June 23, 1931. W. E. MOLINS 1,811,759

CIGARETTE MAKING MACHINERY

Filed Sept. 9, 1929 4 Sheets-Sheet 1

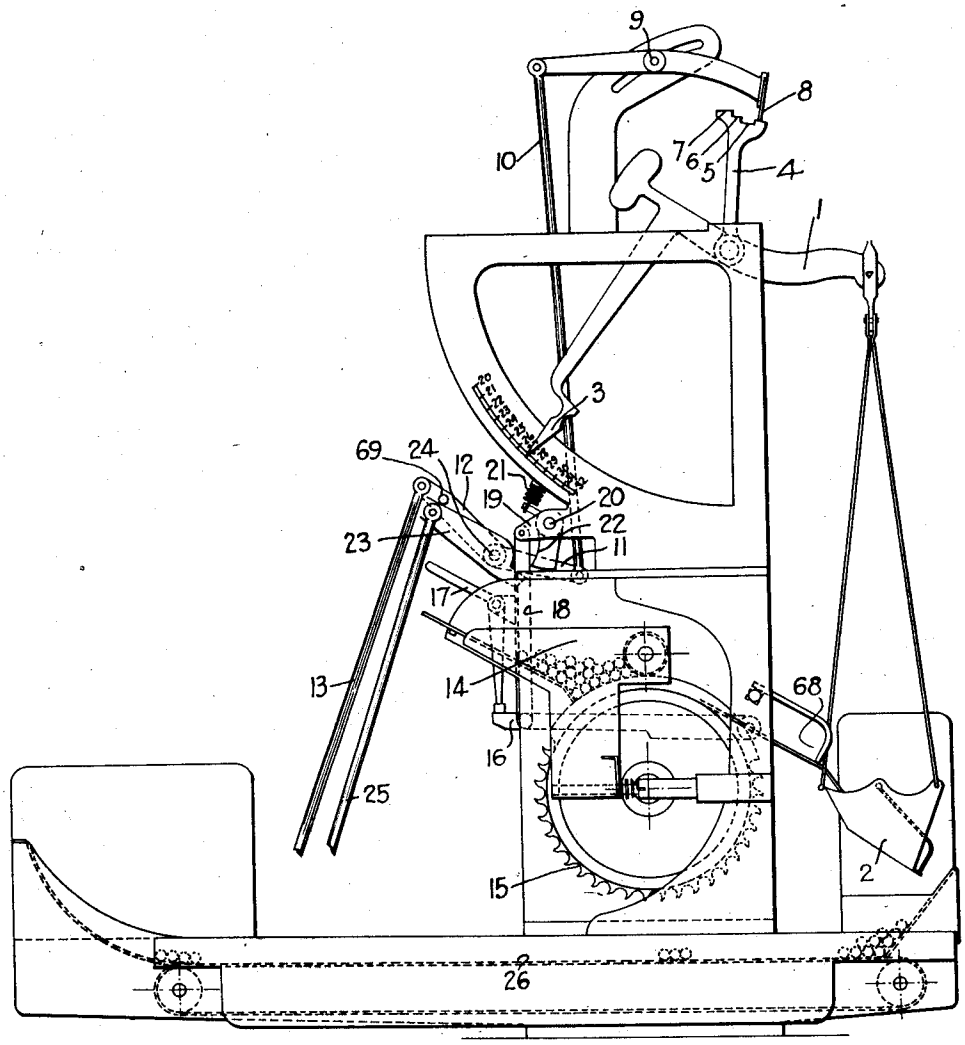


Fig. 1.

