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CIGAR PIERCER

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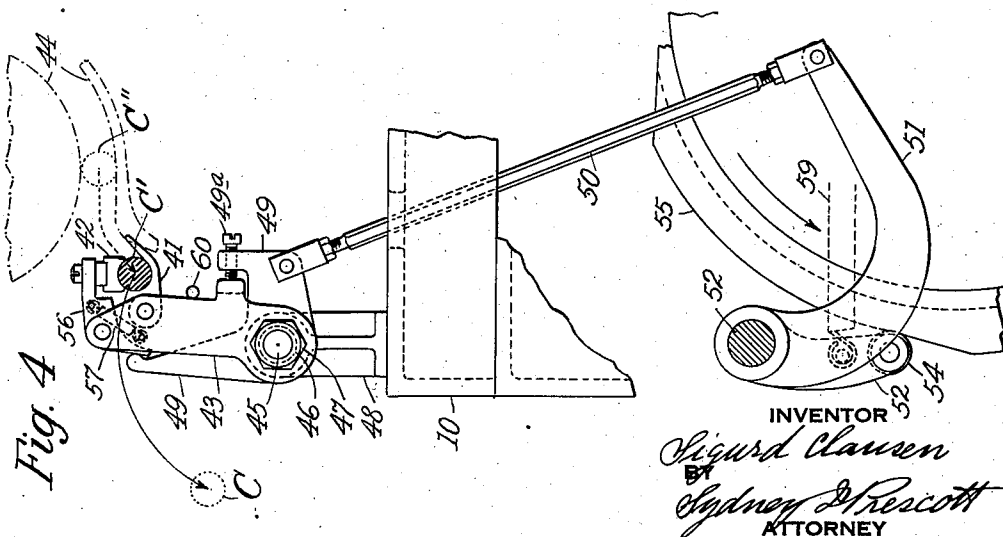
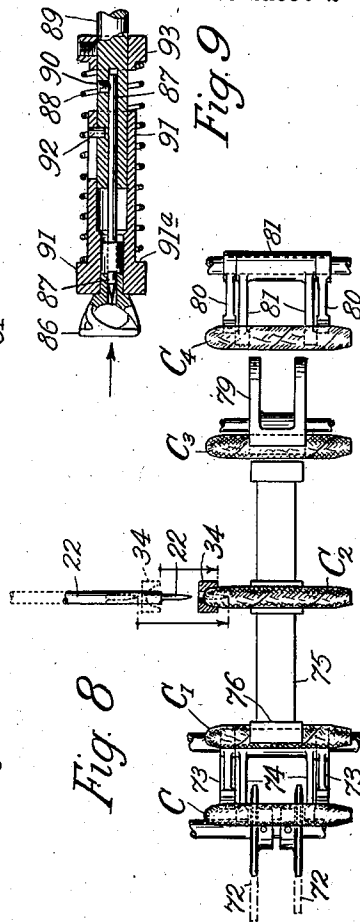
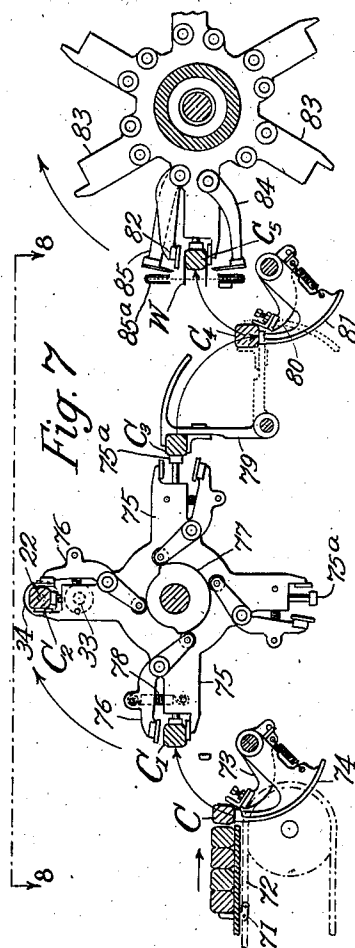
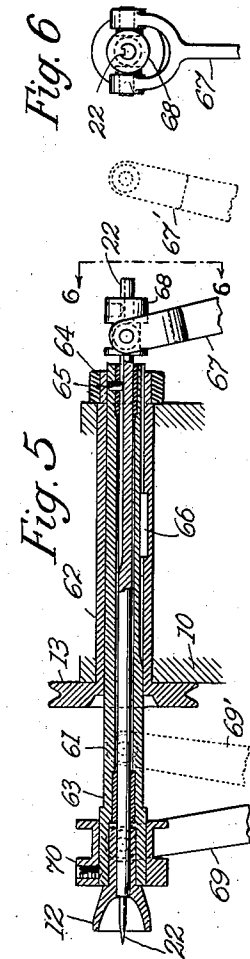
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UNITED STATES PATENT OFFICE

