July 24, 1934. D. W. MOLINS 1,967,624

MANUFACTURE OF CIGARETTES

Filed Dec. 30, 1932 3 Sheets-Sheet 1

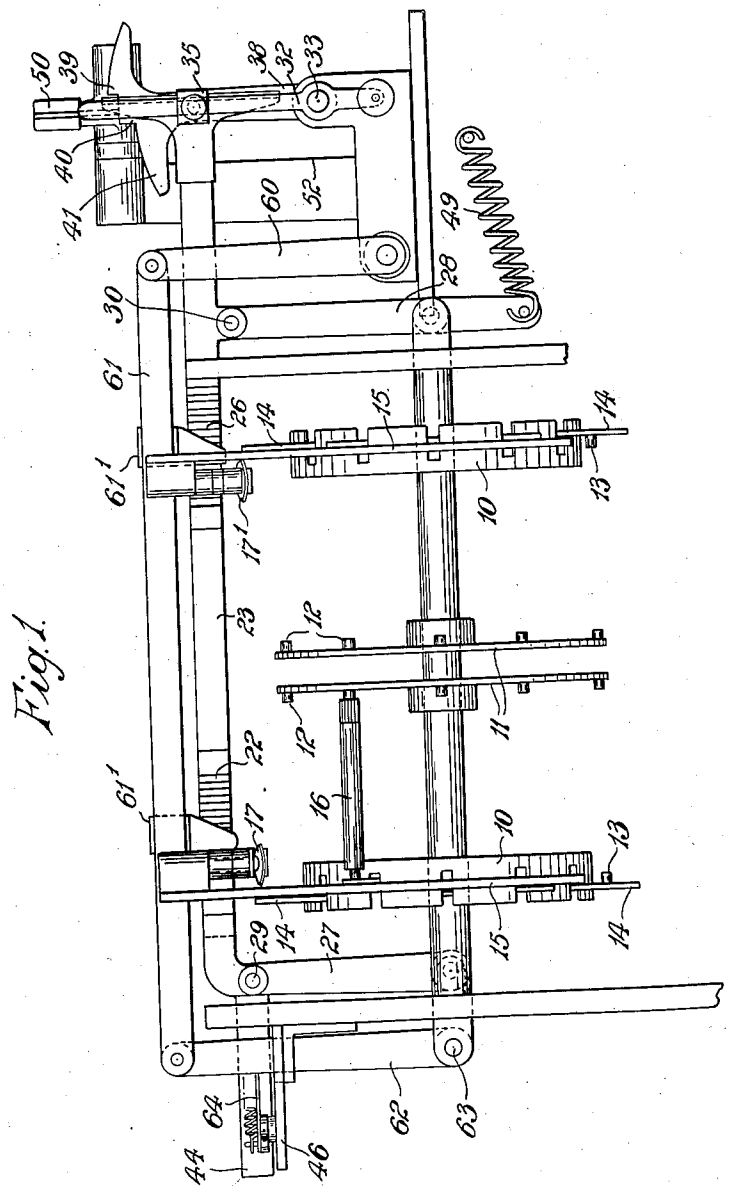


Fig. 1.

