

Powell et al.

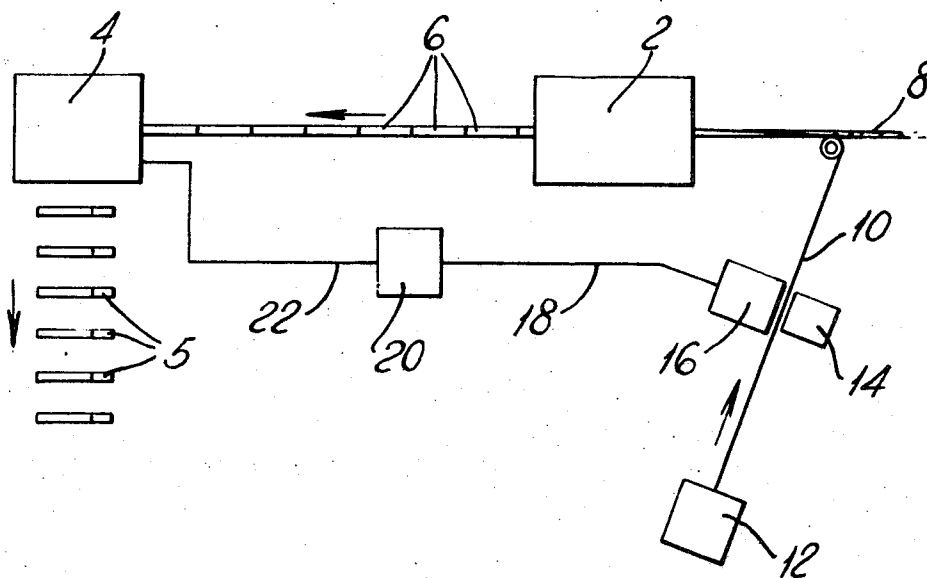
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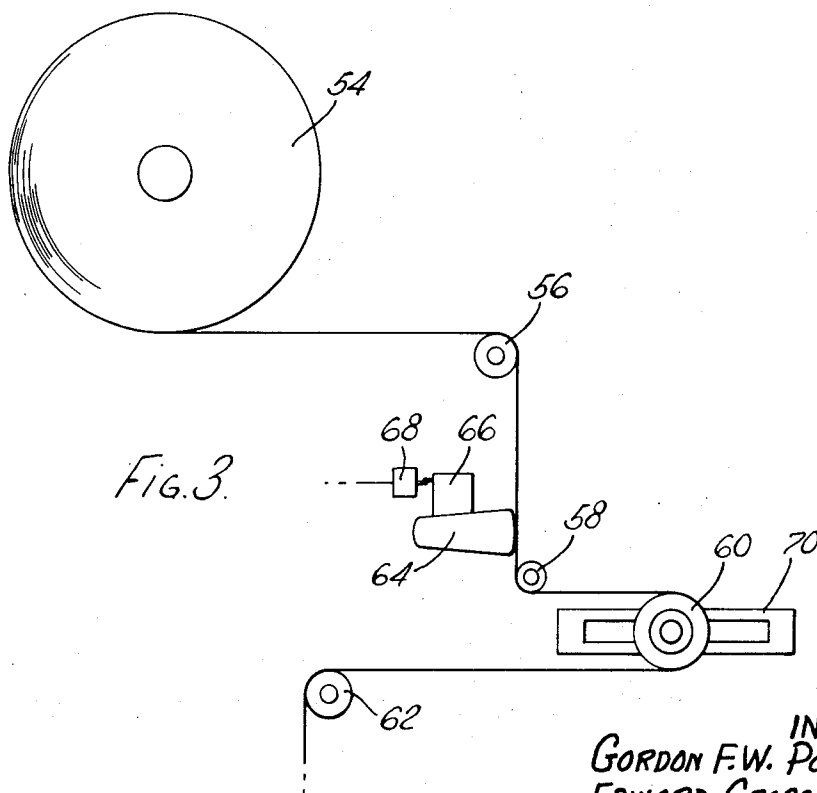
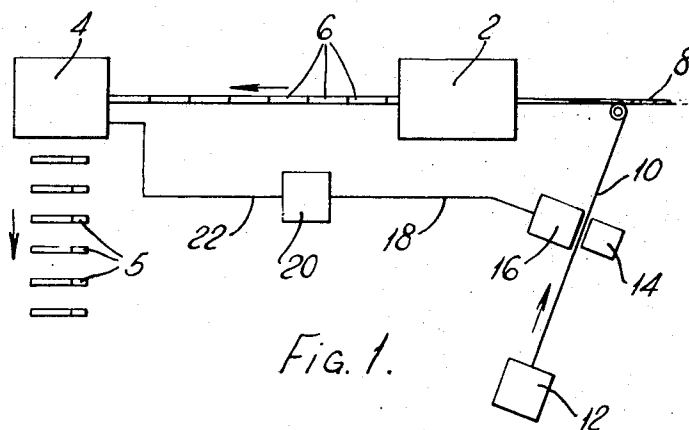
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A cigarette making system for making mouthpiece cigarettes ejects cigarettes which have web joins by utilizing the facility of the assembler unit to eject incomplete assemblies, the assembly of a mouthpiece in each cigarette including a web join being automatically stopped so that the incomplete assembly thus formed is ejected by the assembler unit.