INVENTOR

Walter E. Molins

By Watson, Cole, Morse & Grindle

Attys

June 23, 1931. W. E. MOLINS 1,811,759

CIGARETTE MAKING MACHINERY

Filed Sept. 9, 1929 4 Sheets-Sheet 2

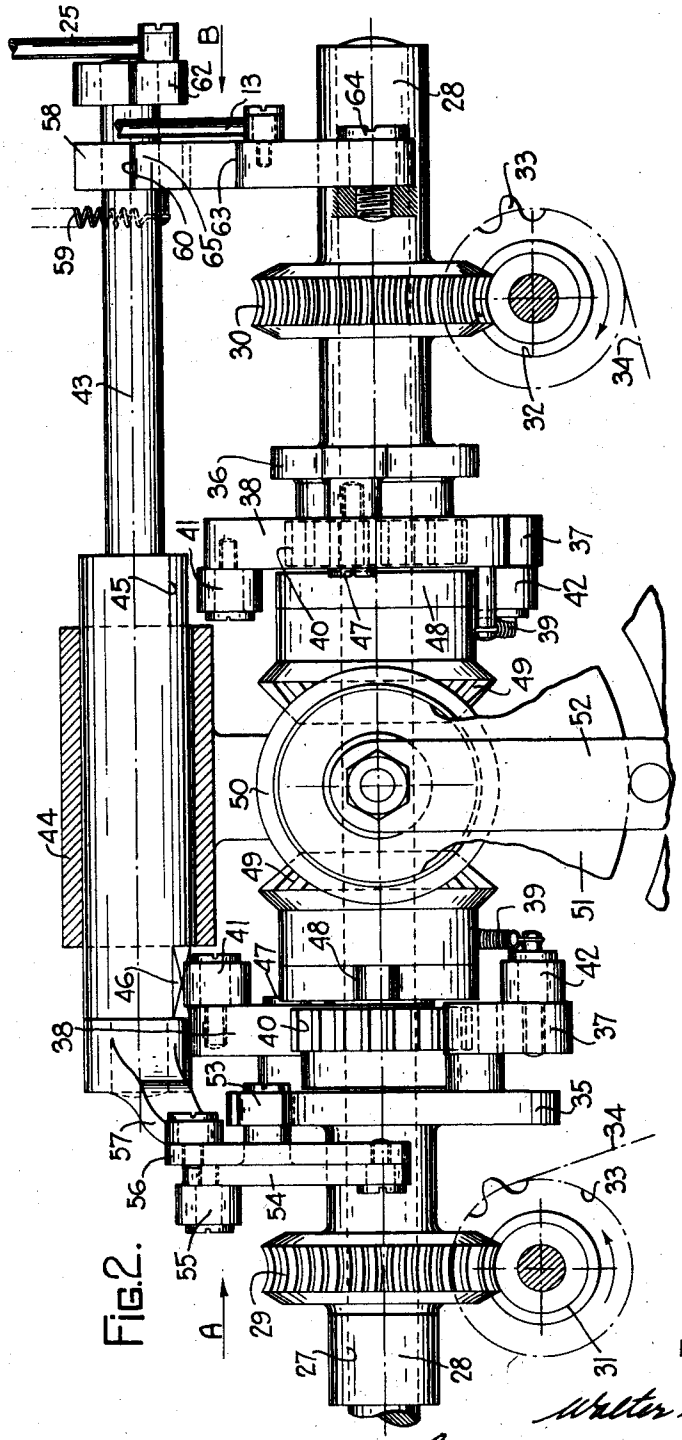


Fig. 2.