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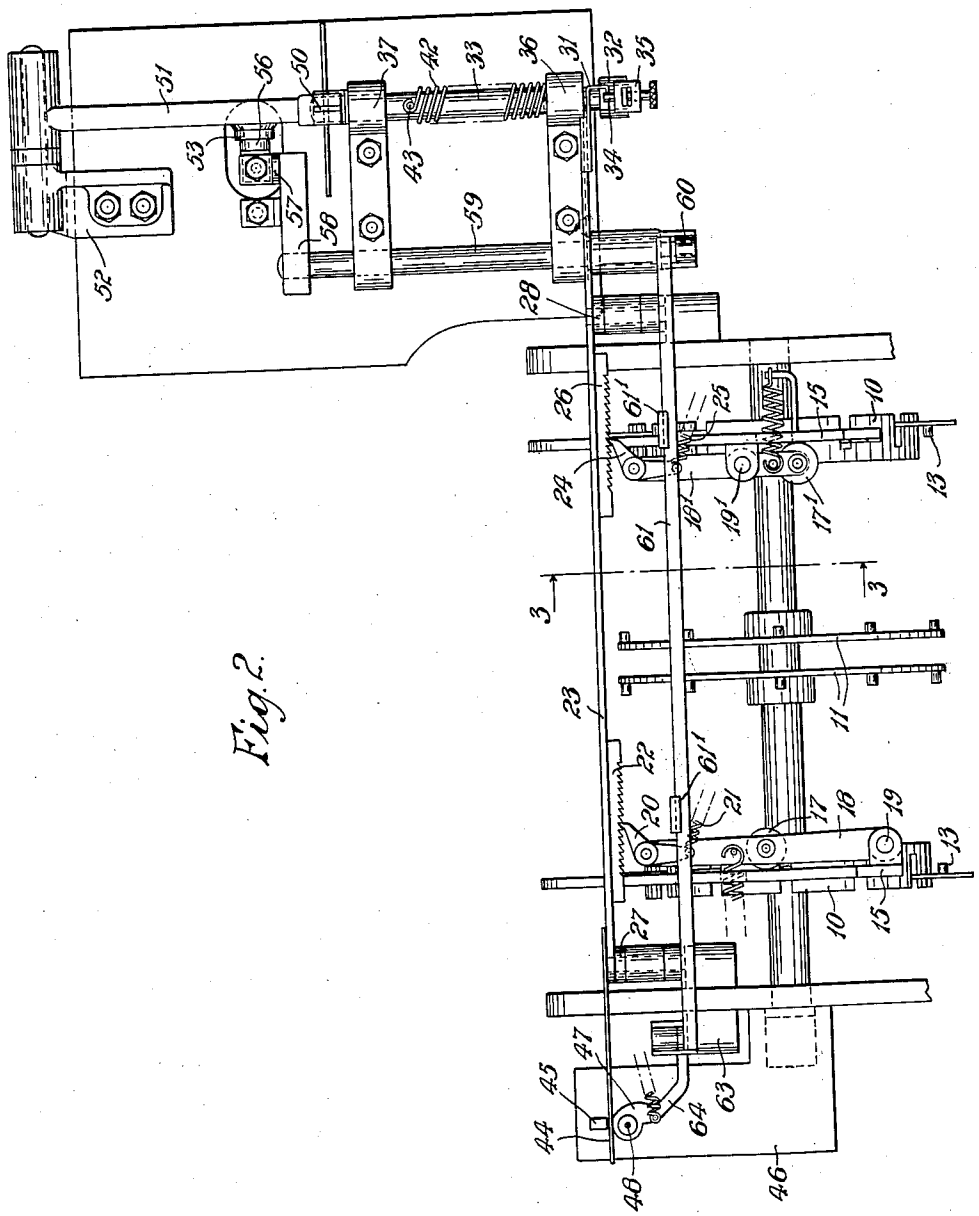


Fig. 2.

