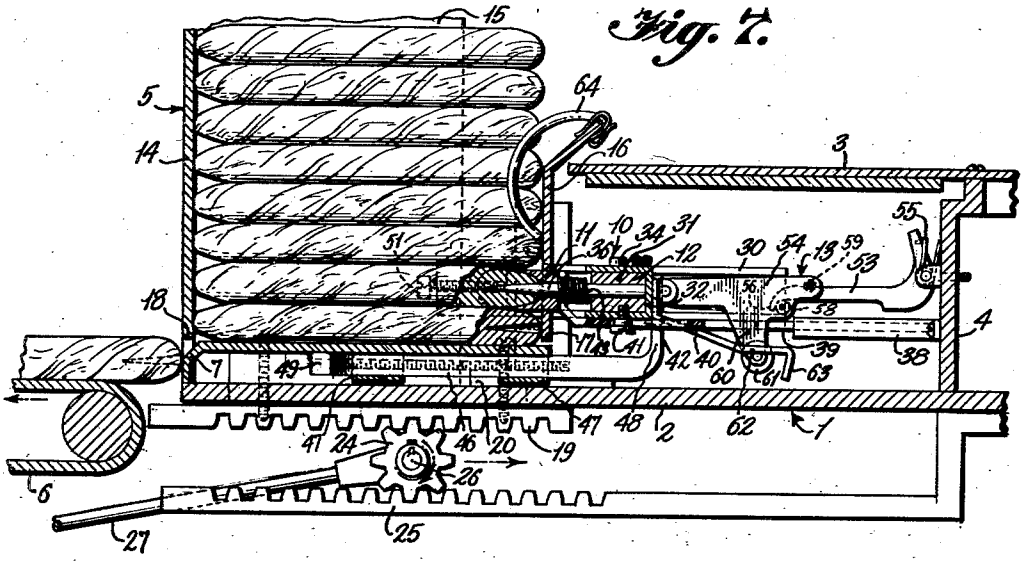
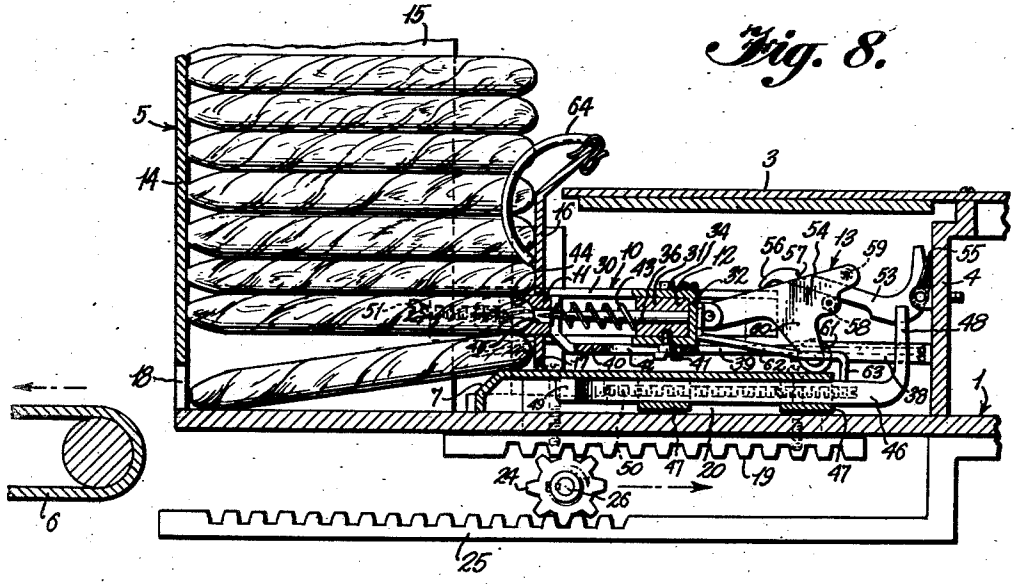


Fig. 8.