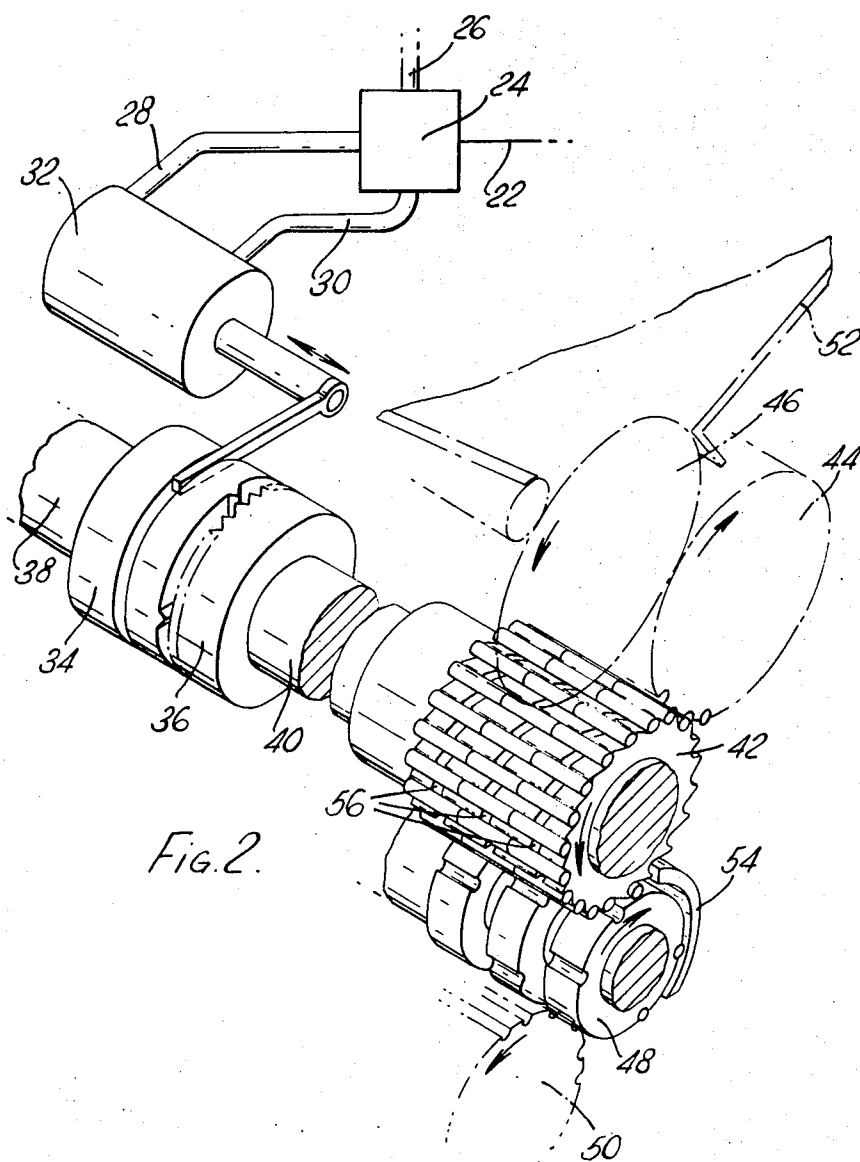
15 Claims, 4 Drawing Figures

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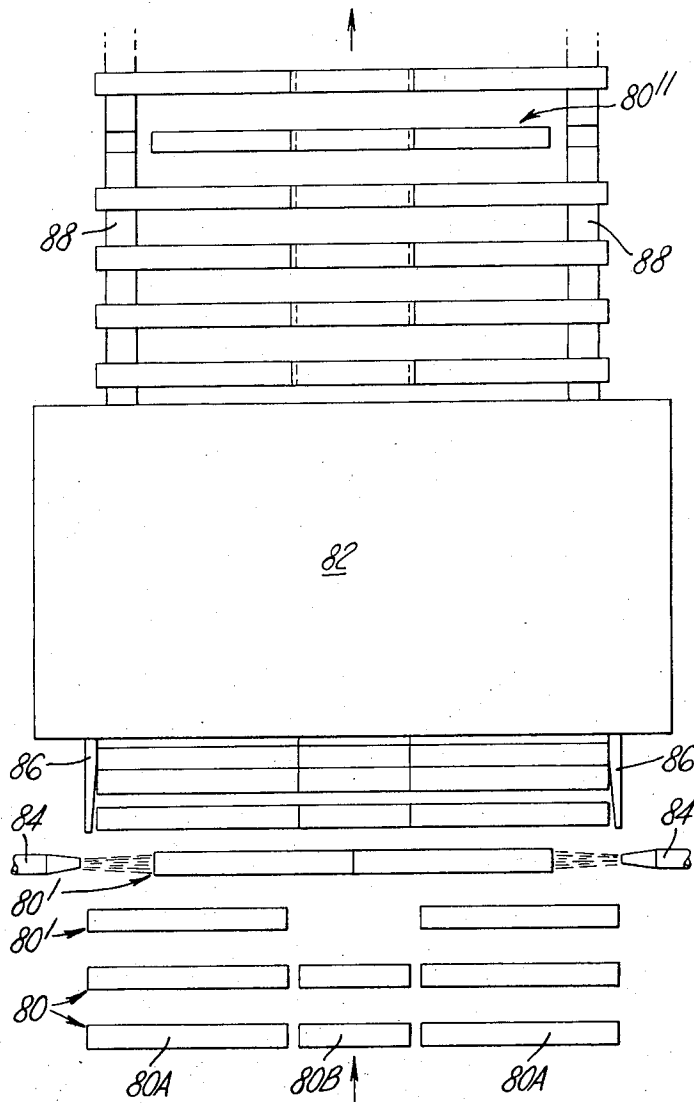


FIG. 4.

CIGARETTE MANUFACTURE

This invention is concerned with cigarette making systems for making mouthpiece cigarettes; that is to say cigarettes consisting of a cigarette length (i.e., a smokable part) joined to a mouthpiece which is commonly some form of filter. For this purpose the cigarette lengths are joined to mouthpieces by what may be termed an "assembler unit," which is commonly used to join two cigarette lengths to opposite ends of a double-length mouthpiece by means of a web which is wrapped and glued round the double-length mouthpiece and has its sides overlapping on to the cigarette length; subsequently a cut through the middle of the double-length mouthpiece separates the assembly into two mouthpiece cigarettes.