2,277,690

CIGAR PIERCER

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22 Claims. (Cl. 131—29)

This invention relates to cigar piercers, its general purpose being to provide mechanism for automatically piercing the head end of a cigar with an axial opening so as to render the latter ready for smoking, without first cutting or biting off the cigar end.

One of the principal objects of the present invention is to perform this piercing operation by machine, without requiring the services of an operator to pick up or receive the cigar and push it into the piercer as has been the usual practice in piercing cigars hitherto. The invention therefore contemplates the transferring and supporting of the cigars as they are delivered from a cigar machine and thereupon moving automatically a piercing element into the head of the supported cigar. It is also an object of the invention to provide for the more secure and accurate locating of the head end of the cigar prior to piercing by first bringing a locating thimble fitting the end of the cigar into contact therewith and then bringing a piercer into central piercing relation to the located cigar end, thus insuring accurate central locating of the pierced opening. This is desirable for the reason that if the piercer is first advanced into the cigar and the locating element is simultaneously or subsequently advanced to the cigar end, if the piercing point preceding the locating element engages the cigar off center, the locating element will merely crush the cigar head sidewise into central relation, producing a broken head or a torn opening.

The invention also contemplates the combining of the piercing with the knurling operation, the knurler, piercer and cigar being so moved automatically as to produce the desired positioning and locating of the cigar and piercing thereof, without handling of the cigar by an operator.

Still another object of the invention is to provide for automatically feeding cigars from a supply to a cigar transfer which carries them to a piercing position and which may further carry them to a delivering position.

It is an important object of the invention to insure that the hole stays open after piercing, by heating the piercing point so as to dry out the filler around the point. Where hand knurling is employed after the piercing operation the hand knurler has a tendency to squeeze the hole closed again and it is an object of the invention to remedy this by combining with the previous piercing operation, a knurling operation in which a point or plug enters the cigar to maintain the

pierced opening against the knurling pressure. In some instances, it is desirable to separate the knurling and piercing operations for the reason among others that the piercing tends to slightly enlarge the head so that it does not fit the knurler. The invention therefore contemplates the provision of mechanism for separately performing these two operations, as well as providing for transferring the cigar from one to the other.

With these and other objects not specifically mentioned in view, the invention consists in certain constructions and combinations which will be hereinafter fully described and then particularly pointed out in the claims hereunto appended.

In the accompanying drawings:

Fig. 1 is a view in side elevation partly in section, of the improved cigar piercer;

Fig. 2 is a view in end elevation on line 2—2, partly in section of Fig. 1;

Fig. 3 is a view in cross section on line 3—3 of Fig. 1;

Fig. 3A is a detail view partly in section showing the piercing point;

Fig. 4 is an end elevation on line 4—4 of Fig. 1, showing the transfer for taking the cigar from the trimming station to the piercing station;

Fig. 5 is a sectional view in side elevation of a piercing device incorporated with a knurler;

Fig. 6 is a view in end elevation on line 6—6 of Fig. 5, showing the operating means of the piercing pin;

Fig. 7 is a diagram in side elevation partly in section showing the arrangement of a piercing device in connection with a cigar enveloping machine;

Fig. 8 is a plan view from line 8—8 of Fig. 7; and

Fig. 9 is a cross section showing the arrangement of a knurler used for hand finishing pierced cigars.