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2,641,265

CIGAR PERFORATING DEVICE

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Application February 5, 1952, Serial No. 270,004

14 Claims. (Cl. 131—254)

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This invention relates to devices for perforating the finished heads of cigars, and more particularly to such devices which may be a part of, or an attachment to, any machine using an automatic hopper for dispensing cigars into an automatic wrapping or packaging machine.

Cigars, as they come from the production machines, have a round body with a finished head and trimmed, slightly tapered tuck end. After a drying period, the cigars are placed in trays of such size that they will accommodate a layer of cigars equal to a layer of cigars received in the dispensing hopper of a wrapping or packaging machine. These trays have retaining end and front walls slightly less in height than the diameter of the round cigars. The trays are then placed one upon another in a container and the pile compressed until the bottom of each tray rests upon the upper edges of the end and front retaining walls of the tray below. This compresses the cigars, and they become rectangular in cross-section. After the cigars have retained a set in this new shape, the cigars are placed in the hopper of the wrapping or packaging machine.

The object of the present invention is to provide a device for perforating, or staking the cigars while they are in the hopper of the wrapping or packaging machine.

Another object of the invention is to provide such a device which is operated synchronously with the dispensing apparatus so that the perforating is done without interrupting the passage of the cigars to the wrapping machine.

Other objects of the invention will become apparent from the following description of one practical embodiment thereof, when taken in conjunction with the drawings which accompany, and form a part of, this specification.

In the drawings:

Figure 1 is a side elevation of the dispensing hopper and a portion of the frame and conveyor of a cigar wrapping or packaging machine with an embodiment of the present invention attached thereto;

Figure 2 is a vertical section through a portion of the hopper and parts of the perforating device, and is taken on the line 2—2 of Figure 1;

Figure 3 is a horizontal section taken on the line 3—3 of Figure 2;

Figure 4 is a vertical section taken through the guide channels of the perforating device, and is taken on the line 4—4 of Figure 3;

Figure 5 is a vertical section through the hopper and the perforating device, showing the perforating device in its position of rest;

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Figures 6, 7 and 8 are views similar to Figure 5, showing the mechanism in various stages of its cycle of operation; and,

Figure 9 is a perspective view of a portion of the cigar positioning head of the machine, and a portion of its guide channel and stop screw; and,

Fig. 10 is a diagrammatic view of an electrical circuit for controlling the operation of the motor of the machine.

Referring to the drawings in detail, there is shown in Figure 1, somewhat conventionally, parts of the frame of a cigar wrapping or packaging machine, the hopper base 2 supported upon the frame, and work table 3 supported above the base by the legs 4. The dispensing hopper is shown at 5, and one end of an endless belt conveyor for carrying cigars from the hopper to the point where they are wrapped is shown at 6. Cigars are removed from the hopper onto the conveyor by means of an ejector plate 7 which is operated by motor 8, mounted on the frame, through the crank and gear and rack assembly 9 shown in Figure 1 and to be described in detail hereinafter. This much of the device illustrated is conventional.

The cigar perforating mechanism, indicated generally at 10, is mounted above the ejector and driven thereby. This mechanism consists of a cigar positioning head 11, the movable perforating bar 12, and a latch 13 to lock the positioning head and perforating bar in operative position.

The dispensing hopper 5 is formed by a back wall 14, side walls 15, and a short front wall 16. The front wall terminates a short distance above the work table 3, and flares outwardly from approximately the plane of the table to its top. This permits easy access to the hopper for loading. Cigars are placed in the hopper in layers, as shown in Figures 3 and 5. Both the front and back walls terminate short of the hopper base 2, in order to form a rectangular opening 17 in the front wall through which the ejector plate may pass freely, and a similar opening 18 in the back wall through which rows of cigars may be ejected from the hopper. Each of the openings 17 and 18 is of slightly greater height than the thickness of a cigar.

