Aug. 13, 1957 F. R. TREBLE 2,802,470

CIGARETTE FILTER TIP ASSEMBLY MACHINES

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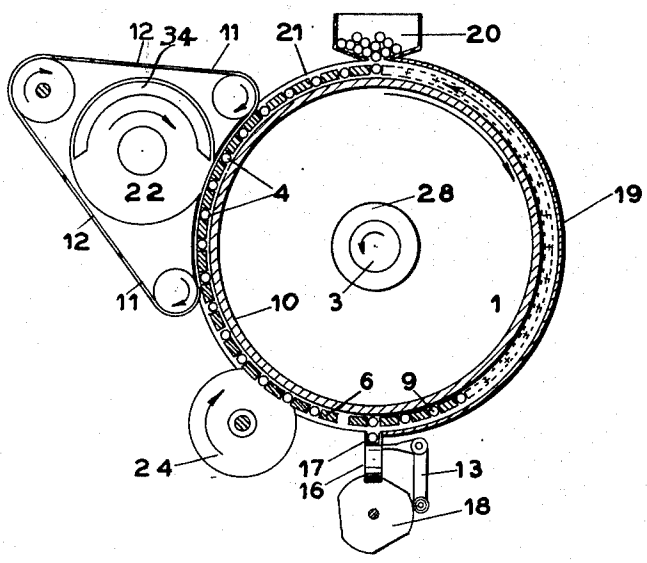

FIG1

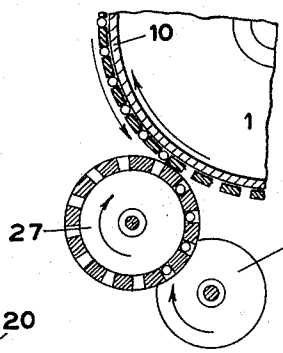

FIG4

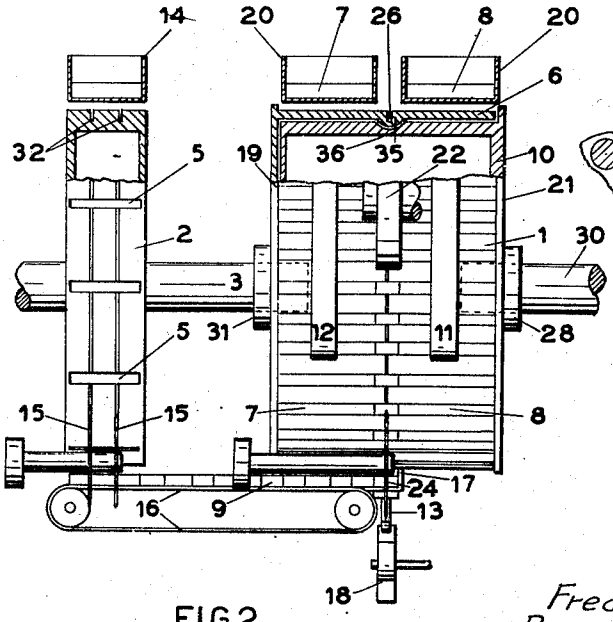

FIG2

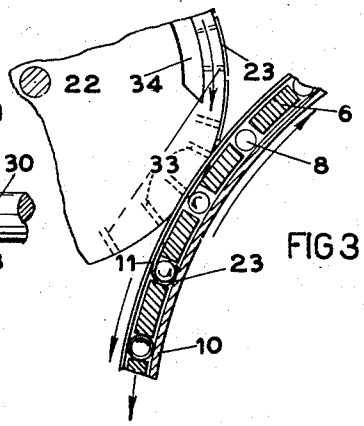

FIG3

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CIGARETTE FILTER TIP ASSEMBLY MACHINES

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6 Claims. (Cl. 131—94)

This invention relates to a machine for assembling filter plugs to cigarettes, to produce what is known as filter tip cigarettes.

The machine may be used as a separate unit or in conjunction with a normal cigarette making machine. It is the object of this invention to produce a machine which while being efficient will be simple to construct and be very compact.