The apparatus illustrative of one way in which the invention may be carried into effect may as shown in Figs. 1 to 9, comprise the combination with a cigar support, of a locating thimble arranged to fit one end of the cigar, a piercer arranged centrally of said thimble and means for first moving the thimble and cigar relative to one another to locate the cigar end and then moving the piercer relative to the end of the located cigar to pierce the same. Preferably a heater is arranged to heat the piercer to retain the hole caused by piercing, after the withdrawal of the piercer. Preferably the support comprises a transfer having a to and fro motion and

including cigar gripping elements arranged to receive cigars from the delivery of the cigar machine and transfer them into the range of action of said piercer. In the best constructions this transfer takes the cigars from the automatic knurling position of the cigar machine and carries them to piercing position. In one form of the invention, means are provided for delivering cigars one by one from a supply of cigars to the piercing position and in a form contemplated, after the piercing operation, these cigars are delivered to a cigar enveloping machine which may enwrap the cigars including the pierced ends in moisture resistant material. This apparatus may be varied widely in construction within the scope of the claims, for the particular device selected to illustrate the invention is but one of many possible concrete embodiments of the same. The invention therefore is not to be restricted to the precise details shown and described nor to the particular embodiments chosen as illustrative of the invention.

Referring to Figs. 1, 2 and 3, the frame 10 of the cigar machine supports a shaft 11 which carries the finishing knurler 12, an automatically operated part of the cigar machine. The shaft 11 is rotated by a pulley 13 splined thereon and reciprocated axially by a lever 14 connected by a rod 15 to a lever not shown actuated by a cam not shown of the cigar machine. By means of a belt a pulley 16 splined on shaft 11 transmits the motion of shaft 11 to a pulley 17 splined on a shaft 18 supported in a pedestal 19 and slidable in a sleeve 20 held by a pedestal 21. The shaft 18 carries the piercing pin 22 and is reciprocated axially by a lever 23 connected by a rod 24 to a cam lever 25 having a roller 26 held in engagement with a cam piece 27 by a spring 28.

A pin 29 carried by a block 30 slidable in a longitudinal slot of lever 23 engages a slot 31a in a slide 31 supported by a guide 32 mounted on frame 10. To the slide 31 is fastened a rod 33 which is guided by a bushing in pedestal 21 and carries the header block 34. A spring 35 anchored to pedestal 21 and hooked to a post 36 in slide 31 tends to hold block 34 in its forward position shown in full lines in Fig. 1, in which locating device 34 engages and locates the cigar.

The pin 22 slides in a block 37 heated by an electric heating cartridge 38, the block 37 having a heat insulating covering 39 and being supported adjacent to pedestal 21 by a clamp bracket 40.

The cigar C is held in clamps or gripper fingers 41, 42 of a transfer arm 43, Fig. 4, which takes the same from the knurling position C' into which it is discharged by the softener 44 of the cigar machine. The transfer arm 43 is mounted on a shaft 45 on which it is held frictionally by means of a coil spring 46 inserted between its hub and a fastening nut 47. The shaft 45 is supported by pedestals 48 on frame 10 and carries loosely a crank lever 49 connected by a rod 50 to a lever 51 on fulcrum shaft 52 of the cigar machine. The lever 51 is actuated by an arm 53 having a roller 54 in engagement with a cam piece 55 attached to one of the cams of the cigar machine.

While the cigar at position C' in the softener 44 is being rolled back and forth a given number of times between the concave and drum thereof, the cam 55 depresses crank lever 49, thereby turning crank lever 55 which raises the upper clamps 42, thus allowing the finished cigar to roll into position C' within the clamps or fingers

41, upon the arrival of arm 43 in receiving position. The cam then raises lever 49, permitting a spring 57 to close clamps 42 upon the cigar and thereupon pushing a set or stop screw 49a carried by lever 49 against a lug of arm 43, thereby turning the same and carrying the cigar into the dotted line piercing position C.