The ejector plate is mounted for reciprocal movement into and out of the hopper. For this purpose, it is connected along one side to a rack bar 19, the connecting member 20 passing through an elongated slot 21 in the hopper base plate. The opposite side of the ejector plate is supported upon a runner 22 which rides in a groove 23 in the base plate. Rack bar 19 is in engagement with

a rotatable and bodily movable gear 24 which rides upon a second rack bar 25. Shaft 26, upon which gear 24 is mounted, is connected to one end of a pitman 27 having its opposite end connected to a crank 28 mounted upon the shaft 29 of the motor 8. Operation of the motor will cause the gear to move back and forth over the rack 25 imparting rotation to the gear. This bodily and rotative movement of the gear will cause longitudinal movement of rack 19 to move the ejector plate in and out of the hopper. The movement of rack 19 will be much more rapid than the transilatory movement of the gear as its movement is the sum of the transilatory and rotative movements of the gear.

The perforating mechanism 10 is mounted for sliding movement along horizontal guide channels 30, which pass through rectangular openings in the hopper front wall 16, and are welded or otherwise rigidly seamed thereto. The perforating bar 12 is sufficiently long to have its ends fit within the guide channels 30 so that the bar may slide along the channels into and from operable position. The perforating bar is made up of a plurality of sections 31 fitted into a backing channel 32 with spaces 33 between ends of adjacent sections. Vertical pins 34 pass through the flanges of the channel 32 and through slots 35 in the sections. By this arrangement, each section may expand and contract under temperature changes due to the heating means to be described without critical changes in spacing between the perforating pins 36. Each section will carry but a few perforating pins, and, consequently, the pin positions change much less than if all of the pins were mounted upon a single continuous bar. The perforating bar is supported and guided, not only by the guide channels 30, but also by telescoping guides 37. These guides have channels 38 fixed to the leg 3 supporting the work table, and tongues 39 fixed to the underside of the perforating bar channel member 32 and slidable in the channels 38. The perforating pins are secured in the sections in horizontal spaced positions having their projecting ends pointed.

The cigar positioning head also extends between the guide channels 30 and has its ends slidably mounted in the guide channels. The positioning head lies parallel to the perforating bar and is connected to it by means of the slotted brackets 40. The brackets are fixedly secured to the positioning head and have their slotted ends projecting forwardly beneath the perforating bar. Screws 41 pass through the slots 42 in the brackets into the staking bar. Coiled springs 43 are slipped over the ends of several of the perforating pins, and bear against the positioning head and perforating bar to keep these members normally separated the full distance permitted by the slots in the brackets.

The positioning head is simply an elongated bar having a plurality of cup-shaped recesses 44 spaced along one edge, and openings 45 from the bottoms of the recesses to the opposite side of the bar. The recesses are spaced the distance between centers of the cigars in a row in the hopper.

As mentioned above, the perforating bar and positioning head are caused to move by the movement of the ejector plate. For this purpose, the ejector plate is provided with a pair of draft links 46 adapted to engage the rear of the perforating bar during the movement of the ejector plate into the hopper. These draft links are slidably mounted in bearings 47 beneath the ejector plate. Each link has its outer end 48 turned upward at right angles to the body portion of the link, and its inner end 49 turned at right angles to the body portion but lying in a horizontal plane. The vertical outer ends of the links are adapted to strike and move the perforating bar during the operative movement of the ejector plate, and the inner ends contact the ends of stop screws 50 to limit the free movement of the links. Screws 50 are threaded through the bearing blocks in which the links slide, and may be adjusted in or out to change the amount of lost motion permitted the links.

A second set of stop screws 51 are mounted in the ends of the guide channels 30. These screws are adjustable to limit the inward movement of the positioning head so that the head may move into position on the ends of the cigars, but no crushing pressure will be put upon the cigars.