Cigarette making machines commonly include a photo-electric or other device for detecting paper web joins. These joins may result from the splicing of the trailing end of one reel to the leading end of the next reel on the cigarette making machine, or may even be in the reel as supplied to the cigarette manufacturer. Various memory systems have been used to bring about the ejection of cigarettes including paper joins. This invention is concerned with a different system for use in the case of mouthpiece cigarettes.

According to the present invention a cigarette making system for making mouthpiece cigarettes has a web feed with means to signal the occurrence of a join in the web, and means responsive to such a signal and arranged to prevent the joining of a mouthpiece to the cigarette which includes the web join, the assembler unit being arranged to eject automatically any incomplete assembly, so that any cigarette that includes a web join is ejected by the assembler unit. The facility to eject incomplete assemblies is commonly included in assembler units and may take various forms; the exact manner in which incomplete assemblies are ejected is not fundamental to the present invention.

The signal initiated by a web join is preferably arranged to withhold or withdraw the mouthpiece which would otherwise form part of a cigarette including a web join. In the case of an assembler unit which joins cigarette lengths to opposite ends of double mouthpieces, withdrawal of a double mouthpiece results in two cigarettes being ejected, but this is unavoidable. Moreover, in order to be sure of ejecting from the assembly line all cigarettes with a paper join, no matter where the join occurs along the length of the cigarette, it may be necessary or convenient to eject two or more double-length mouthpieces at a time, which would result in four or more cigarettes being ejected.

The mouthpiece withdrawal operation may be set off by a shift register, which may be a proprietary article, so as to occur an appropriate number of stages after the join detector has detected a join. Each stage in this case corresponds to one cigarette. In other words, if the join detector is N1 cigarette lengths away from a mouthpiece assembly point (i.e. a point in the region at which mouthpieces and cigarette lengths are brought together), and if the mouthpiece withdrawal point is N2 stages away from the assembly point, then the shift register would in principle set in motion the mouthpiece withdrawal operation N1-N2 stages after a join is detected.

The use of a shift register may be avoided by making N1 equal to N2. In other words, in this case a mouthpiece is automatically withdrawn immediately the join detector detects a join, so that the arrival of a join at the assembly point coincides with a gap in the mouthpiece delivery caused by the automatic withdrawal of the appropriate mouthpiece.

An example of a system according to this invention is shown in the accompanying drawings. In these drawings:

FIG. 1 is a diagrammatic overall view of a complete system;

FIG. 2 shows a diagrammatic perspective view of the mouthpiece delivery arrangement in the assembler unit;

FIG. 3 shows diagrammatically how the web for joining mouthpieces to cigarette lengths is fed in the assembler unit; and

FIG. 4 shows diagrammatically how the assembler unit rejects incomplete assemblies.

FIG. 1 shows a system which includes a cigarette making machine 2 and an assembler unit 4. The machine 2 makes cigarette lengths 6 by enclosing a tobacco stream 8 in a paper web 10 which forms the cigarette wrapper. The assembler unit 4 attaches mouthpieces to the cigarette lengths in any known manner, and delivers mouthpiece cigarettes 5 as a sideways moving stream.

A unit 12 supplies the web 10 as a continuous length and includes a splicer for joining the trailing end of each reel of web to the leading end of the next reel in any well-known manner.

Between the unit 12 and the machine 2 there is a join detector comprising a light source 14 and a photoelectric device 16 between which the web passes. Light from the source 14 normally passes through the web and into the device 16, but the arrangement is such that a web join passing by will interrupt or partially block the light beam and as a result a signal is emitted by the photo-electric device through a conductor 18 leading to a shift register 20. After an appropriate interval of time (as already explained) the shift register 20 transmits a signal to the assembler unit 4 through a conductor 22, and the result of this signal is that the mouthpiece which would otherwise have been assembled with the cigarette length including the web join is withheld and the resulting incomplete assembly is automatically ejected by the assembler unit.

