Feb. 2, 1954 D. W. MOLINS ET AL 2,667,877

APPARATUS FOR MAKING MOUTHPIECE CIGARETTES

Filed Dec. 3, 1951

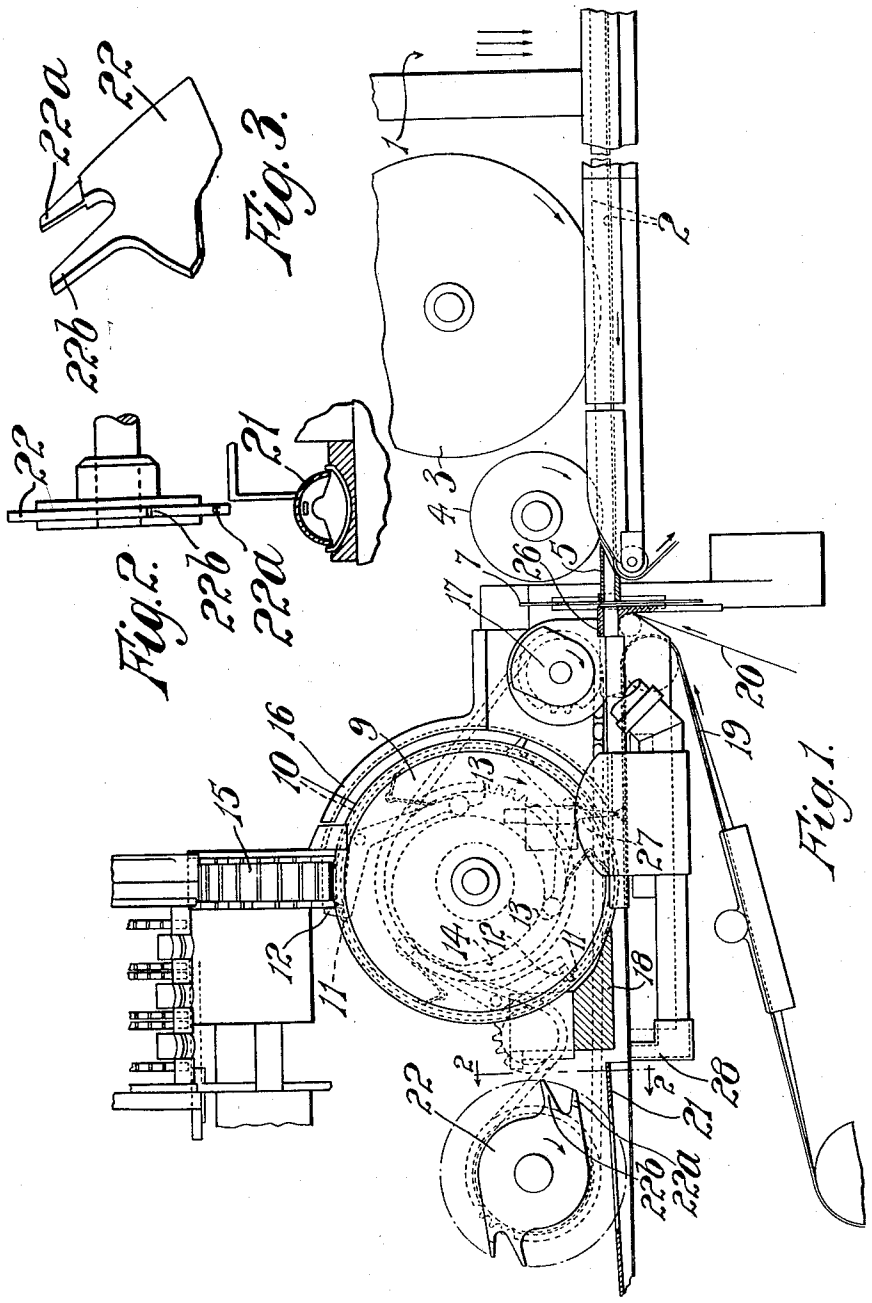


Fig. 1.

Fig. 2.

Fig. 3.