INVENTOR

Walter E. Molins

By Watson, Cole, Grindle & Watson

June 23, 1931. W. E. MOLINS 1,811,759

CIGARETTE MAKING MACHINERY

Filed Sept. 9, 1929 4 Sheets-Sheet 3

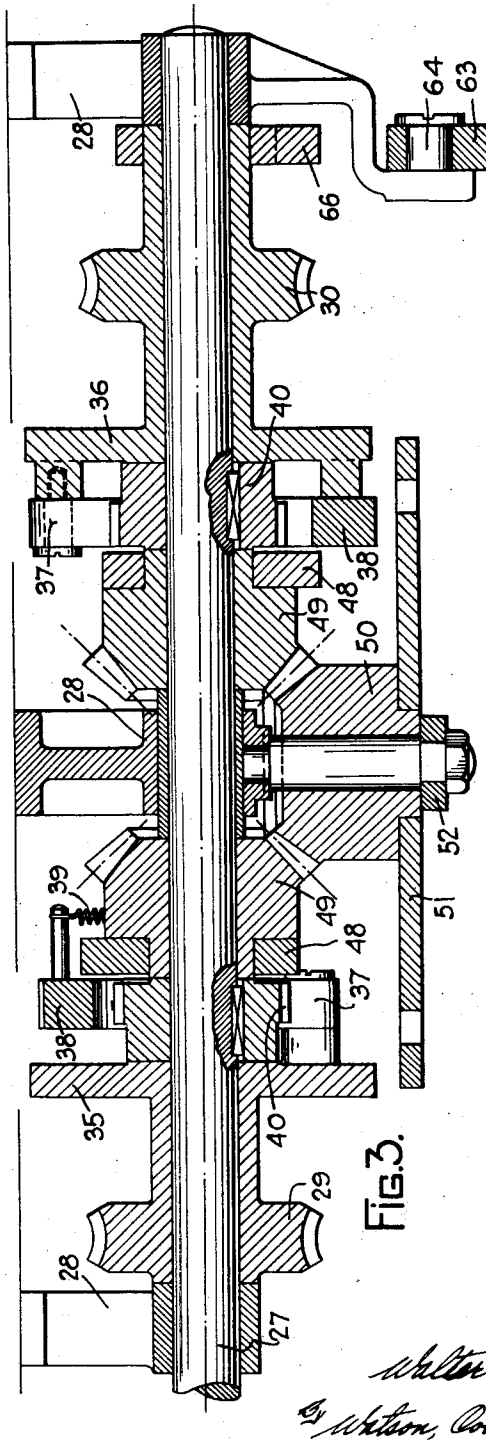


Fig. 3.

INVENTOR

Walter E. Molins

By Watson, Cole, Moore & Grindle

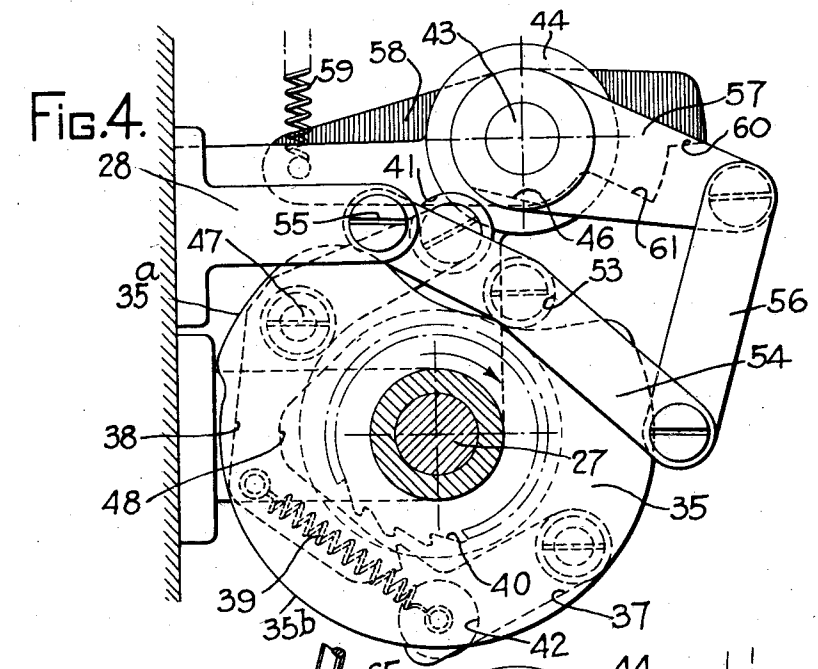
Attys

June 23, 1931. W. E. MOLINS 1,811,759

CIGARETTE MAKING MACHINERY

Filed Sept. 9, 1929 4 Sheets-Sheet 4

Fig. 4.