The cam 27 then advances the pin 22, allowing spring 35 to also advance block 34. The latter stops upon engaging with the head of the cigar C and pressing its tuck end against a stop 58 attached to frame 10, but, by virtue of the slot in slide 31, the pin 22 moves on and enters the cigar. Cam 27 then withdraws pin 22 while block 34 remains in position until pin 29 of lever 23 has reached the end of slot 31a when both pin 22 and block 34 recede together until they have reached the dotted positions shown in Fig. 1. The clamps 42 are then opened by the action of cam 55 to discharge the pierced cigar, and the transfer 43, by the action of a spring 59 attached to arm 53, returns to its receiving position against a stop 60 held by frame 10.

In the modified form shown in Figs. 5 and 6, the knurler and piercer are embodied in one unit. The finishing knurler 12 is attached to a sleeve 61 sliding in the sleeve hub 62 of pulley 13 which is supported by frame 10. In bushings 63 within the sleeve 61 is mounted the piercing pin 22 which thus is concentric with knurler 12. A collar 64 on sleeve 62 retains the pulley 13 in place, and a pin 65, fast in sleeve 61 and engaging with a long keyway in pin 22, transmits the rotating motion of pulley 13 to the pin 22. The sleeve 62 has a key 66 engaging with a long keyway in sleeve 63, so that the sleeve 61 and pin 22 can both move axially, independent of one another. A cam operated lever 67, by means of a shifter collar 68, reciprocates the pin 22, and a cam operated lever 69 by means of a collar 70 reciprocates the sleeve 63; the pin 22 and knurler 12 performing the same motions as pin 22 and header block 34 in Fig. 1, as the levers 67 and 69 are moved to and from their rest positions 67' and 69' by their respective cams.

In another form, Figs. 7 and 8, illustrative of the invention, the improved piercing apparatus is provided with a turret cigar carrier and is also shown applied to a cigar enveloping machine. A supply of cigars C taken from a forming box are advanced by the pusher fingers 71 of an endless conveyor 72 to a transfer arm 73 operating in conjunction with a pusher 74, such as shown in U. S. Patent #1,964,411 to R. J. Beutel.

This transfer inserts one cigar at a time into one of the holding pockets of an intermittently revolving turret 75; the jaws 76 of which are actuated by a stationary cam 77 and springs 78. In the entering position C1, the cigar is turned at right angles to its original position C on conveyor 72. In position C2, at the next stop of turret 75, the cigar engages with the header block 34 and the piercing pin 22 as shown in Fig. 8, the arrangement of the piercing apparatus being the same as in Figs. 1, 2 and 3. In position C3, after turning through 180 degrees from the entering position C1, the pierced cigar is discharged by ejecting plunger 75a into a transfer 79 which after another 90 degree turn into position C4, delivers the cigar to a second transfer arm and pusher combination 80, 81, which in turn inserts the cigar into the receiving pocket 82 of a cellophaning machine 83 such as described in the patent specification above referred to. The cigar ejecting plungers 75a may take the form of

the plungers shown in the Beutel patent above referred to in which they constitute the bottom walls of the turret pockets, and are normally urged into ejecting positions by springs (not shown) when jaws 76 are opened to unclamp cigars held in the pockets for ejection therefrom. When arrived in this position C5, the cigar has been turned on its axis one complete revolution since entering the piercer turret 74 and thus is in the same position as at C1.

As it enters the turret 83, the cigar C5 is enveloped on three sides by the Cellophane web W, supported in guides 85a, the latter being subsequently lapped on the fourth side by folding arms 84, 85, and its ends tucked and creased by devices shown in the patent cited. In the cellophaning turret 83 the cigar is turned through 270 degrees and the wrapped pierced cigar is finally deposited on a table by a 90 degree transfer similar to transfer 79 in the same position as when taken from the conveyor 12, with the wrapping seam at the bottom.

