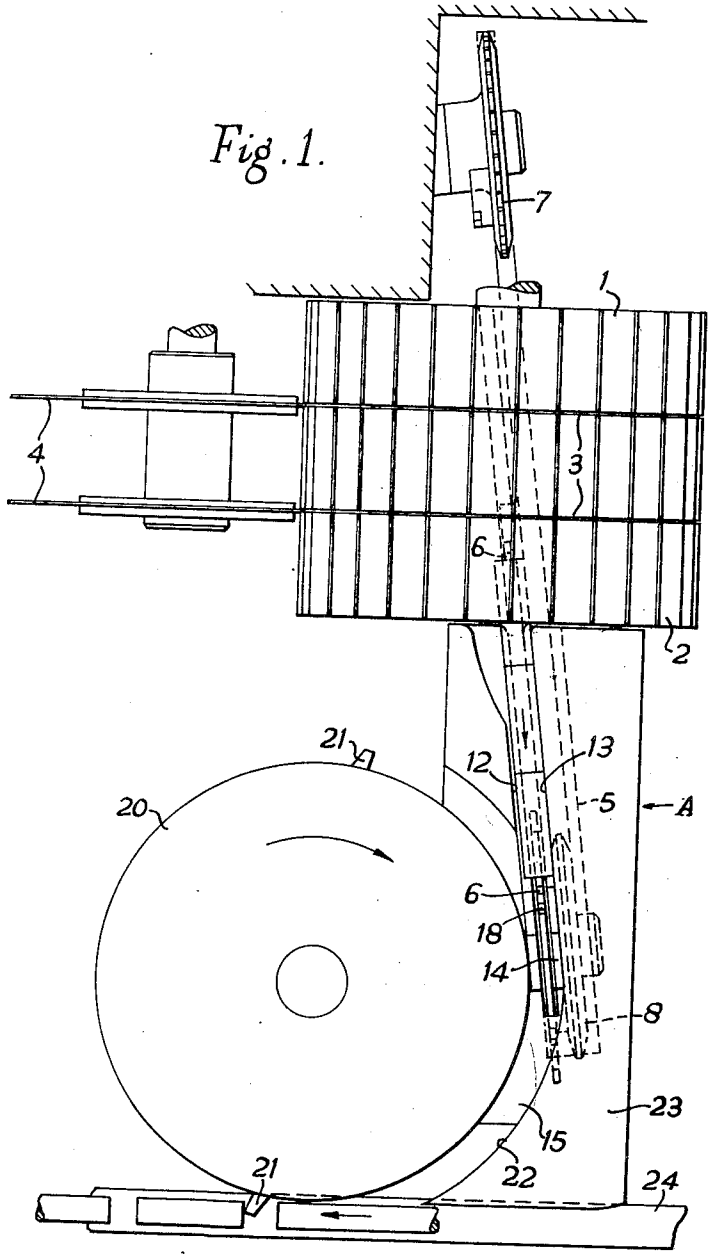
Nov. 21, 1961 N. W. JACKSON 3,009,557

APPARATUS FOR MAKING MOUTHPIECE CIGARETTES

Filed Feb. 10, 1958

3 Sheets-Sheet 1

Fig. 1.