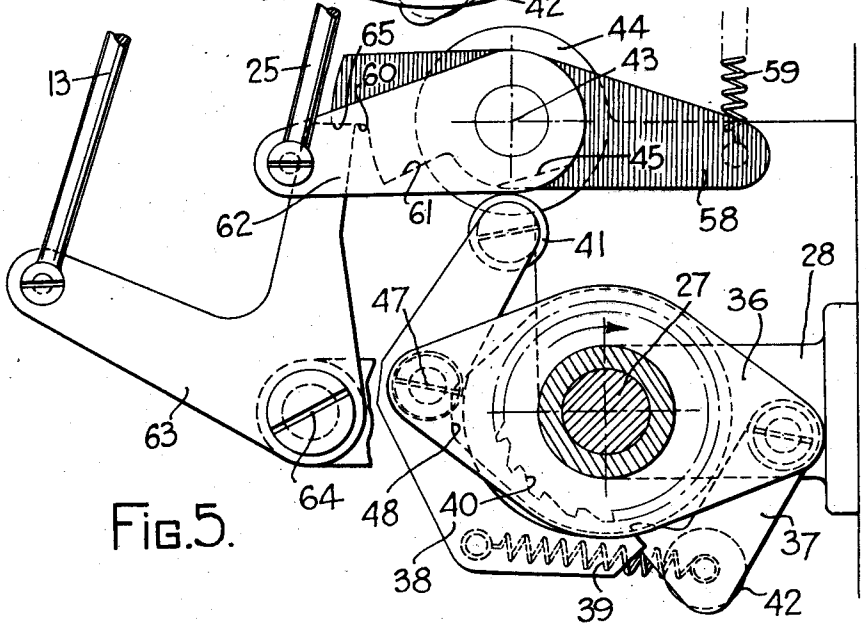


Fig. 5.

INVENTOR

Walter E. Molins

By Watson, Cole, Moser & Grindle

Attys

Patented June 23, 1931 1,811,759

UNITED STATES PATENT OFFICE

WALTER EVERETT MOLINS, OF DEPTFORD, LONDON, ENGLAND

CIGARETTE MAKING MACHINERY

Application filed September 9, 1929, Serial No. 391,496, and in Great Britain September 25, 1928.

This invention is for a cigarette making machine and relates more particularly to a device for automatically controlling the tobacco feed of a cigarette making machine so as to ensure that cigarettes of consistent weight are produced.

It has previously been proposed to provide a weighing mechanism for use on cigarette making machines which weighs progressively the whole produce of the machine, the arrangement being such that the cigarettes are continuously deposited and removed from the apparatus in units so that a fixed quantity, for example, one hundred, is always on the weighing apparatus and the variation in weight causes a control apparatus on the tobacco feed to operate.

It will be appreciated that with such an apparatus, the variation in weight at any given period of the oncoming cigarettes is relatively small compared with the total mass of the weighing apparatus, and consequently, extremely delicate weighing apparatus is required.

The present invention consists of an apparatus for use on a cigarette making machine wherein means operable to vary automatically the feed of tobacco to the cigarette making machine is operatively connected to a weighing mechanism adapted to receive at intervals batches of cigarettes in such a manner that variations in the weight of the batches of cigarettes automatically ensure variations in the feed of the tobacco.

One method of carrying the invention into effect comprises a device at the delivery end of the machine for weighing cigarettes, and the apparatus is so constructed that the variation of weight in the cigarettes delivered is caused to operate a control apparatus which in turn regulates a variable speed drive by which the tobacco feeding apparatus is operated.

The invention will be more particularly described with reference to the accompanying drawings, in which:—

Fig. 1 is a front elevation of a weighing apparatus constructed according to the invention.

Fig. 2 is a front elevation, partly in section, of the mechanism for altering the speed of the tobacco feed.

Fig. 3 is a sectional plan of Fig. 2.

Fig. 4 is an end elevation, partly in section, of a portion of Fig. 2 looking in the direction of the arrow "A", and

Fig. 5 is an end elevation, partly in section, of Fig. 2 viewed in the direction of the arrow "B".

Referring to Fig. 1; the weighing apparatus in general resembles that described in U. S. application, Serial No. 137,715, and if desired, the recording apparatus and chart described therein may be incorporated.

The weighing beam 1 is so arranged that when the scale pan 2 is empty, the pointer 3 is a few divisions below the figure required for normal weight cigarettes, for example, in the drawings the pointer is at 27 cigarettes per ounce, and the cigarettes being made are 24 per ounce, this arrangement prevents unnecessary movement of the weighing beam. The beam 1 carries a projecting plate 4 furnished with a series of steps or surfaces 5, 6 and 7 corresponding to light, normal or heavy weight cigarettes, respectively, and an "empty" step 4^a, as hereinafter described. A feeler 8 is adapted to engage with either of the three surfaces 5, 6, and 7 according to the weight of the cigarettes in the pan. The feeler 8 is pivoted at 9, and operated by a link 10 from a lever 11 which is fixed to a second lever 12 pivoted at 24 and connected by link 13 in the control mechanism shown in Figs. 2 to 5.

The cigarettes are placed in the hopper 14 of the weighing apparatus and fed out from the hopper by the fluted drum 15 and discharged into the pan 2 when the machine is operated.