When refinishing an imperfect pierced cigar by hand, the knurler 86 for this purpose provided is equipped with a concentric pointed pin 87, Fig. 9, which enters the hole in the cigar after the same has been inserted into the knurler and is pushed with the latter against a spring 88 thus keeping the hole open during the refinishing operation. This pin closing of the opening in a previously pierced cigar during a hand knurling operation is sometimes required after machine knurling. The pin 87 is fastened in a concentric bore of rotary knurler shaft 89 by a set screw 90, while the knurler 86 is held in a sleeve 91 slidably mounted on shaft 89. A pin 92 in shaft 89 engaging with a longitudinal slot in sleeve 91 transmits the rotary motion of shaft 89 to the said sleeve and limits its axial motion. The spring 88, which rests against a collar 93 fast on shaft 89 and against a flange 91a of sleeve 91, normally holds the knurler 86 in its outermost position shown in the drawing. As the cigar, upon its insertion into the knurler, is pressed inward, the sleeve 91 compresses the spring 88 and allows the pin 87 to enter the hole in the then properly centered cigar.

The finishing knurler shown in Fig. 9, constituting a complete piercing unit with the exception of the heating block 37, may also be used for hand piercing cigars delivered by a cigar machine not equipped with an automatic piercer.

Referring now to the operation of the improved piercing mechanism, the cigar as shown in Fig. 1, is supported in a stationary position on a transfer or traveling supporting element having gripper fingers 41 and 42. The cigar is first accurately located through movement against the head end of the cigar by the locating device 34. This device locates the cigars two ways, longitudinally by pushing a cigar up against a stop 58, preferably somewhat yieldingly mounted, and transversely. If the cigar head is a little off center of the piercing point, it is quite important that it be brought to central position before the piercing operation starts, otherwise the hole will be off center, marring the appearance of the cigar and moreover if the cigar is later pierced or knurled in the hand knurler having a plug to keep the hole open, the end of the cigar may be crushed or injured. This arrangement therefore is a substantial improvement over the construction in which a locating cup travels in unison with the piercing

point or in which a point is rigidly secured in a knurler.

The locating block 34 has another function of importance, in that it acts as a stripper to hold the position of a cigar and particularly to hold down the delicate wrapper at the head end of the cigar as the piercing point is withdrawn. Otherwise, there is a tendency for the piercing point to pull away the adjacent portion of the wrapper as it is withdrawn. Since the locating block in some instances and under certain conditions some times has a tendency to suck away the wrapper from the bunch as it in turn withdraws, the block 34 is recessed as shown at 34a by any suitable holes or slots reducing the area contacting the cigar head.

The piercing point is heated by a cartridge 38 in a heating element 37 through which a needle moves in its movement toward and away from the cigar. The effect of heating the needle is to fix the tobacco surrounding the hole by drying it so that the hole is not filled in, due to the natural resilience of the cigar filler, and is especially important when the cigars are transferred directly from a cigar machine and are still in a moist resilient condition. As shown in Fig. 3A, the needle is provided at 22a with a slightly recessed curved shoulder which has the desirable effect of producing a rounded lip about the opening produced by the needle point, thus improving the appearance of the completed pierced cigar.

After automatic piercing of the cigar head, it is sometimes desirable to hand knurl the cigar head, as for instance when the machine knurling was not entirely perfect. If a conventional knurler is used, the hole is often filled in and the advantage of piercing lost, therefore as shown in Fig. 9, a convenient rotary knurler 86 is provided having incorporated therein a relatively movable point 87 to maintain the pierced opening during knurling. While this could be done by a point rigidly secured in a position projecting from the inner surface of the knurler, for the reasons already stated, it is much preferable to so construct the knurler that the cigar head be first located by the knurler and then pierced by relative movement of the knurler and the piercer as is done by movement of the knurler carrying sleeve 91 on the piercer point carrying shank 89 against the resistance of the spring 88. It is of course obvious that the knurler and piercer shown in Fig. 9 can be used for initial hand piercing if desired, and that this knurler is rotated by any suitable means, as by means similar to that shown in Fig. 1 for rotating the knurler 12, except that the parts for reciprocating the knurler shank will be omitted, while retaining the parts for rotating this shank.

What is claimed is:

1. The combination with a cigar support, of means engaging the body of a cigar and holding it on said support, a locating device arranged to engage one end of a cigar on said support, a piercer arranged centrally of said device, and means for producing a relative movement of said cigar and piercer to pierce the same, and a heating element, a support for said element, a piercer support positioned in engagement with and supported by said heating element and receiving heat from said heating element.