INVENTOR
Norman W. Jackson

BY
Watson, Cole, Grindle & Watson
ATTORNEY

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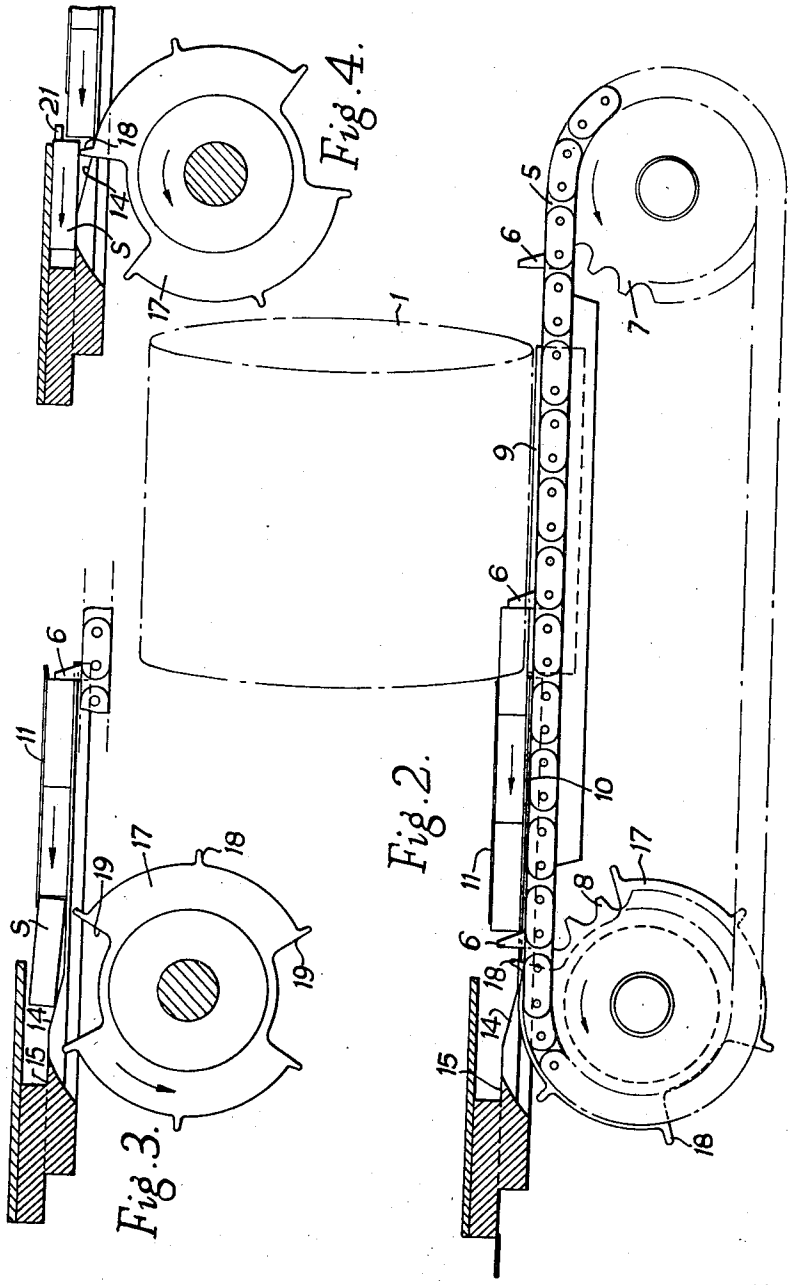
3 Sheets-Sheet 2



INVENTOR
Norman W. Jackson
BY
Watson, Cole, Grindle & Watson
ATTORNEY

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Fig. 5.

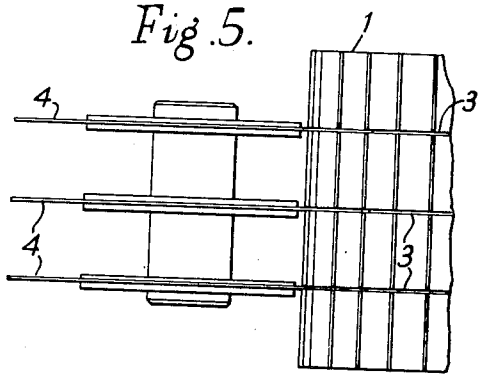
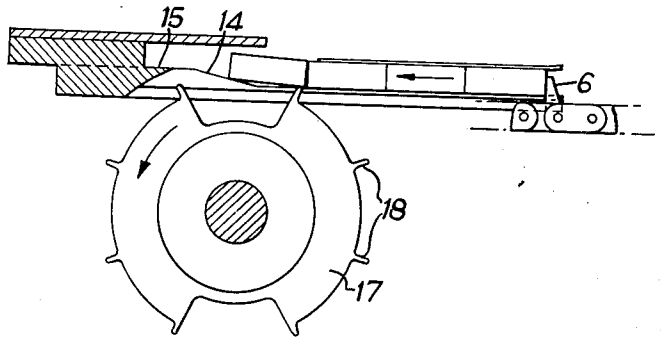


Fig. 6.



Norman W. Jackson INVENTOR

BY

Watson, Cole, Grindle & Watson

ATTORNEY

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APPARATUS FOR MAKING MOUTHPIECE CIGARETTES

Norman Walter Jackson, Deptford, London, England, assignor to Moline Machine Company Limited, London, England, a British company

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Claims priority, application Great Britain Feb. 20, 1957
5 Claims. (Cl. 198—20)

This invention concerns improvements in or relating to apparatus for making mouthpiece cigarettes, and in particular, apparatus for feeding mouthpiece portions which are to be incorporated in such cigarettes.