The fluted drum 15 is driven through a pawl and ratchet wheel, as described in U. S. application, Serial No. 137,715 and the apparatus is started by allowing the lever 16 to lift in the manner hereinafter described and subject to the control of the hand operated latch 17. A link 18 connects the lever 16 to a lever 19 which is fixed to the stop spindle 20 which corresponds to the spindle 48 in the above mentioned U. S. application.

A spring 21 is fixed to a point on the spindle 20 and tends to pull the link 18 upwardly and start the apparatus as soon as the spindle 20 is free to move. A lug 22 is also fitted to the spindle 20. This lug is engaged by one end of a lever 23, pivoted at 24 so that it can move independently of levers 11 and 12, and connected by a link 25 to the control apparatus shown in Figs. 2 to 5.

After the cigarettes have been weighed they are automatically discharged from the pan 2 by a mechanism (not shown) on to a travelling belt 26 from which they are removed by the machine operator.

Referring to Figs. 2 to 5; 27 is a control shaft carrier in bearings 28 and connected at one end to a variable speed gear which drives the tobacco hopper so that rotation of the shaft 27 in either direction will regulate the gear and alter the speed of the tobacco feeding apparatus, and consequently, the amount of tobacco delivered per minute by the same. The rotation of the shaft 27 in either direction is controlled from the weighing apparatus in a manner to be hereinafter described. Two wormwheels 29, 30 are loosely mounted on the control shaft 27 and are driven in opposite directions by worms 31 and 32 which are continuously driven in the direction of the arrows by sprockets 33, the direction of the sprocket chain being indicated by the lines 34. The wormwheel 29 is provided with a large boss or disc 35, the periphery of which is formed into cam surfaces of varying radii indicated in Figure 4 by reference characters 35*a*, 35*b*, and 35*c*. The wormwheel 30 is also provided with a large boss 36. Each boss carries a driving pawl 37 and a catch pawl 38 as shown clearly in Figs. 4 and 5, and the working ends of the two pawls are drawn together by springs 39.

Two ratchet wheels 40 are keyed to the shaft 27 adjacent to the bosses 35 and 36 carrying the pawls 37 and the latter are adapted to drive the ratchet wheels when the pawls 37 are released by the catch pawls 38. Each catch pawl 38 is furnished with a cam roller 41 and each driving pawl is furnished with a similar roller 42. A cam shaft 43 is carried in a bearing 44 above the control shaft 27, as shown in Figs. 2, 4 and 5.

The cam shaft 43 has two flat surfaces 45, 46 at the ends of the enlarged portion and partial rotation of the cam shaft 43 will bring either of the flat surfaces into such a position that it will clear the roller 41 on its appropriate catch pawl 38 as the pawls are rotated by the wormwheels.

When either of the catch pawls 38 is operated by striking the circular portion of the cam shaft 43, it is caused to move about its pivot 47 out of contact with the nose of the pawl 37, and the latter springs in under the action of the spring 39 and drives its ratchet wheel. Stop cams 48 are fitted on the control shaft 27, and when the pawl 37 has rotated about a quarter of a revolution, (for example) the roller 42 engages with the nose of the cam 48 which causes the driving end of the pawl 37 to come out of contact with the ratchet teeth and cease to drive the ratchet wheel. Simultaneously the catch pawl 38 springs in again and retains the pawl 37 in its inoperative position until it is again operated.

The stop cams 48 are carried on the hubs of bevel wheels 49 which are partly rotated by another bevel 50 which is secured to a movable quadrant plate 51, the latter being locked in position by means of a stud on the fixed bar 52, thus affording the operator means for altering the position of the stop cams, and consequently, altering the amount of rotation imparted to the ratchet wheels by each movement of the apparatus.

As mentioned hereinbefore, the boss 35 of the wormwheel 29 is provided with cam surfaces 35*a*, 35*b*, and 35*c*. A roller 53 carried on a lever 54 pivoted at 55 is capable of engaging with said cam surfaces as hereinafter explained. A link 56 connects the lever 54 to another lever 57 fixed on the cam shaft 43.

Referring to Fig. 5; it will be seen that the cam shaft 43 has a lever 58 fixed thereon having a spring 59 at one end and two steps 60 and 61 formed on the opposite arm of the lever. Another lever 62 is fixed on the cam shaft and connected by the link 25 to the lever 23 of the weighing apparatus.