2. The combination with a cigar support, of means engaging the body of a cigar and holding it on said support, a locating device arranged to engage one end of a cigar on said support, a

piercer arranged centrally of said device, means for producing a relative movement of said cigar and piercer to pierce the same, and a heating element arranged to heat the piercer, a support for said heating element, a piercer support positioned in engagement with and supported by said heating element and receiving heat from said heating element, said heating element surrounding a portion of said piercer when the same is in non-piercing position relative to the cigar.

3. The combination with a cigar support, of means for positioning cigars on said support, a piercer arranged for movement into and out of piercing position relative to a cigar on said support, a heater arranged to heat the piercer, a support for said heater, a piercer support positioned in engagement with and supported by said heater and receiving heat therefrom, and means for moving said piercer longitudinally relative to said heater to pierce cigars positioned on said support.

4. The combination with a cigar support, of means for feeding cigars to said support, a cigar knurler arranged to engage the head of a cigar positioned on said support, a piercer arranged centrally of said knurler for movement relative thereto, and means for producing relative movement of said knurler, cigar and piercer for engaging the knurler against the cigar to locate the cigar head, and then pierce the same.

5. The combination with a cigar piercing point, of a cupped locating member coaxial with said piercer for centralizing a cigar being pierced relative to the piercer, and means for heating said point while leaving said locating member relatively cool.

6. In a cigar machine, the combination with means yieldably supporting a cigar, of a locating block having an operating face shaped to the shape of the cigar end, and means holding said block against rotation giving the block to and fro motion endwise of the cigar into and out of engagement with the shaped face against said cigar end, said shaped face being recessed to prevent sticking of the wrapper of the cigar at said end to the face.

7. The combination with a cigar piercing point, of a rotatable cigar head knurler having a central opening arranged to admit said point, and means mounting said knurler for movement relative to the point whereby the cigar head may first be engaged by the knurler and thereafter acted upon by the piercing point.

8. The combination with the re-rolling mechanism of a cigar machine, of a knurler, means for transporting the cigar from said mechanism to a position aligned with said knurler, and means for producing relative axial movement of the knurler and the cigar in said transporting means to cause the knurler to engage and knurl one end of the cigar and locate the cigar in said transporting means, and a device for piercing the knurled end of the cigar, including means for effecting relative movement between said cigar and device to pierce said cigar while said knurler engages said cigar end.

9. The combination with a rotary knurler, of a piercer concentric with said knurler and movable axially relative thereto.

10. The combination with a knurler, of a piercer concentric with said knurler, means for moving said knurler to locate the head end of a cigar, and mechanism for moving said piercer relatively to said knurler to pierce the head end of the cigar after it has been located.

11. The combination with a knurler, of a piercer concentric with said knurler, means for rotating said knurler and piercer, and mechanism for moving said piercer axially relative to said knurler.

12. The combination with a knurler, of a piercer, mechanism for rotating said knurler and said piercer, and means movable relative to the knurler and piercer for automatically transferring a cigar from the knurler to the piercer after the completion of the knurling operation for the performance of the piercing operation.

13. In an automatic cigar piercing machine, the combination with a source of supply of cigars, of a cigar support, means for directing cigars from said source to said support, means for holding a cigar on said support, a locating device arranged to engage one end of said cigar resiliently while held on said support and move said cigar both transversely and axially to locate it thereon for piercing, a piercer arranged centrally of said device for movement relative thereto, and means for producing a relative axial movement of said device, cigar and piercer to locate the cigar end and pierce the same.

14. In an automatic cigar piercing mechanism for piercing the shaped head ends of cigars, the combination with a traveling cigar support, said support including a set of relatively yieldable grippers engaging the cigar between its ends, of a cigar piercer arranged to pierce the shaped head end of a cigar axially while said cigar is held in said grippers, means for engaging the shaped head end of said cigar to move it transversely and axially to locate it on said support, means for moving said support to cause it to position cigars held therein in the range of action of said piercer, means operative automatically when said support has positioned said cigar within the range of operation of said piercer for producing a relative movement of the piercer and the support to pierce the cigar, a source of supply of cigars, and devices coacting with said source of supply to deliver cigars one by one to said traveling support.