For convenience a mouthpiece portion will hereinafter be referred to as a "stub," which word shall be understood as including any portion of material (such as a piece of filtering material, or a hollow tube, or a combination of the two) which is suitable for incorporation in a mouthpiece cigarette, whether such portion is of the length required in a finished cigarette or a multiple of such length.

In the manufacture of mouthpiece cigarettes it is often the practice to feed stubs, each double the length required in a finished cigarette, to be united with cigarette portions or with unwrapped tobacco lengths, the double-length stubs being ultimately cut in two when individual cigarettes are formed. Since these double length stubs are quite small and inconvenient to handle, it is often the practice to supply longer lengths of stub material (for example sextuple lengths) to the machine and to subdivide these into double lengths. Thus a sextuple length, for example, is divided into three double-length stubs arranged end to end. Various methods have been proposed for separating these double-length stubs so as to feed them individually.

According to the present invention, there is provided stub-feeding apparatus comprising means to feed stubs endwise in line, means to move each stub in turn sideways so as to bring part of its rear face out of line with the stub behind it, and a pusher arranged to engage such displaced rear face and thereby accelerate the stub.

The apparatus may comprise a carrier (e.g. a fluted drum) to convey multiple-length stubs laterally past cutting means by which they are subdivided into groups of, for example, double-length stubs and stub-feeding-means to push each such group in turn endwise so as to form a succession of endwise moving stubs.

The said conveyor-means may comprise channels in which the multiple-length stubs are carried laterally past the said cutting means, and the said stub-feeding means may comprise a feeder-element arranged to move transversely of the direction of movement of the said channels and with a component in said direction, the arrangement being such that the said feeder-element can enter a channel and move through it so as to feed a row of stubs lengthwise therefrom while the said channel is moving laterally. The apparatus may comprise a succession of such feeder-elements mounted at spaced intervals on an endless conveyor, which latter extends across the said carrier and is inclined to the longitudinal axes of the said channels so as to move each feeder-element in turn through a different channel with a component in the direction of movement of the latter.

The said means to move a stub sideways may comprise a guide surface to cause the leading end of an endwise-moving stub to be moved out of line, and a pusher-element to engage the side of the stub and push its rear end out of line. The said pusher-element may be rotatably mounted so as to move recurrently into and out of the path of the endwise moving stubs.

Where reference is made to a stub being moved "sideways" it is to be understood as meaning that the stub is moved in a direction transverse to its length, and not that it is necessarily moved in any particular plane such as a horizontal plane.

The said pusher which engages the displaced rear ends of the stubs may be arranged to feed the stubs into spaces between cigarette lengths for assembly therewith.

Further according to the invention there is provided stub-feeding apparatus comprising a carrier (e.g. a fluted drum) having channels (e.g. flutes) each adapted to contain a row of endwise-aligned stubs and to convey said row sideways, and a feeder-element arranged to move transversely of the direction of movement of said channels and with a component in said direction, the arrangement being such that the said feeder-element can enter a channel and move through it so as to feed a row of stubs lengthwise therefrom while the said carrier continues to move. The apparatus may comprise a succession of feeder-elements mounted at spaced intervals on an endless conveyor, which latter extends across the said carrier and is inclined to the longitudinal axes of the said channels so as to move each feeder-element in turn through a channel with a component in the direction of movement of the latter.

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

FIGURE 1 is a plan;

FIGURE 2 is a sectional view in the direction of the arrow A, FIGURE 1;

FIGURES 3 and 4 are fragmentary views similar to FIGURE 2, certain parts being omitted; and

FIGURES 5 and 6 illustrate a modification.

Referring first to FIGURE 1, a carrier consisting of a fluted drum 1 having channels or flutes 2 and two peripheral grooves 3 is arranged to receive from a hopper sextuple stub lengths, and to rotate so as to carry them in its flutes 2 laterally past rotating disc knives 4 which cut the sextuple stub lengths into groups of three double length stubs.

A chain conveyor 5, see also FIGURE 2, provided with extending lugs or pusher-members 6, extends across and passes beneath the drum 1. As seen in FIGURE 1, the conveyor 5 is inclined to the axis of the drum, and a lug 6 on the upper run of the conveyor can extend upwardly into the lowermost flute 2. The conveyor is so inclined to the longitudinal axis of the flute, and is arranged to move at such a speed, relative to that of the drum, that a lug can enter the lowermost flute at one end of the rotating drum and pass through it, due to its component of movement in the direction of movement of the flute. The lugs 6 are suitably spaced apart so that successive lugs enter and pass through successive flutes in turn.

The conveyor 5 passes about sprockets 7 and 8.