When the ejector plate moves into the hopper, it will move the entire perforating assembly, the positioning head moving until it strikes the stop pins 51, and the perforating bar then continuing to move to permit the perforating pins to pierce the cigar ends. The perforating bar carries heating elements 52 by means of which the bar and perforating pins will be heated to seal the sides of the openings made in the cigar tips. These elements are preferably electrical, and may be activated from any convenient source.

To give the heat time to effectively seal the openings, it is desirable to hold the perforating pins in the cigars for a brief period. To accomplish this and permit the ejector plate to continue its cycle of movement, the latch 13 is provided to lock the positioning head and perforating bar in cigar-engaging position. The latch is composed of two pivoted elements, a tongue 53 pivotally connected to the leg 4 supporting the work table, and a keeper 54 pivotally mounted upon the perforating bar. The tongue 53 has a spring 55 which engages the tongue and the leg 4 to urge the free end of the tongue in a downward direction. The free end of the tongue has a downturned lip 56, and the upper side of the tongue near its outer extremity is provided with a notch 57. Lip 56 and notch 57 are adapted to engage rollers 58 and 59 carried by the keeper to prevent rearward movement of the perforating bar when the latch members are in locking position. Keeper 54 has a depending arm 60 which carries a roller 61 positioned to engage, and ride up on, the ejector plate to trip the latch when the ejector plate reaches a predetermined point in its reverse movement. The upward rocking movement of the keeper as the roller moves up on the ejector plate lifts the roller 59 from the notch 57, and the effective distance between the rollers 58 and 59 is increased so that the tongue may move freely between them as the perforating bar moves to inoperative position.

To return the staking assembly to inoperative position, a retriever bracket 62 is connected to the perforating bar. The retriever bracket has a downturned end 63 to be engaged by the ejector plate on its reverse movement.

In operation, cigars from the trays above described are placed in layers in the hopper of the machine. To insure proper vertical alignment of the cigars in the various layers, spring guide fingers 64 are clipped in proper spaced relation along the edge of the hopper front wall 16 with the spring fingers extending downwardly. Thus the cigars will be in proper vertical alignment to be engaged by the positioning head 11. When the machine is first started up two layers of dummy cigars are placed in the bottom of the

hopper so that the first layer of cigars will be in the same horizontal plane as the perforating mechanism. A circuit including switch 68 for controlling the motor 8 is shown diagrammatically in Fig. 10 of the drawing. This circuit includes a wire 69 from a source of electrical power 70 to the movable arm 51 of the switch 68, the fixed contact 72 and wire 73 to the motor 8 and wire 74 to the opposite side of the power source. When the machine is started the parts will be in the position shown in Figure 5. Operation of the motor will cause the gear 24 to move over the rack 25 and a resulting forward movement of rack 19. As rack 19 moves, ejector plate 7 is moved with it. As the ejector moves, the vertical ends 48 of the draft links 46 will engage the backing channels 32 of the staking bar. Due to the lost motion provided between the draft links and ejector plate, the plate will continue its movement while the links slide through their bearings. When horizontal ends 49 of the links contact the stop screws 50 the draft links will begin to move, carrying the perforating mechanism inward. The positioning head will move forward until the cigar ends are seated in the recess 44 and the positioning head strikes the stop pins 51. At this point the ejector plate is still advancing, and the perforating bar will continue its movement, compressing springs 43 and causing the perforating pins to pierce the cigar tips which are held in centered position in the recesses 44. When the parts have arrived at their most forward position, the latch members will have moved to extended position, and the rollers 58 and 59 will be in engagement with the lip 56 and the notch 57. The perforating assembly will be locked and held in this position. This phase of the cycle of operation is shown in Figure 7.

As the ejector plate moves forward, it pushes the bottom row of cigars from the hopper onto the moving conveyor belt 6. The conveyor carries the cigars to the wrapping or packaging machine. As the cigars move onto the conveyor, they pass under, and lift, a switch-actuating roller 66 which is attached to the end of a pivoted lever 67. Movement of the lever operates a switch 68 which controls the motor 8. When cigars on the conveyor raise the arm 67 the switch is opened and the motor stops. The conveyor will continue to move the cigars along, and as soon as the cigars have passed from beneath the roller 66 the arm will fall, closing the switch 68 and restarting the motor. By this arrangement the rows are properly spaced on the conveyor belt to be received by the wrapping or packaging machine.

