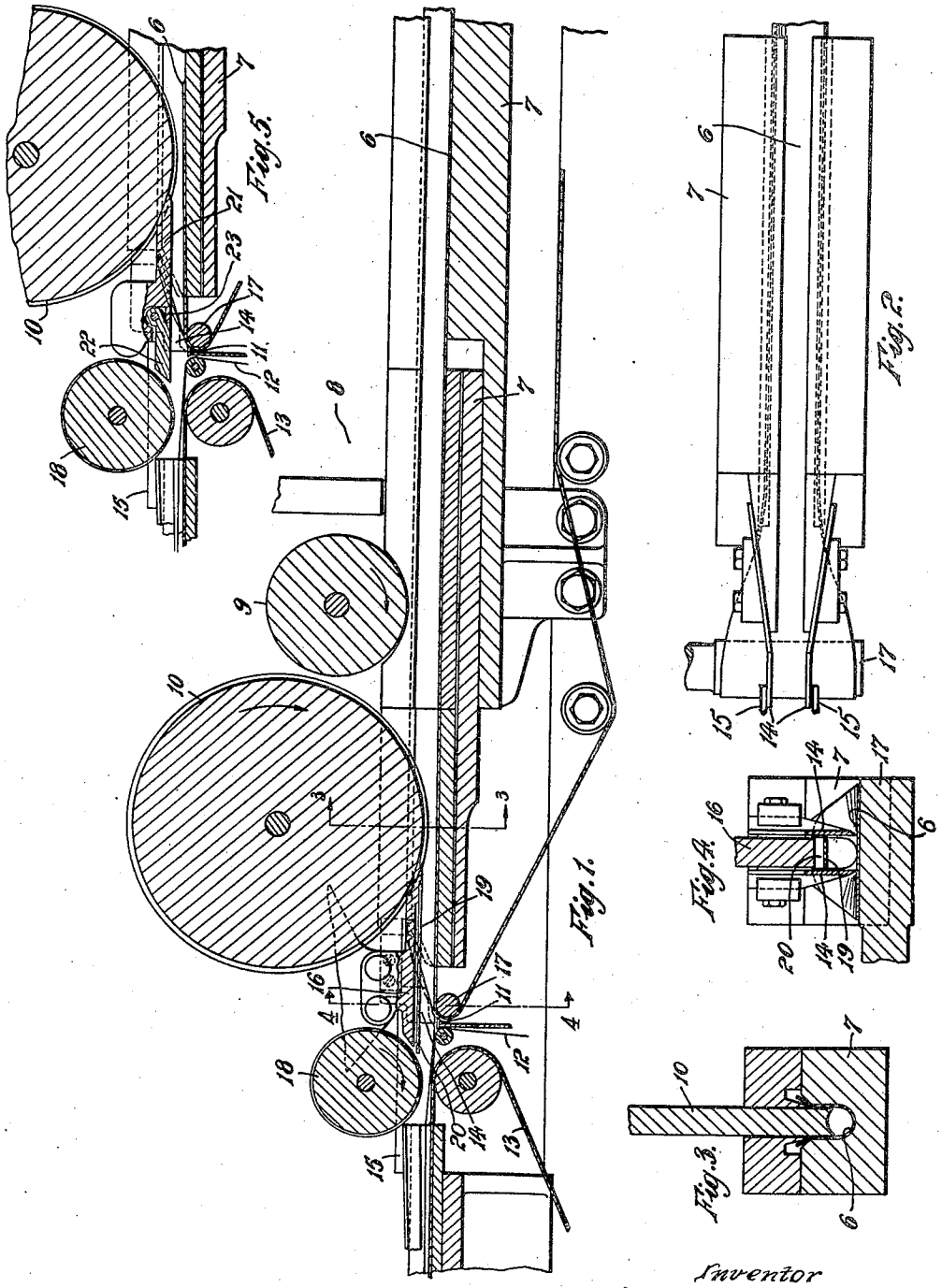
Dec. 3, 1940. F. F. RUAU 2,223,498

TOBACCO MANIPULATING MACHINE

Filed Nov. 26, 1937



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Patented Dec. 3, 1940 2,223,498