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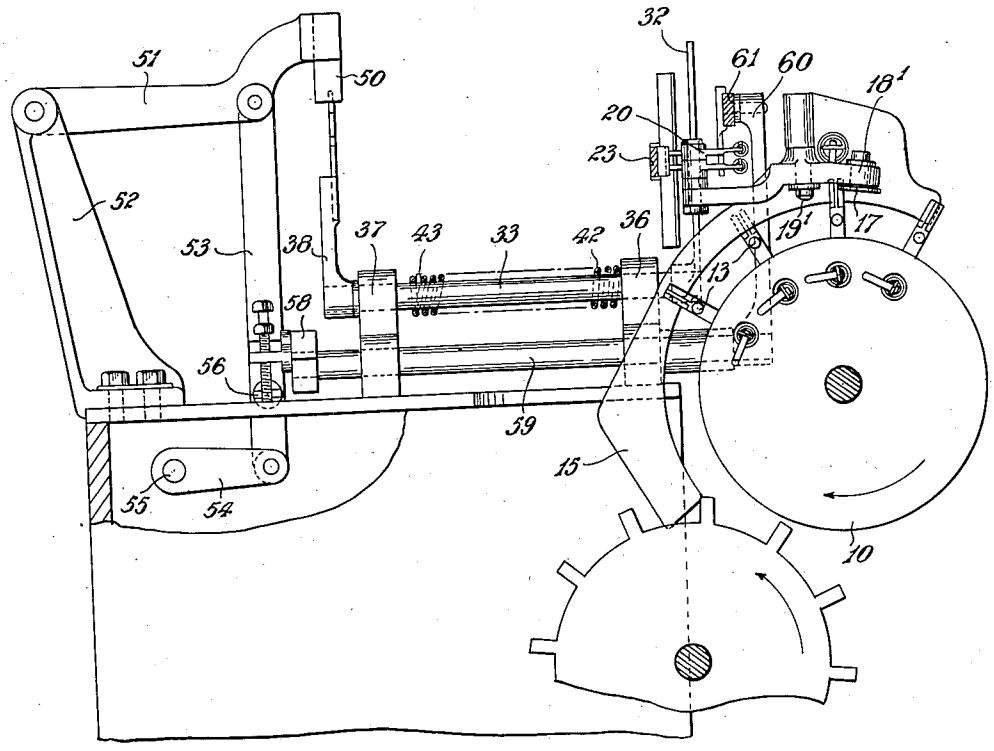
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Fig. 3.



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MANUFACTURE OF CIGARETTES

Desmond Walter Molins, Bexley, England

Application December 30, 1932, Serial No. 649,634
In Great Britain January 12, 1932

13 Claims. (Cl. 131—39)

The present invention relates to the manufacture of cigarettes, and has for its object the achievement of a greater regularity in the tobacco filling, to give a more uniform consistency of firmness known in the trade as "feel" to the cigarettes produced.

It has hitherto been customary to control the manufacture of cigarettes by weight and to regulate the cigarette making machine to produce cigarettes to a required number, for instance, twenty-six per ounce. This system, however, has the disadvantage that when the tobacco is of high moisture content, cigarettes made to a specific weight will contain less tobacco than when the tobacco being used is of a lower moisture content, and the moisture content of the tobacco is something which is subject to considerable variation most difficult to control.

A further difficulty is the variation in the proportion of the "shorts" or "smalls" contained in the tobacco.

When the tobacco contains a higher percentage of small or broken tobacco it requires more tobacco satisfactorily to fill the cigarette than when the "shorts" content is lower, so that a system of working to a constant specific weight will give variations in the "feel" or the firmness or filling.

There are yet other factors, such as, for instance, the specific gravity of the tobacco leaf itself or the firmness or springiness of the tobacco, both of which vary according to the different types of tobacco leaf, and also according to variations in the treatment that the tobacco leaf receives before being delivered to the cigarette making machine.

To avoid the disadvantages above described, it is therefore, proposed to control the manufacture of the cigarettes by "feel" as distinguished from weight, and the invention consists in a device for achieving this end.

In one form according to the present invention, there is provided in or for a cigarette making machine, the combination of one or more pairs of fingers for feeling or pressing points, particularly the ends, of individual cigarettes, wherein at least one of the fingers of each pair is movable towards the other, mechanism for controlling the feed of tobacco to the machine, and means controlled by the movable fingers for altering the setting of the control mechanism whenever a feeler or presser moves along a certain predetermined path.