In accordance with this invention the machine comprises an assembly drum having peripheral grooves in line with its axis, a feeding device for feeding double length filter plugs into the grooves in the assembly drum, a hopper for feeding pairs of cigarettes into the grooves, one on each side of the plugs, a wrapping device for wrapping the plugs to secure them to the adjacent portions of the cigarettes and a cutter for cutting the wrapped assembly in half.

According to a further feature of the invention the plug feeding device, a wrapping device and the cutter are positioned around the periphery of the drum to operate in sequence as the cigarettes are carried round the drum and from which they are finally stripped.

According to still further features of the invention, plugs in length equal to an even multiple of the final required length are fed into grooves in a plug carrier drum concentric and rotatable with, and adjacent to the assembly drum, said plugs then being suitably cut prior to being fed as double length plugs between the pairs of cigarettes fed to the assembly drum, and a rotary movement is imparted to the plugs and cigarettes while they are in the grooves to effect the wrapping operation on the assembly drum.

This invention also provides for the means for rotating the plugs and the cigarettes while they are on the assembly drum to effect the wrapping operation comprising a cylindrical roller drum mounted on and fixed to a rotating shaft, a concentric sleeve on said drum rotating in the opposite direction to the drum peripheral grooves in the sleeve parallel to its axis and breaking through the inside surface of the sleeve to permit the cigarettes to contact the roller drum.

The invention further provides a transfer drum, which receives the wrapped assembly from the assembling drum. The transfer drum has equally spaced grooves running parallel to its axis, also a centrally positioned peripheral slot in which rotates a knife to cut the wrapped assembly in two halves to form two filter tipped cigarettes.

A pair of belts suitably driven outside the assembly drum to run in the same direction as the grooved sleeve, and in contact with the cigarettes, but running at a higher surface speed than the grooved sleeve, so that the belts assist to rotate the cigarette and facilitate the wrapping of the assembly.

Alternatively the invention provides for the external sleeve on the assembly drum to be slotted circumferentially and centrally in its length with an internal rib to accommodate the circumferential slot therein and for the rib, in turn to be accommodated in a groove in the surface of the drum, the provision also of other ribs on the inside of the sleeve to strengthen the parts between the axially aligned grooves in the drum.

A preferred form of this invention will be described with reference to the accompanying diagrammatic drawings partly in sections in which:

Fig. 1 is an elevation of the machine with the plug carrier drum removed.

Fig. 2 is an end view of Fig. 1 with the plug carrier drum in position and the suction drum removed.

Fig. 3 illustrates the wrapping of the cigarettes and filter plugs on an enlarged scale, and

Fig. 4 is a cross section of a detail showing an alternative way of cutting the cigarettes.

For the purpose of description it will be assumed that the original filter plugs are supplied in lengths six times that required for a single cigarette.

A cigarette assembly unit **1** and concentric filter plug carrier drum **2** are mounted on the same shaft **3** to rotate at the same speed and both have equally spaced peripheral grooves **4**, **5**, in line with their axes, the number of grooves in the plug carrier drum **2** being one third in number of that in the cigarette assembly unit **1**. The cigarette assembly unit **1** comprises two distinct parts; an external sleeve **6** which has the equally spaced peripheral grooves **4** in line with its axis each of sufficient length to accommodate two cigarettes **7**, **8** plus a double length filter plug **9** between them. The cigarettes and plugs are loaded in each consecutive groove **4**. The sleeve **6** is connected to the shaft **3** driving the plug carrier drum **2**. Also mounted on the same shaft **3** is the roller drum **10** enveloped by the sleeve **6**. Drum **10** is driven at the same speed as sleeve **6**, but in an opposite direction.

As shown in Fig. 2, the shaft **3** is divided and the other portion **30** has a sleeve **28** extending from the drum **10** and is secured to the shaft **30**. A sleeve **31** on the external sleeve **6** is secured to the shaft **3**.

A rotary movement about their own axes is imparted to each pair of cigarettes **7**, **8** and double length filter plug **9**, by virtue of their contact with the periphery of the roller drum **10** which is rotating, as above described in a contra direction to the concentric and grooved sleeve **6**. Each groove in sleeve **6** therefore carries an assembly of cigarettes **7**, **8** and filter plug **9**. A pair of belts **11**, **12**, is also provided which are driven to make contact with the cigarettes **7**, **8**, over that section of the assembly drum **1** where the wrapping of plugs **9** and the adjacent ends of cigarettes **7**, **8** take place. These belts **11**, **12** are driven to move in the same direction as the sleeve **6**, but at a higher surface speed.