UNITED STATES PATENT OFFICE

2,223,498

TOBACCO MANIPULATING MACHINE

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Application November 26, 1937, Serial No. 176,730
In Great Britain December 11, 1936

8 Claims. (Cl. 131—84)

This invention is for improvements in or relating to tobacco manipulating machines in which a continuous tobacco filler rod is formed, such for example as continuous rod cigarette making machines or tobacco packaging machines in which a continuous tobacco filler rod is formed, but in which such filler rod is of a larger cross-section than in the case of a filler rod of a continuous rod cigarette making machine, and this larger filler rod is severed into sections or lengths for subsequently inserting into packages.

The present invention is for an improvement in or modification of the arrangement described and claimed in the co-pending application which is now United States Patent No. 2,149,924, granted March 7, 1939.

Where throughout the specification and claims the term "mass" is used, it shall mean weight per unit length considered axially of the filler rod or the tobacco fed, and the term "desired mass" shall be taken to mean the weight, or substantially the weight per unit length which it is desired that the continuous tobacco filler rod shall have.

The term "forwardly" when used hereinafter in connection with direction refers to the general direction of movement of the tobacco filler rod or the tobacco stream or the tobacco fed to the filler rod.

The expression "continuous tobacco filler rod" when used herein and in the appended claims means a rod-like stream of tobacco of a cross-section comparable with that included within a wrapper (for example, the paper wrapper of a cigarette) which is finally to contain the filler rod, which rod-like stream is continuously moved axially of itself, and the expression is not to be taken as limited to a filler rod of any given length or even to the final filler rod which is severed into sections, since the filler rod after being formed in accordance with the present invention may be subjected to further treatment, which further treatment forms no part of the present invention, nor is the expression to be taken to include a tobacco carpet which is formed in a hopper and then fed (e. g., picked and showered) therefrom preparatory to commencing the formation of the filler rod.

According to the present invention there is provided an improvement in or modification of the arrangement claimed in the co-pending application which is now United States Patent No. 2,149,924, granted March 7, 1939, which improvement or modification comprises a continuously movable conveyor device and an endless band to feed tobacco in the same general direction as and towards the continuously movable conveyor device, the band and the conveyor device together with guiding elements forming part of a confining passage, said band being folded to substantially U form and arranged so that the upstanding limbs of the U provide moving side walls in the passage.

A part at least of that surface which comprises a top wall of the confining passage may be movable towards and away from the wall opposed thereto for the purpose of relieving excess pressure within the confining passage. The movable part of the top wall may be pivoted in such manner that the part thereof which partakes of the greatest movement is disposed above the conveyor device.

The movable part of the top wall of the passage may comprise a smooth resilient leaf spring (e. g., a flat spring strip) extending in the direction of movement of the tobacco passing through the confining passage, the element being anchored at or adjacent the inlet to the confining passage.

The top wall may comprise a fixed part and a movable part which together are arranged normally to form a substantially continuous wall of the confining passage, said movable part being at least partly disposed above the endless band and means (e. g., an abutment on the fixed part) provided to determine the normal position of the movable part relatively to the fixed part.

Two embodiments of the invention will be described by way of example with reference to the accompanying drawing in which—

Figure 1 is a sectional side elevation of apparatus for forming a continuous tobacco filler rod.

Figure 2 is a plan view of a portion of Figure 1 and is drawn to an enlarged scale, some of the upper structure shown in Figure 1 being omitted.

Figure 3 is a section on the line **3—3**, Figure 1, and is drawn to an enlarged scale.

Figure 4 is a section on the line **4—4**, Figure 1, and is drawn to an enlarged scale.

Figure 5 is a sectional side elevation of a modified construction.

Like reference numerals refer to like parts throughout the specification and drawing.