In another form according to the present invention, there is provided in or for a cigarette making machine, a detecting or selecting device of the type specified below, combined with mechanism for controlling the operation of the machine and means controlled by a movable feeler to alter the setting of the control mechanism whenever a yieldably mounted feeler has moved inwardly beyond a predetermined amount. The type of detecting or selecting device referred to above comprises in combination, a pair of feelers arranged to engage the opposite ends of each cigarette, at least one feeler of each pair being yieldingly mounted to move inwardly towards the other, means for delivering one cigarette at a time between said feelers, and means for releasing the cigarette from the feelers at a different time and/or place according to the movement of the yielding feeler when the particular cigarette is being tested.

One way of carrying the invention into effect will be described by way of example, with reference to the accompanying drawings, in which:—

Fig. 1 is a side elevation of the apparatus.

Fig. 2 is a plan of the construction shown in Fig. 1, and

Fig. 3 is a sectional elevation at 3—3 of Fig. 2 looking in the direction of the arrows.

Like reference numerals refer to like parts throughout the several figures of the drawings.

The apparatus is designed to control the feed of tobacco to the machine by the feel of the ends of the cigarettes. For this purpose, a detecting device is provided. In the present case, the detecting device is similar in construction and operation to that described in the specification of my prior application for Letters Patent Serial No. 647,247, whereby the cigarettes are automatically felt at their ends, and those cigarettes which are soft at the ends, are rejected.

It has therefore, been thought unnecessary to insert in this specification a full description of the construction and operation of the detector, and only those parts which co-operate with the means for altering the setting of the control mechanism will be described herein.

The upper pairs of parallel discs of the detector device are shown at 10 and 11 respectively in the accompanying drawings.

The fixed fingers or feelers are constituted by studs 12 mounted on the discs 11 and the movable fingers or feelers are constituted by studs 13 on movable arms 14 which are spring urged inwardly. A cam 15 is provided around a portion of the periphery of each disc 10, and it is

so arranged that when a soft ended cigarette, such as the cigarette 16 in Fig. 1 is engaged between any pair of feelers 12 and 13, the arm 14 which happens to press on a soft ended cigarette will lie on the inside of the cam 15.

Located also on the inside of the cam 15 and in the path of any of the arms 14 which may travel on the inside of the cam, is a roller 17, mounted on a lever arm 18 which is pivoted to a fixed part of the machine at 19. On the forward end of the lever 18, there is pivotally mounted a pawl 20 which is urged by means of a spring 21 towards a ratchet 22 mounted on a movable bar 23.

Near the right-hand disc 10 in Figs. 1 and 3, there is provided a similar roller 17^1, also mounted on a lever 18^1 and pivoted about a point 19^1. This lever arm 18^1 is also provided with a pawl 24 which is urged by means of a spring 25 towards a ratchet 26 mounted on the endwise movable rod 23. The rod 23 is supported on two uprights 27 and 28 respectively, which are pivoted to fixed parts of the machine, and which are also pivoted at points 29 and 30 respectively to the rod 23. At one extremity, the rod 23 is provided with a channel shaped end 31, the length of the channel being vertically and at right angles to the rod 23.

An arm 32 rigidly mounted on a rotatable shaft 33 is provided with a pin 34 mounted on a slidable clamp 35 to enable the height of the pin 34 on the arm 32 to be altered. The shaft 33 is supported in bearings 36 and 37, and is provided with a second arm 38 which is also rigidly mounted on the shaft so that when the arm 32 is rotated, the arm 38 will also rotate at the same time. The upper end of the arm 38 is provided with a cross piece which is divided into three arcuate portions 39, 40, and 41, which are of different radii, but are concentric with the shaft 33. The shaft 33 is provided with a spring 42 which acts between a pin 43 on the shaft and the fixed bearing 36. The spring is so arranged that it tends to swing the arm 38 in a clockwise direction, as viewed in Fig. 1.

On the other end of the rod 23, there is provided an extension 44 which lies between a stop 45 on a bracket 46 fixed to the frame-work of the machine, and a clamping member 47 which is pivoted about a pin 48. The clamping member 47 is spring urged in an anti-clockwise direction, thus tending to keep the extension 44, and, therefore, the rod 23, locked against movement by a spring 49 which tends to move the rod 23 to the left.