INVENTOR
D. W. Molins,
F. F. Ruan + N. W. Jackson
By Watson, Cole, Grindle + Watson

Patented Feb. 2, 1954 2,667,877

UNITED STATES PATENT OFFICE

2,667,877

APPARATUS FOR MAKING MOUTHPIECE CIGARETTES

Desmond Walter Molins, Félix Frédéric Ruau, and Norman Walter Jackson, Deptford, London, England, assignors to Molins Machine Company Limited, London, England, a British company

Application December 3, 1951, Serial No. 259,524

Claims priority, application Great Britain December 18, 1950

5 Claims. (Cl. 131—61)

1

This invention concerns improvements in or relating to apparatus for making mouthpiece cigarettes.

One way of making mouthpiece cigarettes consists in feeding spaced lengths of unwrapped tobacco, with mouthpiece portions between successive lengths of unwrapped tobacco so as to form a continuous composite filler, which is enclosed in a paper wrapper to form a continuous composite rod, the rod being then severed at suitable intervals to produce mouthpiece cigarettes. The present invention is concerned with the manufacture of mouthpiece cigarettes by the general apparatus, and cigarettes so manufactured will for convenience be referred to herein as "cigarettes of the kind described." For convenience, all mouthpiece portions (which are often made of paper and are sometimes known as "filter plugs" or "filter tips") suitable for incorporation in mouthpiece cigarettes will be referred to hereinafter as "stubs."

When making mouthpiece cigarettes by the system referred to above, one problem is to obtain a good joint between stubs and lengths of tobacco. If the tobacco and stubs do not abut closely in the composite filler and the composite rod, the cigarettes produced will be unsatisfactory in that they are soft at the region adjacent the stub.

A further problem is the correct longitudinal positioning of the stubs in the composite filler, so as to ensure that the stubs in the finished cigarettes are all of a reasonably consistent length, since in normal practice the composite filler has stubs and tobacco sections of double length, and the composite rod is cut through the middle of each stub and through the middle of each tobacco section.

It has been proposed to overcome the latter difficulty by causing an adjusting element to move into the path of the composite filler behind a stub and to move forward faster than the filler for a predetermined distance and then withdraw from the said path. The object of this proposal was to cause any stub which might be lagging behind its desired position in the composite filler to be overtaken and accelerated by the adjusting element, whilst the stub is under the tongue, while stubs which were already in their proper longitudinal positions would be unaffected by the adjusting element.

It has been proposed in the specification of our United States application Serial No. 163,456, filed May 22, 1950, to provide a pair of elements, one behind the other, arranged to enter the path of

2

the composite filler and move forwardly, while in engagement with tobacco in the leading end part of a tobacco section, faster than the composite filler, so as to move tobacco so engaged forwardly relatively to tobacco behind it. The proposed arrangement was such as to ensure that the leading element entered the tobacco some distance, e. g. 5 mm. behind a stub, while the rear element was about 16 mm. behind the leading one. This arrangement had the effect of causing good abutment between the leading end of a tobacco section and the rear end of a stub, but although the positioning of the stubs was good, really accurate positioning of the stubs was not of course attempted by the leading element, since the leading element of the pair did not engage the stubs but only acted on them through the medium of tobacco lying between the element and stub in each case, and thus could exert only a yielding pressure on the stubs. If, on the other hand, the arrangement was altered to provide that the leading element entered the path of the composite filler at a point close enough to a stub to engage a lagging stub positively so as to position it correctly, the abutment of stubs with leading ends of tobacco sections was sometimes unsatisfactory. The reason for this was that as the two elements moved at the same speed, a lagging stub and the tobacco behind it would both be advanced the same amount, and therefore any existing gap between tobacco and stub would be substantially unaffected by the operation.

A further proposal has been made in the specification of United States application Serial No. 233,326, now Patent No. 2,622,602, granted December 23, 1952, to provide an adjusting element to enter the path of the composite filler behind a stub and to move faster than the filler so as to advance a stub which is insufficiently advanced, and a tobacco-advancing element to enter the path so as to engage tobacco in the leading end part of a tobacco length, and to move forward faster than the adjusting element so as to tend to advance the tobacco relatively to the stub and thereby cause the tobacco and stub to abut.