Paper joins made by the splicer in the unit 12 are preferably made by means of a block or other opaque adhesive tape so that the joins can be easily detected by the photo-electric join detector.

FIG. 2 shows one way in which the delivery of a mouthpiece can be withheld in response to a signal from the shift register 20. The signal is fed into a solenoid-operated valve 24 which has a fluid pressure inlet pipe 26 and outlet pipes 28 and 30 leading to opposite ends of a fluid-powered ram 32. Fluid is normally supplied through the pipe 28 so that the ram is extended and holds a clutch member 34 in engagement with a cooperating clutch member 36. The clutch thus transmits a drive from a shaft 38 to a shaft 40 through which three fluted drums 42, 44 and 46 of an assembler unit are driven. When a signal from the shift register is transmitted to the valve 24, indicating that the

mouthpiece delivery must be stopped, the valve 24 delivers fluid to the ram through the pipe 30 and thus retracts the ram and momentarily disengages the clutch 34, 36. Thus a gap is created in the mouthpiece delivery which continues on drums 48 and 50 of the assembler unit. Consequently the cigarette length including the paper join becomes part of an assembly without a mouthpiece and is automatically ejected by the assembler unit.

In the example shown, the drum 46 receives filter rods from a hopper 52, each rod being six times the length of the filter which is eventually attached to each cigarette length. By the time it reaches the drum 42, each rod has received two cuts so as to form a group of three double-length mouthpieces. Each group in turn is stripped off the drum 42 and deposited on the drum 48 by means of three fingers (not shown) on a stationary plate 54 which project into three grooves 56 in the drum 42. The arrangement is such that the drum 48 and the subsequent drums can continue to rotate (their drive being uninterrupted) when the drums 42, 44 and 46 stop, without damaging any of the filter rods.

The drum 48 has flutes which receive the three parts of each rod in a staggered relationship so that the three streams of double-length filters can be pushed together to form a single stream. This method of forming a single stream of double-length filter rods from a stream of longer rods is described, for example, in French Pat. No. 1,540,351.

It will be seen that the interruption of the filter rod drive by disengaging the clutch 34, 36 results in at least one group of three double-length filters being withheld, so that at least six cigarettes at a time are ejected and possibly more, for example 12 or 18.

By way of example, incomplete assemblies may be ejected by the assembler unit in the following manner. After the long filter rods have been reduced to a single sideways moving stream of double-length filters, two streams of cigarette lengths are delivered along opposite sides of the filter rod stream to form a succession of groups each of which consists of a double-length filter lying between two cigarette lengths. The cigarette lengths are pressed against the filter rod, for example by means of air jets, to ensure that the three parts are abutting before they are joined by wrapping round them a web (commonly referred to as the "cork") which unites them in the manner already described. However, if the filter is missing from any group, the two cigarette lengths move closer together and the resulting assembly is shorter than normal. Such short assemblies are allowed to fall away when, for a short part of the subsequent conveyance of the assemblies, the assemblies are supported against gravity, for example, by stationary rails which are spaced apart so as to support the ends of full-length assemblies but not shorter assemblies. In other words, short assemblies fall through between the rails and are thus discarded. Further downstream the assemblies are each cut through the middle to form two separate filter-tipped cigarettes.

FIG. 4 illustrates such an arrangement. Assemblies 80 are fed sideways at regular intervals, for example on a fluted drum, towards a unit 82. Each assembly 80 normally comprises two cigarette lengths 80A spaced apart with a double-length filter 80B between them. As shown in the drawing, there are two assemblies 80' ap-

proaching the unit 82 which do not have filter sections. Consequently, as the assemblies 80 pass two nozzles 84, which provide air jets blowing on opposite ends of the assemblies, the cigarette lengths of the incomplete assemblies 80' are moved together by the air jets, as shown. In the case of normal assemblies, the air jets simply move the cigarette lengths right up to the interposed double length filters 80B, and stationary guides 86 ensure that the assemblies are properly located transversely to their direction of movement as they enter the unit 82.