Mounted above the cross-piece on the arm 38, there is a feeling device 50 which is mounted on an arm 51 which in turn is pivoted to a bracket 52 mounted on the machine frame. The arm 51 is arranged to be raised and permitted to fall by gravity periodically; for instance, once a minute, each downward movement of the arm 51 completing a cycle.

The vertical swinging movement of the arm 51 is obtained by a link 53 which is pivoted at one end to the arm 51, and at the other end to a crank 54 which is fixed to a shaft 55. The shaft 55 is coupled to mechanism for controlling automatically the feed of tobacco to the hopper of the machine. This may be done in any well known manner, and the connection may be either electrically made, or it may be effected by any suitably mechanical means.

The setting of the mechanism for controlling the feed to the hopper, is obtained by the extent to which the lever arm 51 moves the feeler 50 downwardly each time that it is actuated, the extent of the downward movement determining the angular movement of shaft 55.

A pin 56 mounted on the link 53 is connected to a swivelling arm 57 mounted on a crank 58. The crank 58 is rigidly coupled to a rotatable shaft 59 at the other end of which is mounted an arm 60, which is pivotally connected to one end of a rod 61, the other end of which is pivoted to a link 62 which in turn is mounted on a fixed part of the frame at the point 63. The clamping member 47 is provided with an extending arm 64 which lies near the link 62.

It will be seen, therefore, that when the arm 51 and link 53 are moved upwardly after the control mechanism for feeding the tobacco to the hopper has been set, the shaft 59 will be rotated which in turn will cause the rod 61 to move towards the left of Fig. 1 or Fig. 2. In this way, the clamping member 47 will be turned in a clockwise direction, and the pawls 20 and 24 will be released by the projections 61^1 on the rod 61, and will allow the bar 23 to move towards the left of Fig. 1 under the control of the return spring 49.

The operation of the apparatus is briefly, as follows:—

As the discs 10 and 11 rotate, any cigarettes such as the cigarette 16 shown in Fig. 1 which are soft ended, will cause the arm 14 which engages it to travel along the inside of the cam 15. Every time such an arm passes one of the rollers 17 or 17^1, in other words, whenever a soft-ended cigarette is gripped, one or other of the pawls 20 or 24 will be moved to the right, consequently, moving the rod 23 with it.

One set of discs 10 and 11 is slightly staggered with respect to the other set to ensure that only one pawl can operate at a time, otherwise two defective cigarettes (one on each row) might pass through and only cause one movement of the bar 23.

According to the height at which the pin 34 is clamped to the arm 32, a given amount of endwise movement of the rod 23 will produce a different angular movement of the arms 32 and 38. It follows that the number of soft ended cigarettes which must be rejected by the detector device before either of the surfaces 39 and 40 on the arm 38 is moved to the right in Fig. 1 so as to be clear of the feeler 50, is variable at will, and can be controlled by adjusting the setting of the pin 34 on the arm 32.

The surfaces 39, 40 and 41 correspond to settings of the tobacco feed control mechanism which produce soft, normal and hard cigarettes respectively and in practice the machine is set to keep these limits as close as possible.

When a cycle restarts after the tobacco feed control has been automatically adjusted, if necessary during the previous cycle, the surface 39 lies beneath the feeler because the rack bar 23 has been released.

The cigarettes made during the current cycle will depend on the setting of the tobacco feed control at the end of the previous cycle, and supposing this setting corresponded to surface 41, the cigarettes will be hard and no movement of the rack bar 23 takes place during the whole cycle. Consequently, at the end of the current cycle, the surface 39 will receive the feeler when it is lowered, and during the next cycle compara-

tively soft cigarettes will be made and a certain number will be rejected, the bar 23 feeding along accordingly. In all probability the movement of the rack bar 23 during this cycle will cause the surface 40 to be beneath the feeler when it is lowered and thereby determine the setting of the tobacco feed control, and generally the machine keeps on normal production for long period. By making the limits very close the output can be kept at a very uniform level.