After the motor is restarted, the ejector plate begins the return movement of its cycle. As it moves outward the draft links leave the perforating bar, but the latch holds the perforating mechanism in position. In its travel the edge of the ejector plate will strike the trip arm of the latch keeper, raising the keeper and releasing the latch. Springs 43 will immediately cause the perforating bar to move back, withdrawing the pins from the cigars. As the ejector continues its return movement, it will catch the down-turned end 63 of the retriever bracket 62, and draw the entire perforating assembly to its inoperative position. Near the end of the ejector return stroke the draft links will strike the leg 4 and be held stationary until the ejector completes its movement. This will return the draft links to their original position with respect to the ejector plate.

As the ejector plate moves out of the hopper, the cigars, no longer supported by the plate, will drop downward, positioning another layer to be ejected from the hopper, and another layer into position to be pierced by the perforating mechanism.

It will be obvious from the above that all of the cigars will be pierced while they are in the hopper. This precludes the necessity for a separate operation, and requires only the additional mechanism needed to pierce the cigars as the operating mechanism is part of the wrapping or packaging machine.

While in the above one practical embodiment of the invention has been shown and described, it will be evident that this is merely by way of example, as the invention may take other forms than the precise structure disclosed within the scope of the appended claims.

What is claimed is:

1. Mechanism for perforating cigars comprising, a hopper to receive superimposed layers of cigars, an ejector plate to push successive bottom layers of cigars from the hopper, means to move said ejector plate into and out of said hopper, and a perforating assembly including a cigar positioning head and a perforating bar having perforating pins mounted above said ejector plate in the plane of a layer of cigars above the bottom layer and movable into and from engagement with the cigars of said higher layer by said ejector plate.

2. In mechanism for perforating cigars as claimed in claim 1, means for holding said perforating assembly in engagement with said layer of cigars during a portion of the movement of said ejector plate out of said hopper.

3. In mechanism for perforating cigars as claimed in claim 1, means for holding said perforating assembly in engagement with said layer of cigars during a portion of the movement of said ejector plate out of said hopper, and said holding means including a member engageable by said ejector plate on its return movement to release the holding means.

4. In mechanism for staking cigars as claimed in claim 1, means for holding said perforating assembly in engagement with said layer of cigars during a portion of the movement of said ejector plate out of said hopper, said holding means including a member engageable by said ejector plate on its return movement to release the holding means, and means carried by said perforating assembly for engagement by said ejector plate to retract said perforating assembly.

5. Mechanism for perforating cigars comprising a vertical hopper to receive superimposed layers of cigars and having openings near the bottom thereof extending the full width of the hopper, a horizontally movable ejector plate to push successive bottom layers of cigars from said hopper, means to move said ejector plate through said openings into and out of said hopper, a perforating assembly including a cigar positioning head and a staking bar having a plurality of perforating pins equal to the number of cigars in a row, and guide channels for mounting said assembly for horizontal movement therein, said guide channels being mounted above said ejector plate to position said perforating assembly in the plane of a layer of cigars above the bottom layer, and said perforating assembly being movable

into and from engagement with the cigars of said higher layer by the ejector plate.

6. In mechanism for perforating cigars as claimed in claim 5, said positioning head having a plurality of recesses to receive cigar tips and a plurality of openings communicating with said recesses through which the perforating pins may pass to pierce said tips, and yieldable means normally holding said positioning head and perforating bar separated with the perforating pins withdrawn from the opening in the positioning head.