A filter plug hopper **14** is positioned to feed plugs having a length six times the required length of a filter for a cigarette into grooves **5** in the upper part of the carrier drum **2**, and suitable cutters **15** are provided to cut these plugs into three equal lengths. Circumferential slots **32** are provided in the plug carrier drum **2** to accommodate the cutters **15** preferably located in circumferential stiffening ribs.

A conveyor belt **16** is provided beneath the plug carrier drum **2** to transport the cut plugs **9** to a device adapted to regularly transfer the plugs **9** from the belt **16** to the grooves in the assembly unit **1**. This device conveniently consists of a platform **17** which is U-shaped in cross section as shown in Fig. 1 to receive each double length plug conveyed by belt **16**. A cam **18** operates a push rod **13** to lift the plugs off the platform **17** and to a position under the sleeve **6** to deposit each double length plug **9** into consecutive grooves **4**, the plugs **9** being retained and guided by side guides **19** as they approach the position where the pairs of cigarettes **7**, **8** are transferred to the sleeve **6** from hopper **20**.

This cigarette hopper **20** is positioned above the sleeve

6 and is adapted to feed plain cigarettes, that is untipped cigarettes 7, 8, one on each side of the double length filter plugs 9. Side guides 21 are suitably positioned to ensure that the plain cigarettes 7, 8, are in contact with the adjacent ends of the plug 9 as they move to the wrapping device. The latter as shown consists of a perforated and internally segmented suction drum 22 rotating in an opposite direction to the sleeve 6 and onto which is fed an adhesive web of cork paper or the like which is cut into strips 23 of proper length on the drum. Said strips 23 due to the suction, adhere to the surface of the drum 22. The suction drum 22 is positioned so that the wrapping strips 23 will contact the plug 9, and adjacent pair of cigarettes 7, 8 and is provided with ports 33 which connect it to a stationary vacuum chamber 34 associated with the rotating drum 22. On rotation, the ports 33 pass and therefore are disconnected from chamber 34 so that the wrapping strip 23 is released when it connects with the cigarette assembly. The adhesive may be applied to the cork strip in the known manner.

A transfer drum 27 is provided to receive the wrapped assembly. This drum rotates in unison with the assembly drum 1 so that each consecutive assembly is transferred into a corresponding groove in the transfer drum. These grooves being equally spaced on the periphery of the drum, and parallel to its axis. The drum 27 also has a centrally positioned peripheral slot into which runs a rotary knife 25. The assemblies are retained in the grooves of the drum by guides, until the rotary knife 25 severs them in two halves to form two filter tipped cigarettes which are then released or stripped from the transfer drum to fall onto a catcher conveyor.

The drum 10 runs in the opposite direction to shaft 3 as shown by the arrows in Fig. 1. Sleeve 6 cannot be extended due to the provision of side guides 21 and its circumference but by cutting away the top corner of the drum 10, sleeve 6 may have one side disced as shown in Fig. 2. The disc 30 and the hub 31 thereof are secured to the shaft 3. To drive drum 10 its hub 28 is extended and constitutes a pulley which could be driven by a belt 29.

Alternatively a cutter 24 is provided below the wrapping device to separate the double length filter plug 9 when assembled with the cigarettes 7, 8, to provide two normal length filter tipped cigarettes before they leave the sleeve 6.

The sleeve 6 of the assembly unit 1 is provided with an internal rib 35, Fig. 2, to accommodate the circumferential slot 26 for the cutter 24 and the rib in turn is accommodated in a groove 36 in the surface of the drum 10. Other ribs may also be provided on the inside of the sleeve 6 to strengthen the parts between the axially aligned grooves 4 in the sleeve 6.

As illustrated the cutters 15, 24 are preferably circular knives and sharpeners may be provided for these knives.

It will be understood that should it be desirable to remove the pair of cigarettes 7, 8 while still united by the plug 9, this may be done and the plug 9 cut to divide them at a later stage.