It will be understood, therefore, that when the number of soft ended cigarettes exceeds a predetermined number (which is controlled by the setting of the pin 34) between each actuation of the feeler 50, the tobacco fed to the cigarette machine will be increased if the portion 40, and to a greater extent if the portion 41 of the arm 38 lies opposite the feeler 50 when the latter descends to set the feed. As long as the number of rejected cigarettes does not exceed a previously chosen figure, the feeler 50 will engage with the surface 40 and the feed of tobacco to the machine will be unaltered. In other words, when the number of soft ended cigarettes is less than a predetermined number per cycle (or movement of the feeler 50) not even the constant accumulative action of the arms 14 moving the rollers 17 and 17^1, and incidentally the pawls 20 and 24, will be sufficient to cause the cigarette making machine to alter the tobacco feed.

The required standard of "feel" may be set according to the position of the cam 15. Obviously, without departing from the scope of the present invention, the cigarettes may be "felt" by their body instead of at their ends, and also three paths, instead of two on either side of the cam 15 may be provided for the arms 14.

For instance, Path No. 1 may be for cigarettes whose ends are definitely empty. The cigarettes in this case would be rejected.

Path No. 2 would be for cigarettes which, although soft at the ends, are not sufficiently defective as to be discarded. Thus, in this case, the path of the arms 14 would be such that the cigarettes are released as would also be the case with normal cigarettes which would cause the arms 14 to move on path No. 3.

Both the paths Nos. 1 and 2 respectively may be arranged to cause an endwise movement of the rod 23 so that both of the cigarettes which are definitely empty, and those which are running a little soft will be factors in regulating the machine, without causing the actual rejection of any but the definitely empty ended cigarettes.

What I claim as my invention and desire to secure by Letters Patent is:—

1. In apparatus for use in cigarette making machines embodying variable feed control means for regulating the quantity of tobacco fed, the combination with detecting means operable to engage oppositely disposed points on individual cigarettes to determine the density thereof, of mechanism operable by said detecting means and associated with said feed control means to vary the feeding action of the latter.

2. In apparatus for use in cigarette making machines embodying variable feed control means for regulating the quantity of tobacco fed, the combination with detecting means operable to engage the opposite ends of individual cigarettes to determine the density thereof, of mechanism operable by said detecting means and associated with said feed control means to vary the feeding action of the latter.

3. In apparatus for use in cigarette making machines embodying variable feed control means for regulating the quantity of tobacco fed, the combination with a plurality of detecting devices, each operable to engage oppositely disposed points on individual cigarettes to determine the density thereof, of mechanism operable by either of said devices and associated with said feed control means to vary the feeding action of the latter.

4. In apparatus for use in cigarette making machines embodying variable feed control means for regulating the quantity of tobacco fed, the combination with a plurality of detecting devices each of which is operative to engage one cigarette at a time, said devices being displaceable in response to variation in density of the cigarette being tested, and mechanism associated with said feed control means and movable to vary the feeding action of the latter, each of said devices being operatively connected to said mechanism to effect movement thereof, whereby adjustment of the tobacco feed is determined in accordance with the cumulative displacement of said devices.

5. In apparatus for use in cigarette making machines embodying variable feed control means for regulating the quantity of tobacco fed, the combination with a plurality of detecting devices, each engaging the ends of individual cigarettes and displaceable in response to variation in density thereof, and mechanism associated with said feed control means and movable to vary the feeding action of the latter, each of said devices being operatively connected to said mechanism to effect movement thereof, whereby adjustment of the tobacco feed is determined in accordance with the cumulative displacement of said devices.

6. In apparatus for use in cigarette making machines embodying variable feed control means for regulating the quantity of tobacco fed, the combination with detecting means operable to engage oppositely disposed points on individual cigarettes to determine the density thereof, of a device associated with said feed control means and movable through a plurality of positions to selectively regulate said feed control means, and mechanism operable by said detecting means to impart step-by-step movement to said device through the said positions.