That arrangement gives the double advantage of positioning the stubs fairly accurately and at the same time closing up any gap which might exist between the rear end of a stub and the tobacco behind it. In that arrangement, however, the adjusting element might in some cases engage the rear end of the stub itself (if there were a sufficient gap between the stub and the

following tobacco section) while in other cases, where no gap or only a small gap existed, it might engage tobacco and so press a small quantity of tobacco against the rear end of the stub, in which case the stub would be advanced somewhat further than if the element engaged the stub itself.

According to the present invention there is provided in apparatus for manufacturing cigarettes of the kind described, means to feed lengths of unwrapped tobacco and stubs in desired sequence to form a continuous composite filler, and an adjusting element adapted to enter the path of the said filler behind a stub and to move forwardly faster than the said filler so as to advance a stub which is insufficiently advanced, wherein the adjusting element is thin (e. g. a blade-like element) so that if it enters the tobacco filler behind the stub, it can, due to its thinness, pass through tobacco in its forward movement towards the stub.

Further according to the invention there is provided in apparatus for manufacturing cigarettes of the kind described, means to feed lengths of unwrapped tobacco and stubs in desired sequence to form a continuous composite filler, a thin adjusting element adapted to enter the path of the said filler edgewise behind a stub and to move forwardly faster than the said filler, so as to advance a stub which is insufficiently advanced, and capable, due to its thinness, of passing through tobacco in its forward movement towards the stub, and a tobacco-advancing element adapted to enter said path so as to engage tobacco in the leading end part of a length of tobacco and to move forwardly faster than the said filler so as to advance tobacco in the said leading end part, wherein the said adjusting element is arranged to be withdrawn from the said path sooner than the tobacco advancing element, whereby after the adjusting element has ceased to advance the stub, the tobacco-advancing element can continue to advance tobacco so as to advance it relatively to the stub and thereby cause the tobacco and stub to abut.

The adjusting element and the tobacco-advancing element may be arranged to move at the same speed as one another (e. g. they may be fixed on a rotatable member).

The adjusting element may be arranged to slope rearwardly and downwardly during part at least of its forward travel in the path of the composite filler, so as to tend to cause tobacco to yield beneath it if it engages the tobacco filler behind a stub during its forward movement, and so as thereby to assist in enabling the element to pass through tobacco in its forward movement towards the stub.

Apparatus according to the invention will now be described by way of example with reference to the accompanying drawings in which:

Figure 1 is a front elevation, partly in section, of apparatus for forming and cutting a tobacco filler and incorporating stubs therein to make a composite rod.

Figure 2 is a section of Figure 1 on the line 2—2.

Figure 3 is an isometric view of a fragment of Figure 2.

Referring to the drawing tobacco is showered from a hopper indicated diagrammatically at 1 on to a moving conveyor 2, consisting of an endless band, which conveys the showered tobacco lengthwise as a loose stream or filler of unwrapped tobacco. One or more compression rollers, such as 3 and 4, are provided which compress the stream laterally so as to impart to it a suitable cross-sectional size and shape, and also sufficient rigidity to enable it to pass from the end of the conveyor into and through a short guide tube 5 which is located just beyond the compression rollers.

A cutting device 7 is located adjacent the end of the guide tube and is adapted at intervals to cut across the tobacco filler as it issues from the guide tube. The cutting device comprises a relatively narrow knife blade, which is caused to cut across the filler at high speed, so that the guide tube is blocked only for a very short time, and thus there is very little holding up of the tobacco filler in the guide tube.

Beyond the knife is a short outlet guide tube 26.

A paper web 20 is supported on a conveyor belt 19 and moves in the direction of the arrow at a higher speed than that of the uncut filler and of the conveyor 2.

Arranged above the paper web 20 is a wheel, also referred to as a "stub wheel," which is arranged to cause stubs to be placed at intervals on the paper web between successive portions of the tobacco filler. This stub-wheel, whose axis of rotation lies across the direction of movement of the filler, consists of a large disc 9 having a concave rim 10, like some compression wheels. The periphery is perforated at, for example, three equally spaced positions 11, and retractable stub pushing devices 12 are provided within the body of the disc which move in and out of the holes as the disc rotates, when cam followers 13 attached to the pushing devices rotate about a fixed cam 14.