The unit 82 joins the two cigarette lengths and double filter together by means of a section of uniting web or "cork" to form double-length tipped cigarettes. Subsequently these double-length cigarettes are cut through the middle to form two separate cigarettes. The double-length cigarettes leaving the unit 82 are carried, for example, by a fluted drum and are held in the flutes of the drum by fixed rails 88 located near the ends of the double-length cigarettes; the rails are shown in a flat developed form for the purposes of illustration in FIG. 4. Consequently, the spacing of the rails is such that any incomplete assembly consisting only of two cigarette lengths joined together, for example the assembly 80'', falls away between the rails 88 and is thus ejected.

The cork web which unites each assembly also needs to be joined when each reel runs out, and such joins may also be ejected in accordance with the present invention. In this case it is possible to avoid the need for a shift register. As shown in FIG. 3, the cork web is drawn from a reel 54 and passes round pulleys 56, 58, 60 and 62 before moving on to the region in which it is cut into short pieces to be wrapped around individual assemblies. When one reel of web is about to run out, it is joined to the leading end of a new reel (not shown) by means of a splicer 64. The splicer is operated by a member 66 which also operates a switch whenever it operates the splicer. Operation of the switch 68 immediately causes a signal to be transmitted to the valve 24 (see FIG. 2) so as to disengage the clutch 34. As a result the cord web join arrives at the assembly point at a moment when no filter is delivered between the two adjacent cigarette lengths, and the resulting incomplete assembly is automatically ejected.

In order to achieve this timing in relation to cork web joins, the pulley 60 is slidably mounted on a slotted rail 70 so that its position can be varied to vary the length of web extending between the splicer 64 and the assembly point.

Instead of the arrangement shown in FIG. 2, an individual filter may be withheld from an assembly including a web join by blowing the filter (or two or three filters) off a drum or other conveyor carrying the filters to the assembly point. For example, the blowing device may be within a drum and may be arranged to blow the filter or filters radially off the drum.

We claim:

1. A cigarette making system for making mouthpiece cigarettes, comprising a machine for making cigarette lengths; an assembler unit for joining the cigarette lengths to mouthpieces to form assemblies, which assembler unit includes means for ejecting incomplete assemblies; and including a web feed with means to signal the occurrence of a join in a section of the web which is

to form part of a predetermined assembly; and means responsive to such a signal for preventing the joining of a mouthpiece to the cigarette length of the said predetermined assembly which includes the web join, whereby the assembler unit ejects the said predetermined assembly.

2. A system according to claim 1 in which the web feed is the cigarette wrapping paper feed.

3. A system according to claim 2 in which joins in the cigarette wrapping paper are detected by a photo-electric device which transmits the signal to the assembler unit via a shift register.

4. A system according to claim 1 in which the web feed comprises means feeding a web which joins each cigarette length to a mouthpiece.

5. A system according to claim 4 in which a splicer which joins the trailing end of one reel of web to the leading end of the next reel transmits a signal to the assembler unit, whenever the splicer operates to produce a join, which signal acts immediately on the assembler unit to stop the assembler unit from assembling a mouthpiece with the section of the web which includes the join.

6. A system according to claim 1 in which the assembly of a mouthpiece to form part of a cigarette including a web join is prevented by a device which temporarily interrupts the drive to one or more conveyors in the assembler unit which carry the mouthpieces to the region at which they are assembled with cigarette lengths.

7. A system according to claim 1 in which the said means responsive to the signal stops the delivery of the mouthpiece which would otherwise form part of the said predetermined assembly.