7. In apparatus for use in cigarette making machines embodying variable feed control means for regulating the quantity of tobacco fed, the combination with detecting means operable to engage oppositely disposed points on individual cigarettes to determine the density thereof, said detecting means being displaceable on engagement with each cigarette having less than a predetermined density, a device associated with said detecting means and supported for movement through a plurality of positions, said device being movable step-by-step in response to successive displacement of said detecting means, and means operatively connected with said feed control means and movable periodically to engage said device for regulating said feed control means in accordance with the position of said device.

8. In apparatus for use in cigarette making machines embodying variable feed control

means for regulating the quantity of tobacco fed, the combination with detecting means operable to engage oppositely disposed points on individual cigarettes to determine the density thereof, of a device displaceable in one direction from an initial position and adapted to represent the average density of the cigarettes by the extent of displacement thereof, and means operable by said detecting means on engagement of the latter with each cigarette varying from a predetermined density for displacing said device one step from the initial position,

9. In apparatus for use in cigarette making machines embodying variable feed control means for regulating the quantity of tobacco fed, the combination with detecting means operable to engage oppositely disposed points on individual cigarettes to determine the density thereof, of a device displaceable in one direction from an initial position and adapted to represent the average density of the cigarettes by the extent of displacement thereof, means operable by said detecting means on engagement of the latter with each cigarette varying from a predetermined density for displacing said device one step from the initial position, and means for periodically engaging said device and operable in accordance with the extent of displacement of the latter for varying said feed control means.

10. In apparatus for use in cigarette making machines embodying variable feed control means for regulating the quantity of tobacco fed, the combination with a pair of feelers operative to engage opposite points of individual cigarettes, one of said feelers being movable towards the other, of means operable by said movable feeler and moving in a predetermined path to determine the setting of the tobacco feed control means.

11. In apparatus for use in cigarette making machines embodying variable feed control means for regulating the quantity of tobacco fed, the combination with a pair of feelers operative to engage opposite points of individual cigarettes, one of said feelers being yieldably mounted and movable towards the other, of a movable rod operatively connected to the tobacco feed control means, a ratchet member secured to said rod, and a pawl arranged to cooperate with the ratchet member, and actuated by the yieldably mounted feeler as the feeler moves in a predetermined path.

12. In apparatus for use in cigarette making machines embodying variable feed control means for regulating the quantity of tobacco fed, the combination with a pair of feelers operative to engage opposite points of individual cigarettes, one of said feelers being yieldably mounted and movable towards the other, of a movable rod operatively connected to the tobacco feed control means, a ratchet member secured to said rod, a pivoted lever, a pawl arranged to cooperate with said ratchet member and movably mounted on said pivoted lever, said pawl and lever being spring urged towards the ratchet member and the movable feeler respectively, and actuated by the yieldably mounted feeler as the feeler moves in a predetermined path, and a spring operable to urge the movable rod in the opposite direction to that in which it is moved by the action of the pawl and ratchet members.

13. In apparatus for use in cigarette making machines embodying variable feed control means for regulating the quantity of tobacco fed, the combination with a pair of feelers operative to engage opposite points of individual cigarettes, one of said feelers being yieldably mounted and movable towards the other, of a movable rod operatively connected to the tobacco feed control means, a ratchet member secured to said rod, a pivoted lever, a pawl arranged to cooperate with said ratchet member and movably mounted on said pivoted lever, said pawl and lever being spring urged towards the ratchet member and the movable feeler respectively, and actuated by the yieldably mounted feeler as the feeler moves in a predetermined path, a spring operable to urge the movable rod in the opposite direction to that in which it is moved by the action of the pawl and ratchet members, and a clamping member operable to retain the movable rod against movement while the pawl is moving back to a succeeding tooth on the ratchet member.

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