A suitable stub feeding device comprising a fluted drum 15 is provided to feed stubs to the wheel at the top thereof, and these are carried round in turn by the pushers 12. The fluted drum and the mechanism for feeding stubs into its flute are constructed and operated in any suitable and convenient known manner.

At the side of the wheel where the stubs pass, a shield 16 is arranged to prevent stubs from leaving the concave rim, and at the bottom of the wheel each stub is delivered into a space between two filler portions. As a stub is delivered in this manner the pusher 12 is retracted by the cam 14.

A small drive-roller 17 is provided above the paper web near the outlet guide tube 26. The roller 17 is in the nature of a sector whose arcuate part is so arranged that it is clear of the tobacco just prior to the cut, and immediately after the cut engages the tobacco to cause the latter to travel at the faster speed of the paper web. This drive-roller is so shaped as to move out of engagement with the tobacco which has not been cut. In this way, the tobacco, before being cut, is allowed, as far as possible, to slip on the faster moving paper web 20. The stub-wheel 9 also has the further function of engaging the tobacco filler at desired times so as to cause the tobacco to be pressed down against the paper web after the tobacco has been cut, so as to ensure that the cut portion travels at the speed of the paper web. This may be at the moment that the roller 17 engages the tobacco to accelerate it, or at a time when the cut-off length has passed beneath the roller 17. This depends on the length of the tobacco portion, which in turn, of course, depends on the length of the cigarette being made.

If the machine is making long cigarettes, the tobacco portion cut from the filler may be long enough to be engaged by the stub-wheel 9 shortly after it has been severed from the filler and while its rear end is still engaged by the roller 17. On the other hand, if short cigarettes are being made, the tobacco portion severed from the filler may be too short to be engaged by the stub-wheel 9 and the roller 17 at the same time, and it will, in that case, not be engaged by the stub-wheel until after it has passed beneath the roller 17.

Just beyond the stub wheel, and located above the second conveyor, is a scraper shoe 18 to remove any tobacco which tends to move up with the wheel after the delivery of a stub and which may act also as a compression shoe beneath which the stubs and separated portions of tobacco filler pass as a composite stream. This shoe is arranged with one end in contact, or nearly so, with the edge of the wheel so as to ensure that the stubs and the tobacco are properly stripped from the wheel.

The cutting of the unwrapped filler occurs when an appropriate length of filler is already on the paper web. Immediately after cutting, the rotatable sector 17 referred to above is caused to engage the cut length of tobacco to press it against and move with the paper web and thereby cause the cut length to move forward quickly with the speed of the paper web. In this way the cut portions are accelerated and spaced apart. Stubs are inserted in the gaps so formed, by the stub-wheel as above described.

It will be seen that the speed ratio of the first conveyor 2 to the paper web 20 must be so chosen that the gaps formed between the tobacco portions on the paper web (which moves at the faster, and final, speed) are no greater than necessary for the accommodation of stubs. It is important that the stubs and tobacco portions on the composite rod should abut closely, and since the speed of the stubs and tobacco portions cannot be reduced so as to close any gaps after the stubs are introduced between the tobacco portions (since the stubs and tobacco are carried on the paper web) the gaps must be of no more than just sufficient length to accommodate stubs in closely abutting relationship to the tobacco portions.

In order to insert the stubs into these gaps, the stub-wheel 9 is arranged to rotate at a faster (e. g. 10%–20% faster) peripheral speed than the speed of the paper web 20. Thus a stub, while being delivered from the stub wheel into a gap between tobacco portions on the paper web, moves faster than the tobacco portions. As the stub moves forwardly and downwardly into the gap, its leading end engages the rear end face of the preceding tobacco portion, and due to its greater speed (since the stub is still being pushed by a pusher 12 on the stub-wheel) pushes the tobacco forward a little and thus compacts and compresses the tobacco in the region of the rear end of that tobacco portion. This widens the gap slightly and leaves enough room for the stub to fit in between the two tobacco portions.