The hoppers 20, 14 for the cigarettes and plugs are conveniently positioned adjacent to each other, and at a suitable height to enable the cigarettes 7, 8, to be transferred progressively from a catcher band of any normal standard cigarette making machine. The filter assembly machine can be fitted with a suitable conveyor to deliver the assembled filter tip cigarettes onto a separate catcher band conveyor in the normal way.

In the normal operation of the machine filter plugs are fed from the filter plug hopper 14 onto the plug carrier drum 2 where they are separated into plugs 9 twice the length of the required length of cigarette filters by the cutters 15. These cut plugs 9 are transported by the conveyor 16 and transferred to the sleeve 6. On the sleeve 6 the plugs 9 are carried to pass beneath the cigarette hopper 20 to pick up two plain cigarettes 7, 8 and with the plug 9 centrally located by the guides 21 between them, the assembly passes to the wrapping device. The cork strips 23 are wrapped around the assembly as illustrated in Fig. 3 and pass to the cutter 24 where two normal filter tip cigarettes are produced from the assembly.

The separated cigarettes are stripped either from the transfer drum 27 or the assembly sleeve 6 after they have been separated and onto the filter assembly machine catcher band.

Under the influence of rotation the cigarettes fall out of the wheel 27 or sleeve 6 by gravity. A plough member 35 as in Fig. 1 makes contact with grooves 36 as in Fig. 2 to aid in ejecting the cigarettes from sleeve 6. Similar plough members 37 can be used in conjunction with the wheel 27.

What I claim as new and desire to secure by Letters Patent is:

1. A cigarette filter tip assembly machine comprising a cylindrically shaped assembly unit consisting of a sleeve having peripheral grooves in line with its axis, and a concentric drum inside said sleeve, said sleeve and drum being adapted to rotate in opposite directions, the peripheral grooves in the sleeve extending through its inside surface to allow cigarettes and filter plugs in said grooves to make contact with the surface of the inside drum.

2. A cigarette filter tip assembly machine according to claim 1, in which a pair of belts is provided which are moved with a surface speed greater than the peripheral speed of the sleeve and situated so that the surfaces of the belts contact the periphery of the cigarettes carried in the grooves of the sleeve.

3. A cigarette filter tip assembly machine comprising a cylindrically shaped assembly unit having peripheral grooves in line with its axis, a device for feeding double length filter plugs into the grooves in the assembly unit, a hopper for feeding cigarettes one to each side of the plugs, a wrapping device operable adjacent the assembly unit for wrapping the plugs and adjacent ends of the cigarettes to secure them one to the other, said assembly unit having a circumferentially slot positioned centrally of the length of the assembly unit, and a circular cutter with its edge accommodated in said slot.

4. A cigarette filter tip assembly machine according to claim 1, in which the sleeve is provided with slots disposed circumferentially and centrally of its length, and an internal rib for the sleeve accommodating said slot and in which in the concentric drum is provided with a groove to accommodate said rib.

5. A cigarette filter tip assembly machine according to claim 1, in which a pair of belts are provided mounted to move with a surface speed greater than the peripheral speed of the sleeve and situated so that the surface of the belts contacts the periphery of the cigarettes carried in the grooves of the sleeve, and in which means are provided for attaching a web of material round the double length filter plug and the ends of the adjacent cigarettes to unite the plug to the cigarettes while the cigarettes and the plug are rotating in the groove of the assembly machine.

6. A cigarette filter tip assembly machine comprising a cylindrically shaped assembly unit consisting of a sleeve having peripheral grooves in line with its axis, a concentric drum inside said sleeve, said sleeve and drum being adapted to be rotated in opposite directions, the peripheral grooves in the sleeve extending through its inside surface to allow cigarettes and filter plugs in said grooves to make contact with the surface of the inside drum, a pair of belts mounted to move with a surface speed greater than the peripheral speed of the sleeve and situated so that the surface of the belt contacts the periphery of cigarettes carried in the grooves of the sleeve, a perforated and internally segmented suction drum rotated in an opposite direction to the assembly unit parallel with and adjacent to one portion of its periphery in which the cigarettes and plugs adjacent to one another in the peripheral

grooves are carried and rotated, said suction drum adapted to receive strips of material thereon and carried to contact the rotating plugs and adjacent ends of the cigarettes, and a part in the suction drum adapted to break the suction as the strips contact the plug and cigarette assembly.

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