

Sept. 19, 1961

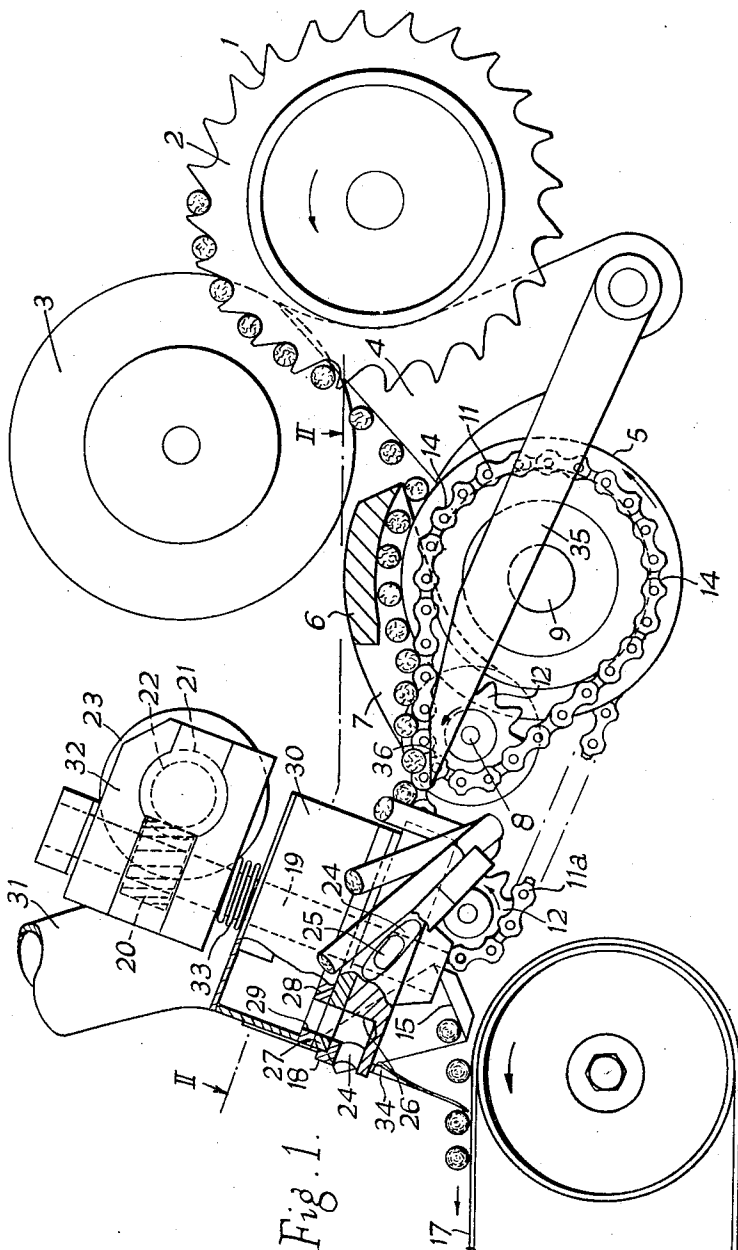
T. ROWLANDS

3,000,488

APPARATUS FOR COLLECTING OR ARRANGING CIGARETTES

Filed Aug. 25, 1958

3 Sheets-Sheet 1



INVENTOR

Tom Rowlands

BY

Watson, Cole, Grindle & Watson

ATTORNEY

Sept. 19, 1961

T. ROWLANDS

3,000,488

APPARATUS FOR COLLECTING OR ARRANGING CIGARETTES

Filed Aug. 25, 1958

3 Sheets-Sheet 2

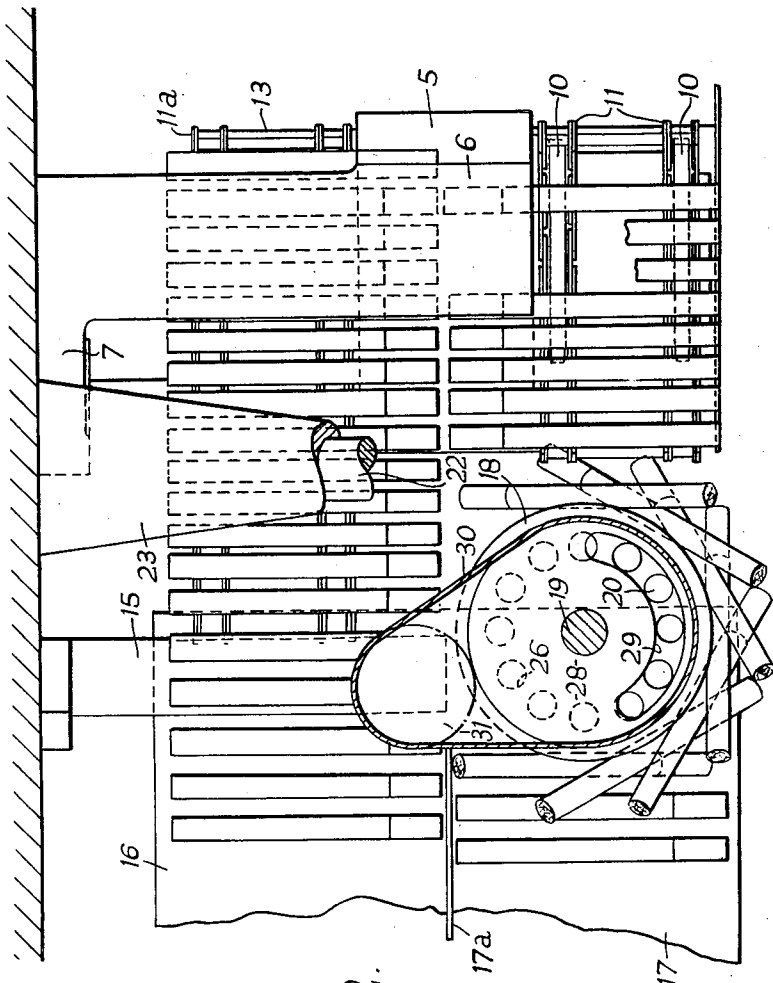


Fig. 2.