The natural resilience of the tobacco causes the compressed end part of the preceding tobacco portion to expand again when it is free to do so—that is, when the pusher 12 is retracted into the wheel 9 and no longer pushes the stub forward at the faster speed—and it is thought that this alone tends to close up the enlarged gaps to a considerable extent.

Thus a continuous composite filler of tobacco portions and stubs in alternation is formed on the paper web 20 and carried thereby beneath a tongue 21 forming part of what is known as a garniture wherein the rod is shaped to its desired size and form and the paper web is wrapped around and sealed to produce a composite cigarette rod.

It is found that in the resulting composite filler, although there is good abutment between the leading ends of the stubs and the rear ends of preceding tobacco portions, gaps tend to occur behind the rear ends of the stubs. In addition the stubs for various reasons sometimes tend to lag behind their correct positions in the filler. Back pressure may be exerted on a stub by the preceding tobacco section as the latter passes beneath and is compressed by the frusto-conical surface of the usual tongue, with the result that the stub is displaced rearwardly.

In order to correct or prevent any such displacement, an adjusting element is provided, consisting of a finger 22*a* mounted on the periphery of a rotatable wheel 22 which is arranged above the tongue 21, the tongue being suitably slotted, see Figure 2, to allow the finger to pass through and into the path of the composite filler. On rotation of the wheel the finger 22*a* moves down into the path of the filler a short distance (e. g. 3 mm.) behind a stub, although this distance will of course depend on the longitudinal position of any individual stub at that moment. Further rotation of the wheel causes the finger to move forwardly in the path of the composite filler, but faster than the filler, the difference in the speed being such that by the time the finger withdraws from the path of the filler it has, during its period of travel in the said path, moved about 6 mm. further than has the filler in the same period. The part of the finger 22*a* which extends into the composite filler is formed as a thin blade-like element about 1 mm. in thickness, see Figure 3, arranged to move edgewise through the path of the filler. If there is a sufficient gap between the rear end of a stub and the leading end of the following tobacco section, the finger will naturally eventually engage the rear end of the stub. If there is no such gap, the finger will enter the tobacco filler behind the stub, and due to its thinness, can generally pass through the tobacco behind the stub, or at any rate can pass through some of it, in its forward movement towards the stub, and thus tends to engage the stub itself, although in some cases it may of course push a small quantity of tobacco forward against the rear end of the stub. It is found, however, that by using a thin finger as described a more accurate positioning of the stubs can be obtained than by using a thick finger. The leading edge of the finger is made relatively sharp so as to provide a lead for the finger to assist it in passing through tobacco.

Moreover the finger 22*a* is arranged so as to slope downwardly and rearwardly when moving forwardly in the path of the filler, and it is thought that this rearward slope of the finger assists it in passing through tobacco, since it may enable the finger to cause tobacco to yield beneath it so that the finger can to some extent ride over tobacco instead of necessarily forcing its way through the tobacco. The rearward slope of the finger also enables the finger to withdraw from the tobacco without the risk of pulling tobacco upwardly out of the filler with it, as might occur if the finger were for example radially mounted on the rotating wheel.

A tobacco-advancing element 22*b* is provided to fill any gap or sparsely filled portion which may exist behind a stub, so as to cause close abutting of the stub and tobacco, and a desirable degree of density in the tobacco immediately behind the stub. The tobacco-advancing element consists of a further finger fixed on the wheel, about 19 mm. behind the first finger, and this further finger 22*b* is, like the first finger 22*a*, arranged to slope rearwardly and downwardly as it moves forwardly in the path of the filler. After the first finger 22*a* has entered the path of the composite filler and has travelled a short distance, further rotation of the wheel brings the tobacco-advancing finger 22*b* down into the tobacco, which it engages and advances, moving at the same speed as the stub-adjusting finger.

The angle between the two fingers is sufficient, in relation to the distance they move in the path of the filler, to cause the leading finger 22*a* to leave the said path an appreciable time before the rear, tobacco-advancing finger 22*b*. Thus after the thin stub-adjusting element 22*a* has finished advancing a stub (assuming that the stub was not already sufficiently advanced) and has moved up out of the path of the composite filler, the tobacco-advancing finger 22*b* is still in engagement with the tobacco and so continues for a short time to advance tobacco relatively to the stub. Thus any gap between the rear of the stub and the succeeding tobacco portion can be closed up and good abutment between stub and tobacco obtained.