15. In an automatic cigar piercing mechanism for piercing the shaped head ends of cigars, the combination with a cigar support, said support including a set of relatively yieldable grippers engaging the cigar between its ends, of a cigar piercer arranged to pierce the shaped end of a cigar axially while said cigar is held between said grippers, a locating device concentric with said piercer to embrace said head end and move the head end transversely and axially to locate said cigar transversely as well as axially in said grippers and thus center the cigar with respect to the piercer, means for moving said support to cause said grippers to position cigars held therein in the range of action of said piercer, means operative automatically when said grippers have positioned said cigar within the range of operation of said piercer for producing a relative movement of the piercer and the support to pierce the cigar, a source of supply of cigars, and devices coacting with said source of supply to deliver cigars one by one to said traveling support.

16. The combination with a support for a cigar, of a knurler, mechanism for feeding a succession of cigars to said support, means for relatively moving said support and knurler to cause the latter to engage and knurl one end of a cigar, a piercer, means for moving said support in timed relation to said feeding mechanism to convey said cigar from said knurler into the range of

action of said piercer, and means for causing relative movement between said support and piercer for piercing the knurled end of the cigar after it is disengaged by said knurler.

17. In an automatic cigar piercing mechanism for piercing the shaped head ends of cigars, the combination with a cigar support, of a cigar piercer arranged to pierce said head end of a cigar in an axial direction, mechanism for engaging the head end of a cigar while on said support and moving said cigar both transversely and axially for locating it in centralized position with respect to said piercer, means for feeding a cigar to said support to position it thereon in the range of action of said piercer, means operative automatically when said cigar has been positioned on said support within the range of operation of said piercer for producing a relative movement of the piercer and the cigar to pierce the latter, a source of supply of cigars, and devices coacting with said source of supply to deliver cigars one by one to said support.

18. In an automatic cigar piercing mechanism for piercing the shaped heads of cigars, the combination with a traveling cigar support, of a cigar piercer arranged to pierce the shaped head end of a cigar in an axial direction, means for moving said support to position said cigar in the range of action of said piercer, means to engage and move a cigar transversely and axially to locate the head end of said cigar on said support centrally with respect to said piercer, means operative automatically when said support has positioned said cigar within the range of operation of said piercer for producing a relative movement of the piercer and the support to pierce the cigar, a source of supply of cigars and devices coacting with said source of supply to deliver cigars one by one to said traveling support.

19. In a machine of the character described, means for holding a cigar for perforation, mechanism for perforating one end of the cigar while it is held by said holding means including a head having a socket to embrace the end of the cigar, a needle reciprocable co-axially through said socket into and out of the cigar end to perforate the latter, means for successively feeding cigars

into proper relation to said head and needle, and means for successively ejecting the cigars after perforation.

20. The combination with opposed relatively yieldable grippers arranged to receive a cigar having a shaped head end delivered between them, of actuating means for closing said grippers to grip the cigar, and after a period of dwell move said grippers bodily to transfer the cigar, a member arranged to embrace said head end of a cigar and move it transversely and axially to locate said cigar transversely after gripping and prior to transferring thereof, a piercer located to engage the shaped end of a located cigar during the dwell of said actuating means, and means for moving said piercer into and out of said cigar to pierce the same.

21. In a cigar piercing machine, means for holding a cigar for perforation, means for feeding a succession of cigars to said holder, means for engaging each cigar as it is fed and moving it transversely and axially in said holder for locating each cigar while positioned in said holder, and mechanism for perforating one end of a cigar while it is held by said holding means, said mechanism comprising a piercing member, and said member having an elongated point for entering the cigar, and a rounded shoulder at the base of the point constructed and arranged to engage the lip of the opening made by the point to round said lip, and means for moving said member relative to said end of said cigar to pierce the same.

22. The combination with a traveling cigar support, of a locating element arranged to embrace the head end of a cigar for moving said cigar to locate it transversely and axially on said support, means for moving said support to locate a cigar for cooperation with said element, a piercer arranged centrally of said element, and means operative automatically when said support has positioned said cigar within the range of operation of said piercer for moving the element and piercer relative to the cigar to pierce the end.

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