Tobacco is showered or otherwise fed, for example as a sliver, from a tobacco feeding apparatus of any suitable form, and the tobacco is delivered on to an endless band **6**, which band travels along the bottom of a trough **7**. As shown in the drawing, the tobacco is delivered to the band **6** from a hopper **8** and the trough folds the band **6** so that the band assumes a susbtantially

U form as seen more clearly in Figure 3. As the tobacco passes from beneath the hopper 8 the band 6 conveys the tobacco beneath a compression roller 9 which is arranged to bear on the upper surface of the tobacco and to press the tobacco against the surface of the band 6. The compression roller 9 is rotated in a direction such that that part of the surface of the roller which engages the tobacco moves in the same direction as that in which the tobacco is moving.

The tobacco is fed forwardly by the endless band 6 beneath a further compression roller 10 and over a bridge piece 11 towards a conveyor device 12 which in the form illustrated in the drawing comprises a continuous web of paper having a substantially smooth surface. An endless conveyor tape 13 is provided to support the paper web, the tape 13 and the paper web being moved forwardly at the same speed. The paper web 12 together with the tape 13 and the endless band 6 form, together with guiding elements 14 and 15, and a top guide element 16, a confining passage through which the tobacco is passed whilst it is being transferred from the endless band 6 to the paper web 12. The endless band 6 receives a sufficient quantity of tobacco to form a tobacco filler rod of the desired mass, but the tobacco is arranged on the endless band 6 in a manner such that before the tobacco enters the confining passage it is at all points or at substantially all points along the length of the endless band 6, below the desired mass. The endless band 6 moves continuously and at a linear speed which is greater than the linear speed at which the paper web 12 and the tape 13 are moving. For example, the endless band 6 is moved at a speed which is 20% greater than the speed at which the paper web 12 moves so that the tobacco moved into the confining passage by the endless band 6 is compacted within the confining passage until the tobacco acquires the desired mass. This operation is fully described in the co-pending application which is now United States Patent No. 2,149,924 above referred to.

The wall 16 of the confining passage comprises a bar which extends over both the continuous paper web 12 and the endless band 6, the bar being held in a fixed position but is so arranged as to be adjustable relatively to the web 12 and band 6 if desired.

The under surface of the bar 16 may if desired comprise the top wall of the confining passage and the sides of the bar are arranged to extend upwardly away from the top wall of the passage. The width of the bar 16 is such that the upstanding limbs of the U formed by the endless band 6 touch, or almost touch, the upwardly extending sides of the bar 16 as shown in Figure 4.

It will be seen, therefore, that the upstanding limbs of the endless band 6 form moving side walls in the confining passage, and that the base of the U comprises a part of the bottom wall of the confining passage.

The endless band 6 is so arranged that the U formation is maintained for as great a distance as possible within the confining passage, and as can be seen from Figures 1 and 2 the band only flattens out just prior to the band passing over the guide roller 17. By this means the tobacco conveyed by the endless band 6 is gripped thereby for as long a time as possible, and is more positively fed into the confining passage than would be the case if the sides of the band were not folded upwardly to U form. Further, by arranging that the upstanding limbs of the band 6 form part of the side walls of the confining passage, a part at least of three of the walls of the passage thereof (namely, the bottom and side walls) are arranged to move at the same speed as that at which the tobacco is moved into the passage.

Above the paper web 12 there is provided a roller 18 having a concave periphery and the roller 18 is moved in the direction indicated in Figure 1 with a peripheral speed which is equal to the linear speed of the paper web 12 so as to facilitate the forward movement of the stream of tobacco as it issues from the confining passage. The concave periphery of the roller 18 is arranged partly to shape the stream of tobacco on the surface of the paper web 12.