Further rotation of the wheel causes the tobacco-advancing finger to move up out of the path of the filler, which then passes through the usual garniture in which the cigarette-paper web is folded and secured around it to form a continuous composite rod, which is cut at desired intervals to form mouthpiece cigarettes.

Preferably two sets of fingers are provided on the wheel, the two sets being diametrically opposite so that the operations described are performed twice on each revolution of the wheel.

In order to reduce any tendency for fragments of tobacco or dust to accumulate on the paper web in gaps between tobacco portions, a blowing device 27 is provided and arranged to blow across the paper 29 where a gap occurs, just before and during the insertion of a stub. The blowing device is operated intermittently and is timed so as to blow air only across gaps between tobacco portions, so as to clean the paper where gaps occur without unduly disturbing the tobacco in the tobacco portions. As the operation of this device is liable to cause dust in the surrounding air and because it is necessary to keep the exterior surface of the paper web clean a suction nozzle 28 is provided.

The tongue 21 and the garniture above referred to, and indeed all subsequent parts of the machine, follow orthodox continuous rod cigarette making machine practice, so no further detailed description is necessary.

The paper web is then folded and secured about the continuous composite filler so as to form a continuous composite rod, which passes to the usual cut-off device which cuts the rod so as to produce mouthpiece cigarettes. The stubs and the tobacco portions of the composite rod are double the length of the corresponding portions in a finished mouthpiece cigarette, and therefore the cut-off is timed to cut the rod in the middle of each stub portion and each tobacco portion to produce individual mouthpiece cigarettes.

What we claim as our invention and desire to secure by Letters Patent is:

1. In apparatus for manufacturing cigarettes of the kind described, means to feed lengths of unwrapped tobacco and stubs in desired sequence to form a continuous composite filler, and an adjusting element adapted to enter the path of the said filler behind a stub and to move forwardly faster than the said filler so as to advance a stub which is insufficiently advanced, wherein the adjusting element is a thin blade-like element, so that if it enters the tobacco filler behind the stub, it can, due to its thinness, pass through tobacco in its forward movement towards the stub.

2. In apparatus for manufacturing cigarettes of the kind described, means to feed lengths of unwrapped tobacco and stubs in desired sequence to form a continuous composite filler, a thin adjusting element adapted to enter the path of the said filler edgewise behind a stub and to move forwardly faster than the said filler, so as to advance a stub which is insufficiently advanced, and capable, due to its thinness, of passing through tobacco in its forward movement towards the stub, and a tobacco-advancing element adapted to enter said path so as to engage tobacco in the leading end part of a length of tobacco and to move forwardly faster than the said filler so as to advance tobacco in the said leading end part, wherein the said adjusting element is arranged to be withdrawn from the said path sooner than the tobacco advancing element, whereby after the adjusting element has ceased to advance the stub the tobacco-advancing element can continue to advance tobacco so as to advance it relatively to the stub and thereby cause the tobacco and stub to abut.

3. Apparatus as claimed in claim 2 wherein the adjusting element and the tobacco-advancing element are arranged to move at the same speed as one another.

4. Apparatus as claimed in claim 3 wherein the two elements are fixed on a rotatable member.

5. Apparatus as claimed in claim 4 wherein the adjusting element is arranged to slope rearwardly and downwardly during part at least of its forward travel in the path of the composite filler, so as to tend to cause tobacco to yield beneath it if it engages the tobacco filler behind a stub during its forward movement, and so as thereby to assist in enabling the element to pass through tobacco in its forward movement towards the stub.

DESMOND WALTER MOLINS.
FÉLIX FRÉDÉRIC RUAU.
NORMAN WALTER JACKSON.

References Cited in the file of this patent

UNITED STATES PATENTS

Number	Name	Date
1,967,154	Molins	July 17, 1934
1,971,870	Molins	Aug. 28, 1934
1,999,910	May	Apr. 30, 1935