8. A system according to claim 1 in which there are two web feeds, one web comprising the cigarette wrapper and the second web being a web which joins each cigarette length to a mouthpiece and including means for responding to joins in both webs and for stopping the delivery in the assembler unit of a mouthpiece for assembly as part of a cigarette including either form of web join.

9. A cigarette making system for making mouthpiece cigarettes, comprising a machine for making cigarette lengths from a cigarette filler and a continuous web of cigarette wrapper material which is wrapped round the filler, and including a photoelectric device for detecting joins in the wrapper web before the said web is wrapped round the cigarette filler; an assembler unit for joining a mouthpiece to each cigarette by means of a web portion cut off a continuous assembler web drawn from a reel, and including a splicer for joining the trailing end of one reel of assembler web to the leading end of the next reel, and means for ejecting incomplete assemblies; control means for selectively stopping the delivery of a mouthpiece in the assembler unit in response to a withdrawal signal; a shift register connected to the photo-electric device to receive a signal from the photo-electric device each time a wrapper web join passes the said device, and to produce a withdrawal signal a predetermined interval of time after receipt of a signal from the photo-electric device, whereby the control means stops the delivery of a mouthpiece to each cigarette which is made with a part of the wrapper web including a join; and switch

means operated by the slicer each time the splicer produces a join in the assembler web, and arranged to produce an immediate withdrawal signal whereby the control means stops the delivery of each mouthpiece destined to be assembled with a cigarette length by means of a portion of the assembler web including a join.

10. A system according to claim 9 including timing means for adjusting the length of the assembler web extending between the splicer and an assembly point at which a portion of the assembler web is used to assemble a cigarette length with a mouthpiece.

11. A cigarette making system for making mouthpiece cigarettes, comprising a machine for making cigarette lengths by enclosing a cigarette filler stream in a continuous wrapper web to form a continuous cigarette rod which is then cut into individual cigarette lengths; an assembler unit for joining a mouthpiece to each cigarette length by means of a section of a uniting web and for ejecting any incomplete assembly consisting of a cigarette length and a section of uniting web without a mouthpiece; detector means mounted adjacent to the wrapper web before it is wrapped round the cigarette filler stream for providing a signal whenever a join in the wrapper web passes the detector means; a shift register for receiving any such signal and for providing an actuating signal a predetermined interval of time after receipt of a signal from the detector means; and mouthpiece withdrawal means responsive to each actuating signal from the shift register to stop the delivery of a mouthpiece in the assembler unit to the cigarette length including the web join, whereby the said cigarette length including the web join has a section of uniting web connected to it, but no mouthpiece, and is consequently ejected by the assembler unit.

12. In a cigarette making system for making mouthpiece cigarettes,

- a. assembler means for joining cigarette lengths and mouthpieces to form a continuous stream of assemblies,
- b. means for ejecting incomplete assemblies from said stream of assemblies,
- c. means for feeding along a path a continuous web to be incorporated in said assemblies,
- d. means along said path for detecting joins in said continuous web and for generating signals when joins are detected, and
- e. means responsive to said signals for preventing said assembler means from including both cigarette lengths and mouthpieces in assemblies incorporating said detected joins,
- f. whereby incomplete assemblies incorporating said joins are formed which are ejected from said stream of assemblies by said ejecting means.

13. A cigarette making system as defined in claim 12 wherein said means for feeding a continuous web is adapted to feed said web to said assembler means to join cigarette lengths and mouthpieces.

14. A cigarette making system as defined in claim 12 further comprising means for making cigarette lengths and feeding said cigarette lengths to said assembler means, said means for feeding a continuous web being adapted to feed cigarette wrapping paper to said means for making cigarette lengths.

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15. A cigarette making system as defined in claim 12 further comprising

- a. means for feeding cigarette lengths to said assembler means, and
- b. means for feeding mouthpieces to said assembler means,

c. said means for preventing said assembler means from including both cigarette lengths and mouthpieces in assemblies comprising means to delay one of said feed means.

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