Guide plates 9 and 10, FIGURE 2, are provided to support and guide stubs which are pushed from successive flutes and fed endwise in line by the lugs 6. The plates are slotted to allow the lugs to extend upwardly through them.

An upper guide surface 11, FIGURE 2, is arranged above the guide 10 to confine the stubs, which are also confined by side walls 12 and 13, FIGURE 1.

The guide plate 10 has an upwardly inclined portion 14, FIGURES 2, 3 and 4, which leads to a further horizontal guide surface 15 at a higher level than that of the plate 10.

Fixed to the sprocket 8 is a spider-wheel 17, which is best seen in FIGURES 3 and 4, from which figures the sprocket is omitted for clearness. The spider-wheel has six projections 18 constituting pusher-elements. The wheel 17 also has recesses 19, which are diametrically opposite so that a recess follows every third projection.

These recesses are to accommodate the lugs **6**, which are offset from the chain **5**, as shown in FIGURE 1, and in line with the projections **18**. The projections are spaced apart by distances such that successive projections, on moving up through the slots **16**, will register with successive stubs, of predetermined length, which are being pushed endwise in groups of three by the lugs **6**.

Alongside the guide plate **10** is a rotatable disc **20**, arranged to rotate in the direction of the arrow, FIGURE 1. The disc is provided with two pushers **21** on its periphery. The speed of rotation of the disc and the timing of the pushers **21** are so related to the speed and timing of the conveyor **5** and lugs **6**, as well as the elements **18**, that a pusher **21** moves across the surfaces **14** and **15** each time a stub has been moved sideways (i.e. upwardly) by the surface **14** and an element **18**. The surface **15** extends alongside the disc **21**, and an arcuate guide surface **22** provided by the arcuate edge of a plate **23**, so that an arcuate guideway is provided along which stubs can be pushed by the pushers **21**. A conveyor tape **24** conveys cigarette lengths C at spaced intervals in the direction shown by the arrow, FIGURE 1, and the arrangement in the present instance is such that a pusher **21** pushes a stub from the guide surface **15** on to the tape **24** into the space which occurs after every second cigarette length. This makes it possible to form endwise abutted groups each consisting of a double-length stub lying between two cigarette lengths in axial alignment.

When the apparatus is operating, sextuple stub lengths are carried laterally in flutes **2** of the drum **1** past the knives **4** and thereby subdivided, as described above, so as each to form groups of three double-length stubs. Each such group in turn is engaged by a lug **6** on the conveyor **5** as the flute in which they are carried reaches or approaches its lowest position. That is to say, a lug engages the exposed end face of the rearmost stub of a drical surface, is engaged neari ts rear end by a pusher group (considered in the direction of movement of the upper run of the conveyor **5**), and thus pushes the group endwise out of the flute. Due to the inclination of the conveyor **5** to the axis of the drum **1**, the lug has a component of movement in the direction of movement of the flute, and thus can move through the flute while the drum continues to rotate. Stubs are thus conveyed endwise in line by successive lugs **6**.

When a stub reaches the inclined surface **14**, its further forward movement causes its leading end to be raised, as shown in FIGURE 3. As this leading end reaches the higher surface **15**, its side, that is its cylindrical surface, is engaged near its rear end by a pusher element **18**, which raises it out of line with the following stub, as shown in FIGURE 4, and thereby causes part of its rear end face to be exposed. Shortly after this, a pusher **21** engages the said rear face and pushes the stub along the surface **15** and on to the tape **24**.

It will be seen that since the stubs are conveyed endwise in groups of three, each group being pushed by a lug **6**, only those stubs in a group will be in endwise abutment, and there will be a space, equal to a little more than the thickness of a lug, between the rear stub of one group and the leading stub of the next. As the wheel **17** rotates with the sprocket **8**, it is convenient to make the pitch of the lugs **6** equal to half that of the sprocket, so that six stubs pushed by two successive lugs will be presented to the inclined surface on each revolution of the sprocket, and accordingly six pusher elements **18** are provided on the wheel **17**. To allow for the space between the two groups of stubs, these six pusher elements are arranged in two corresponding groups, the elements in each group being spaced equally apart. These groups are arranged on opposite sides of the two recesses **19**, see FIGURE 3, and the distance between the last element **18** of one group and the first element of the other is a little greater than the distance between two elements