A bell crank lever 63 pivoted at 64 is connected to the link 13 which in turn is connected to the lever 12 of the weighing apparatus and the other end of the bell crank lever 63 is formed into a pawl 65.

The operation of the apparatus is as follows:—

The rotation of the worm wheel 29 causes the cam 35 to revolve, the portion 35*a* of the cam in turn causing the cam shaft 43 to rotate slightly through the medium of the levers 54 and 57 and link 56.

This action causes the stepped lever 58 to be lifted free of the pawl 65 on the bell crank 63, and at the same time the lever 62 operates the lever 23, Fig. 1, through the link 25 and releases the lug 22 so that the spring 21 causes the spindle 20 to partly rotate provided that the operator has tripped the latch 17 to permit the spring 21 to lift the link 18 which in turn lifts the starting lever 16 and starts the weighing apparatus. This motion is, however, prevented unless the operator lifts the latch 17 and permits the lever 16 to rise, and consequently, the control apparatus is ineffective unless the operator wishes to effect a weighing operation. In order that the operator shall effect weighing operations at suitable intervals,

a cam 66 is provided (see Fig. 3) on the worm 30 and is adapted to operate a signal, for example, a gong mechanism (not shown). When the weighing apparatus is started, the cigarettes are fed out from the hopper by the drum 15 which has, for example, 25 flutes, and the cigarettes are delivered from the fluted drum into the pocket 68, Fig. 1, and subsequently the batch of 25 cigarettes is deposited in the scale pan 2 when the lid of the pocket 68 is automatically lifted.

The beam of the weighing apparatus then rotates and one or other of the surfaces 5, 6 or 7 will come beneath the feeler 8 which has been lifted clear of the plate 4 from the position shown in the drawings by the movement of the levers 11 and 12 from the link 10, the lever 12 having been lifted by the lever 23 through the medium of a projecting pin 69 (Fig. 1). These preliminary movements are effected by the portion 35a of cam 35. The scale is then free to move until it acquires a balance. While the scale is coming to rest the continuing rotation of the cam 35 brings the cam surface 35b under the roller 53 so that the lever 54 is permitted to drop slightly. This causes a slight swinging of the lever 23 through the medium of the link 25. In the meantime, the lever 16, link 18, and lug 22 have been reset in their initial positions against the action of the spring 21 by suitable mechanism such as is disclosed in application Serial No. 137,715 hereinbefore referred to and the slight movement of the lever 23 as the roller 53 drops onto the cam surface 35b is sufficient to prevent the lug 22 from again swinging to the left from the position in which it is shown in Figure 1 of the drawings. Further rotation of the fluted drum 15 by inadvertent operation of the lever 17 is therefore prevented in order that a second weighing operation may not be initiated until the completion of the first weighing operation.

In Fig. 5 the bell crank lever 63 is shown in the position corresponding to normal weights, whereas if the cigarettes were heavy the lever 63 would rotate in a clockwise direction, or if light, in an anti-clockwise direction so that in the former case the pawl 65 would be beneath the surface 61 of the lever 58, or in the latter case would be quite free of the lever 58. Further rotation of the cam 35 causes the lever 58 to go back to its original position.

It may be noted that sufficient clearance must be provided between the cooperating parts so that the pawl 65 is permitted to swing to the left to the position determined by the feeler 8 without interfering with the simultaneous rotation of the lever 58.

It will be seen, therefore, that the position of the shaft 43 has been determined by the position of the pawl 65 which is in turn determined by the position of the weighing arm, and consequently by the weight of the cigarettes.

The cam shaft 43 will then operate either of the catch pawls 38 if the cigarettes vary from normal, or if the cigarettes are of the weight required, neither catch pawl will be operated.

In the former case, one the driving pawls 37 will spring inwardly and commence to drive its particular ratchet wheel until it is removed from contact with the same by one of the stop cams 48.

Various modifications may be made without departing from the principle of the invention, for instance, a device may be arranged adjacent to the apparatus on the cigarette making machine which deflects the cigarettes from the direction of the rod into a direction at right angles thereto, which is operable periodically to deflect a predetermined number of cigarettes, for example 25, into a compartment from which they are automatically deposited as a batch into the pan of the weighing machine, thus rendering the whole apparatus purely automatic. Or again, the variable speed gear, previously mentioned, may be used to alter the speed of a portion of the tobacco feed, for example, the picker roller.