7. In mechanism for perforating cigars as claimed in claim 5, said positioning head having a plurality of cigar tip-receiving recesses and a plurality of openings communicating said recesses through which the perforating pins may pass to pierce said tips, stops to limit the movement of said positioning head, and yielding means interposed between said positioning head and perforating bar to normally hold them separated with the perforating staking pins withdrawn from the openings in the positioning head and permit the perforating bar to continue movement after the positioning head engages said stops.

8. In mechanism for perforating cigars as claimed in claim 5, said positioning head having a plurality of cigar tip-receiving recesses and a plurality of openings communicating said recesses through which the perforating pins may pass to pierce said tips, stops to limit the movement of said positioning head, yielding means interposed between said positioning head and perforating bar to normally hold them separated with the perforating pins withdrawn from the openings in the positioning head and permit the perforating bar to continue movement after the positioning head engages said stops, and means for holding said perforating assembly in engagement with said layer of cigars during a portion of the movement of said ejector plate out of said hopper.

9. In mechanism for perforating cigars as claimed in claim 5, said positioning head having a plurality of cigar tip-receiving recesses and a plurality of openings communicating said recesses through which the perforating pins may pass to pierce said tips, stops to limit the movement of said positioning head, yielding means interposed between said positioning head and perforating bar to normally hold them separated with the perforating pins withdrawn from the openings in the positioning head and permit the perforating bar to continue movement after the positioning head engages said stops, and means for holding said perforating assembly in engagement with said layer of cigars during a portion of the movement of said ejector plate out of said hopper, said holding means including a member engageable by said ejector plate on its retracting movement to release the holding means.

10. In mechanism for perforating cigars as claimed in claim 5, said positioning head having a plurality of cigar tip-receiving recesses and a plurality of openings communicating said recesses through which the perforating pins may pass to pierce said tips, stops to limit the movement of said positioning head, yielding means interposed between said positioning head and perforating bar to normally hold them separated with the perforating pins withdrawn from the openings in the positioning head and permit the perforating bar to continue movement after the positioning head engages said stops, means for holding said perforating assembly in engagement with said layer of cigars during a portion of the movement of said ejector plate out of said hopper, said holding means including a member engageable by said ejector plate on retracting movement of said ejector to release the holding means, and means carried by said perforating assembly for engagement by said ejector plate to retract said perforating assembly.

11. In mechanism for perforating cigars as claimed in claim 5, said ejector plate carrying draft links, said draft links having upturned outer ends to engage the rear of said perforating assembly as said ejector plate moves forward to cause similar movement to said perforating assembly.

12. In mechanism for perforating cigars as claimed in claim 5, said ejector plate carrying draft links, said draft links being slidably mounted beneath said ejector plate and projecting beyond the rear edge thereof, said draft links having their outer ends upturned to engage the rear of said perforating assembly as said ejector plate moves forward, the inner ends of said links being offset in a horizontal plane, and stops in the planes of the offset portions of said links to limit the sliding movement of said links.

13. In mechanism for perforating cigars as claimed in claim 5, said ejector plate carrying draft links, said draft links being slidably mounted beneath said ejector plate and projecting beyond the rear edge thereof, said draft links having their outer ends upturned to engage the rear of said perforating assembly as said ejector plate moves forward, the inner ends of said links being offset in a horizontal plane, stops in the planes of the offset portions of said links to limit the sliding movement of said links, and means carried by said perforating assembly for engagement by said ejector plate to retract said perforating assembly on the reverse movement of said ejector plate.

14. In mechanism for perforating cigars as claimed in claim 5, said ejector plate carrying draft links, said draft links being slidably mounted beneath said ejector plate and projecting beyond the rear edge thereof, said draft links having their outer ends upturned to engage the rear of said perforating assembly as said ejector plate moves forward, the inner ends of said links being offset in a horizontal plane, stops in the planes of the offset portions of said links to limit the sliding movement of said links, a latch to hold the perforating assembly in engagement with said row of cigars, said latch having trip means engageable by said ejector plate on its reverse movement to release the latch, and means carried by said perforating assembly for engagement by said ejector plate to retract said perforating assembly after said latch has been released.

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