By reference to Figure 1 it will be observed that the top wall of the confining passage comprises a small part of the under surface of the bar 16 and a resilient element 19, which element comprises a leaf spring strip anchored to the bar 16. The flat spring strip extends in the direction of movement of the tobacco passing through the confining passage, and as can be seen from Figure 1 the strip is anchored to the bar 16 at or adjacent the inlet to the confining passage. The free end of the spring strip is disposed above the paper web 12 and a clearance 20 is provided between the upper surface of the flat strip and the under surface of the guide 16. The purpose of the spring strip 19 and the clearance 20 is to provide means whereby if there should be an excess of tobacco in the confining passage, which excess of tobacco tends to jam in the passage, the spring strip 19 will move away from the bottom wall of the confining passage, thus permitting the tobacco to be fed through the passage more easily. It will be appreciated that once the tobacco arrives at the position such that it is gripped between the roller 18 and the paper web 12 it will, unless the tobacco is extremely tightly packed, pass between the roller 18 and the paper web and thereby move out of the confining passage. As the pressure is reduced in the confining passage the spring strip 19 will assume its normal position. The thickness of the spring strip 19 is so chosen that at the normal pressure to be expected within the confining passage the strip is not flexed but assumes a position which is substantially parallel to the opposed wall of the confining passage.

In Figure 5 there is illustrated an alternative construction in which instead of the use of a spring strip 19, the top wall of the passage comprises two parts, a fixed part 21 and a movable part 22 which is disposed partly above the paper web 12 and which is pivoted so as to be movable towards and away from the paper web. The movable part 22 is normally retained in position by gravity, and, together with the fixed part 21 forms a substantially continuous top wall for the confining passage. The fixed part 21 is provided with an abutment 23 which determines the normal position of the movable part 22 relatively to the fixed part 21. It will be appreciated that should a jam occur in the confining passage shown in Figure 5, the movable part 22 will be rotated about its pivot in a direction away from the surface of the endless paper web 11 thereby relieving the pressure in the confining passage.

It will be appreciated that if desired the bar 16 may itself comprise the top wall of the confining passage in the manner described in the co-pending application which is now United States

Patent No. 2,149,924, in which case there will of course be no provision made for excess pressure within the confining passage.

It has been found that the top wall which is opposed to the endless band 6 and the paper web 12 may be substantially parallel with such surfaces or may be inclined so that it either diverges or converges slightly in the direction of movement of the tobacco. It has been found that in each of these cases an advantageous result is obtained, but that it is a question of experimenting with the particular kind of tobacco which is being used as to which particular arrangement shall be used for that kind of tobacco and to what degree, if any, the top wall shall be inclined.

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

1. In apparatus for forming a continuous tobacco filler rod, an endless conveyor band, to feed tobacco in a stream which is at substantially all points of less than the desired mass, a smooth conveyor receiving the tobacco stream from the conveyor band and continuing the feed of the stream at a less linear speed, whereby the stream is compacted to increase the mass thereof to the desired mass, and a confining passage to control the cross-sectional area of the tobacco at the point at which compacting is effected whereby a filler of rod-like form is produced at said point, said confining passage including guide elements and the endless conveyor band, said conveyor band being folded to substantially U form, the upstanding limbs of the U formed by the conveyor band forming part of the side walls of said confining passage.

2. In apparatus for forming a continuous tobacco filler rod, an endless conveyor band, to feed tobacco in a stream which is at substantially all points of less than the desired mass, a smooth conveyor receiving the tobacco stream from the conveyor band and continuing the feed of the stream at a less linear speed, whereby the stream is compacted to increase the mass thereof to the desired mass, and a confining passage to control the cross-sectional area of the tobacco at the point at which compacting is effected whereby a filler of rod-like form is produced at said point, said confining passage including guide elements, the endless conveyor band and a top wall, a part at least of which is mounted for movement towards and away from the opposed wall of the confining passage during the operation of the apparatus, said conveyor band being folded to substantially U form, the upstanding limbs of the U formed by the conveyor band forming part of the side walls of said confining passage.

3. In apparatus for forming a continuous tobacco filler rod, an endless conveyor band, to feed tobacco in a stream which is at substantially all points of less than the desired mass, a smooth conveyor receiving the tobacco stream from the conveyor band and continuing the feed of the stream at a less linear speed, whereby the stream is compacted to increase the mass thereof to the desired mass, and a confining passage to control the cross-sectional area of the tobacco at the point at which compacting is effected whereby a filler of rod-like form is produced at said point, said confining passage including guide elements, the endless conveyor band and a top guide, the surface of which comprises a top wall a part of which is pivoted so as to be movable towards and away from the opposed wall of the confining passage, the free end of the movable part being disposed above the smooth conveyor, said conveyor band being folded to substantially U form to provide moving side walls in the passage.