of a group. By this arrangement each stub is engaged by an element **18** at substantially the same position along its length as are all the other stubs. It will be seen that by this means all the stubs will be dealt with in the same way, whereas if all six pusher elements were equispaced about the wheel **17**, different stubs would be engaged at different positions along their lengths. It will also be seen that the stubs will be pushed up at slightly different intervals of time—that is, there will be a longer interval between the pushing up of the last stub of one group and the first of the next group, than between successive stubs of a group. For this reason the disc **20** and pushers **21** are so timed that there is a slight delay, after a stub has been pushed up out of line with the following stubs, before it is engaged by a pusher **21**. This arrangement ensures that the stubs are fed on to the tape **24** in correct timed relationship, notwithstanding that in their arrangement before engagement by the pushers **21** their spacing is slightly irregular due to the presence of a lug **6** behind each group of three stubs.

One advantage of the construction described is that it makes it possible to feed the stubs directly in endwise line from the conveyor (i.e. the drum **1**) on which the multiple lengths are subdivided, and that the endwise separation of the double length stubs from one another can be effected by the pusher **21** which feeds them on to the conveyor tape **24**. Thus the construction avoids the need for the somewhat elaborate arrangements for separation of the stubs which have previously been proposed, whereby the double-length stubs were transferred from a conveyor like the drum **1**, which carried them in groups of three to a further fluted drum in such a way that only one stub was fed into each flute of the further fluted drum.

FIGURES 5 and 6 illustrate a modification in which the apparatus is arranged to subdivide multiple-length stubs into groups of four double-length stubs, instead of groups of three as in the arrangement already described. For this purpose the fluted drum **1** is provided with three peripheral grooves **3** as shown in FIGURE 5, instead of with two grooves as shown in FIGURE 1, and three knives **4** are provided in order to cut the stub lengths into groups of four.

The spider-wheel **17** is accordingly provided with eight pusher-elements **18**, as shown in FIGURE 6. These are divided into two groups of four, the pusher-elements of each group being equally spaced from one another. The arrangement is otherwise exactly as described above with reference to FIGURES 1–4, and the operation of the modified apparatus is the same as that of the arrangement previously described except that each lug **6** pushes endwise a group of four stubs instead of a group of three.

The apparatus can be modified in the manner just described with reference to FIGURES 5 and 6, if it is desired to provide relatively short stubs, while for longer stubs the arrangement according to FIGURES 1–4 may be used, whereby the multiple lengths are subdivided into three.

It will of course be understood that the width of the fluted drum **1**, and the spacing of the grooves **3** and knives **4**, as well as the spacing of the lugs **6** and the arrangement of the pusher-elements **18** on the wheel **17**, should be suitably chosen for any particular length of stub it is desired to feed.

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

1. Stub feeding apparatus, comprising a movable carrier having transverse open-ended channels to carry stubs sideways, an endless conveyor having spaced feeder elements mounted thereon, and extending across the said carrier and so inclined to the longitudinal axes of the said channels as to carry successive feeder elements lengthwise along different channels with a component in the direction of movement of the latter, so as to feed stubs lengthwise from the channels while the latter are moving

laterally, and support means associated with said conveyor to support stubs fed lengthwise from the said channels, said support means and said conveyor extending away from the said carrier in the general direction of movement of the feeder elements through said channels, to support and feed endwise, respectively, a succession of stubs moving lengthwise in line away from the carrier.

2. Apparatus as claimed in claim 1, comprising a guide surface arranged to intercept a stub fed lengthwise by a feeder element and to move the leading end of said stub out of line, a deflector element arranged to engage a side of said stub and push its rear end out of line, a pusher arranged to engage the displaced rear face, and means to move the said pusher at a speed in excess of that of the said feeder elements whereby the pusher accelerates the stub to separate it endwise from the next following stub.

3. Stub feeding apparatus, comprising means to feed stubs endwise in line, a guide surface arranged to intercept the leading end of the leading stub of the line, said surface being disposed obliquely across the path of the line of stubs to guide the said leading end to move out of line, a deflector element arranged to engage a side of the stub and push its rear end out of line, a pusher arranged to engage the displaced rear face of the stub, and means to move the said pusher at a speed in excess of that of the said means to feed the stubs endwise, whereby

the pusher accelerates the stub to separate it endwise from the next following stub.

4. Apparatus as claimed in claim 3, wherein the said deflector element is rotatably mounted so as to move recurrently into and out of the path of the endwise moving stubs.

5. Apparatus as claimed in claim 3, wherein the said pusher which engages the displaced rear ends of the stubs is arranged to feed the stubs into spaces between cigarette lengths for assembly therewith.

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