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

1. In apparatus for use on a cigarette making machine, the combination with weighing apparatus, of mechanism for delivering a batch of cigarettes comprising a predetermined number from the machine to said weighing apparatus, and means operatively associated with said weighing apparatus for controlling the feed of tobacco in the machine.

2. In apparatus for use on a cigarette making machine, the combination with weighing apparatus, of mechanism for delivering a batch of cigarettes comprising a predetermined number from the machine to said weighing apparatus, and means actuated by said apparatus to a predetermined extent only on the completion of the weighing operation for controlling the feed of tobacco in the machine.

3. In apparatus for use on a cigarette making machine, the combination with means for controlling the feed of tobacco in the machine, of an independent weighing apparatus, and mechanism associated with said control means for feeling said apparatus after the latter has come to rest to initiate operation of said control means.

4. In apparatus for use on a cigarette making machine, the combination with means for controlling the feed of tobacco in the machine, of an independent weighing apparatus, mechanism associated with said control means for feeling said apparatus

after the latter has come to rest to initiate operation of said control means, and means for automatically terminating operation of said control means on completion of operation thereof to a definite and predetermined extent.

5. In apparatus for use on a cigarette making machine, the combination with means for controlling the feed of tobacco in the machine, of an independent weighing apparatus, mechanism associated with said control means for feeling said apparatus after the latter has come to rest to initiate operation of said control means, and means for automatically terminating operation of said control means on completion of operation thereof to a definite and predetermined extent, said last named means being adjustable to regulate the period of operation of said control means.

6. In a measuring device, the combination with a rotatable shaft, of separate means for rotating said shaft in opposite directions, an independent weighing apparatus, and mechanism arranged to engage said apparatus after the latter has come to rest on completion of a weighing operation to select and render operative either of said separate means.

7. In a measuring device, the combination with control means movable in different directions, of an independent weighing apparatus, and means movable to engage said apparatus after the latter has come to rest on completion of a weighing operation for selectively moving said control means in one direction.

8. In apparatus for use in cigarette making machines, the combination with weighing apparatus, of a control shaft rotatable in opposite directions to vary the density of cigarettes produced by the machine, separate means continuously rotating in opposite directions, and means actuated by said weighing apparatus for connecting either of said means to said shaft.

9. In apparatus for use in cigarette making machines, the combination with weighing apparatus, of a control shaft rotatable in opposite directions to vary the density of cigarettes produced by the machine, means for delivering a predetermined number of cigarettes to said apparatus, separate means continuously rotating in opposite directions, and means actuated by said weighing apparatus for connecting either of said means to said shaft for a predetermined interval only.

10. In apparatus for controlling the consistency of the output of a cigarette making machine, the combination with a weighing apparatus arranged to receive and weigh a definite number of the cigarettes produced, means for controlling the feed of tobacco in the machine, mechanism for causing actuation of said control means, a member having stepped surfaces movable by said weighing apparatus to an extent depending upon the weight of the cigarettes supplied thereto, and means forming a part of said mechanism and movable in a direction transverse to the path of movement of said member into contact with one of said stepped surfaces.

11. In apparatus for controlling the consistency of the output of a cigarette making machine, the combination with a weighing apparatus arranged to receive and weigh a definite number of the cigarettes produced, means for controlling the feed of tobacco in the machine, mechanism for causing actuation of said control means, a pivoted arm arranged to be swung by said weighing apparatus to an extent depending upon the weight of the cigarettes supplied thereto, said arm having stepped surfaces thereon, and a lever forming a part of said mechanism and movable by the latter into engagement with one of said stepped surfaces.

12. In apparatus for use in cigarette making machines, the combination with weighing apparatus, of a control shaft rotatable in opposite directions to vary the density of cigarettes produced by the machine, separate means continuously rotating in opposite directions, means movable to positions intercepting the path of movement of a portion of either of said separate rotating means to connect the same to the shaft, and mechanism associated with said weighing apparatus for determining the position of said means.

In testimony whereof I hereunto affix my signature.

WALTER EVERETT MOLINS.