4. In apparatus for forming a continuous tobacco filler rod, an endless conveyor band, to feed tobacco in a stream which is at substantially all points of less than the desired mass, a smooth conveyor receiving the tobacco stream from the conveyor band and continuing the feed of the stream at a less linear speed, whereby the stream is compacted to increase the mass thereof to the desired mass, and a confining passage to control the cross-sectional area of the tobacco at the point at which compacting is effected whereby a filler of rod-like form is produced at said point, said confining passage including guide elements, the endless conveyor band and a top wall a part at least of which comprises a top guide, and a resilient element anchored adjacent the inlet to the passage and extending in the direction of movement of the tobacco passing through the confining passage, the free end of the resilient element being disposed above the smooth conveyor, said conveyor band being folded to substantially U form to provide moving walls in the passage.

5. In apparatus for forming a continuous tobacco filler rod, an endless conveyor band to feed tobacco in a stream which is substantially at all points of less than the desired mass, a smooth conveyor receiving the tobacco stream from the conveyor band and continuing the feed of the stream at a less linear speed, whereby the stream is compacted to increase the mass thereof to the desired mass, and a confining passage to control the cross-sectional area of the tobacco at the point at which compacting is effected whereby a filler of rod-like form is produced at said point, said confining passage including guide elements, the endless conveyor band and a top wall a part at least of which comprises a leaf spring anchored adjacent the inlet to the passage and extending in the direction of movement of the tobacco passing through the confining passage, the free end of the leaf spring being disposed above the smooth conveyor, said conveyor band being folded to substantially U form to provide moving walls in the passage.

6. In apparatus for forming a continuous tobacco filler rod, an endless conveyor band to feed tobacco in a stream which is at substantially all points of less than the desired mass, a smooth conveyor receiving the tobacco stream from the conveyor band and continuing the feed of the stream at a less linear speed, whereby the stream is compacted to increase the mass thereof to the desired mass, and a confining passage to control the cross-sectional area of the tobacco at the point at which compacting is effected whereby a filler of rod-like form is produced at said point, said confining passage including guide elements, the endless conveyor band and a top wall comprising a fixed part disposed above the conveyor band and a part pivoted for movement towards and away from the opposed wall of the passage, said fixed and movable parts normally forming a substantially continuous wall of the confining passage, and means to determine the normal position of the movable part relatively to the fixed part, said conveyor band being folded to substantially U form to provide movable walls in the passage.

7. In apparatus for forming a continuous tobacco filler rod, an endless conveyor band, to feed tobacco in a stream which is at substantially

all points of less than the desired mass, a smooth conveyor receiving the tobacco stream from the conveyor band and continuing the feed of the stream at a less linear speed, whereby the stream is compacted to increase the mass thereof to the desired mass, and a confining passage to control the cross-sectional area of the tobacco at the point at which compacting is effected whereby a filler of rod-like form is produced at said point, said confining passage including guide elements, the endless conveyor band and a top wall comprising a fixed part disposed above the conveyor band and a part pivoted for movement towards and away from the opposed wall of the passage, said fixed and movable parts normally forming a substantially continuous wall of the confining passage, and an abutment on the fixed part with which the movable part co-operates to determine the normal position of the movable part relatively to the fixed part, said conveyor band being folded to substantially U form to provide movable walls in the passage.

8. In apparatus for forming a continuous tobacco filler rod, a first conveyor band to feed tobacco in a stream, a smooth conveyor receiving the tobacco stream from the first conveyor band and continuing the feed of the stream at a less linear speed, whereby the stream is compacted to increase the mass thereof to the desired mass, and a confining passage to control the cross-sectional area of the tobacco at the point at which compacting is effected whereby a filler of rod-like form is produced at said point, the first conveyor band being of substantially U form and the upstanding limbs of said U forming a part of said confining passage, a part at least of one wall of the confining passage being mounted so as to move towards and away from an opposed wall during operation of the apparatus.

FÉLIX FRÉDÉRIC RUAU.