INVENTOR

Tom Rowlands

BY

Watson, Cole, Shindle & Watson

ATTORNEY

Sept. 19, 1961

T. ROWLANDS

3,000,488

APPARATUS FOR COLLECTING OR ARRANGING CIGARETTES

Filed Aug. 25, 1958

3 Sheets-Sheet 3

Fig. 3.

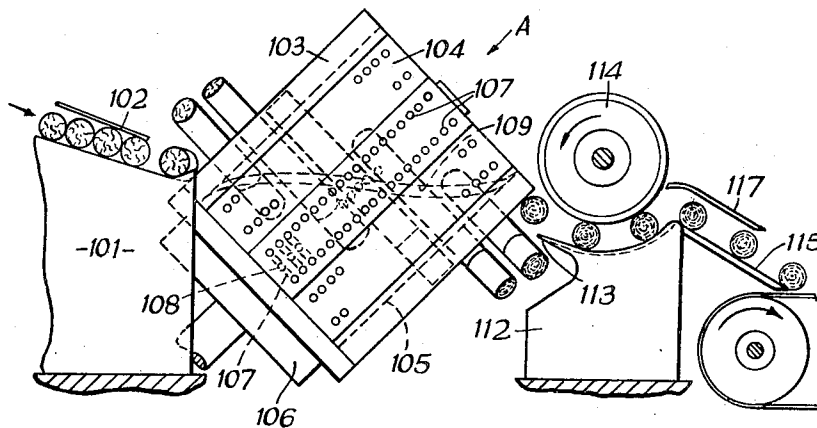
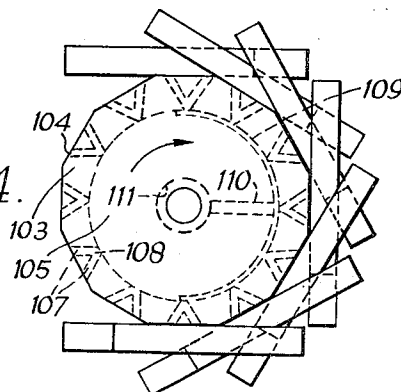


Fig. 4.



INVENTOR

Tom Rowlands

BY

Watson, Cole, Grindle & Watson

ATTORNEY

1

3,000,488

APPARATUS FOR COLLECTING OR ARRANGING CIGARETTES

Tom Rowlands, London, England, assignor to Molins
Machine Company Limited, London, England, a British
company

Filed Aug. 25, 1958, Ser. No. 757,040

Claims priority, application Great Britain Aug. 29, 1957
11 Claims. (Cl. 198—33)

This invention concerns improvements in or relating to
apparatus for collecting or arranging cigarettes.

When cigarettes are being conveyed sideways, for ex-
ample on the catcher band of a cigarette-making machine,
it is sometimes desired to reverse their orientation. For
example, when cigarettes are provided with mouthpiece
portions, such as cork tips, or such as stubs or the like,
it is usual to employ a double-length mouthpiece portion
which is cut in half in order to produce individual mouth-
piece cigarettes. The latter are then usually conveyed
sideways in two rows, and normally the mouthpiece ends
of the cigarettes in one row will all point in one direction,
while those of the cigarettes in the other row will point
in the other direction. A similar situation may arise
when plain cigarettes are provided with printing at one
end. For convenience in collection, or to facilitate in-
spection, it is often desirable in such cases to have all
the cigarettes in both rows pointing in one direction, and
one way of accomplishing this is to turn those cigarettes
which form one row, in order to reverse their orientation.

According to the present invention there is provided
apparatus for reversing cigarettes, comprising feeding
means to feed cigarettes sideways one after the other,
and a rotatable member arranged to receive cigarettes
from the said feeding means one at a time and to carry
them generally lengthwise in an arcuate path about the
axis of said member, so as to reverse their orientation,
the said transfer member being arranged to receive and
carry the said cigarettes in overlapping relationship to
each other.

The said rotatable member may be provided with suc-
tion openings which communicate with a source of suc-
tion and by which the cigarettes are held to the rotatable
member. The rotatable member may be arranged to
carry cigarettes so disposed about its periphery that each
cigarette partly overlies an adjacent cigarette, e.g. the
cigarette immediately preceding it.

The apparatus may comprise means whereby the cig-
arettes are arranged about the periphery of the rotatable
member slantwise relatively to the plane in which the
said arcuate path extends. The rotatable member may
be provided with peripheral grooves arranged slantwise
relatively to the plane in which the said arcuate path ex-
tends, each said groove communicating with a source of
suction and being adapted to receive a cigarette. Means
may be provided to tilt the cigarettes as they approach
the said rotatable member. The means to tilt cigarettes
may comprise a member arranged to support one end
portion of a cigarette while the other end portion is al-
lowed to fall.

Alternatively the apparatus may comprise means as-
sociated with the said rotatable member and arranged to
continue the sideways movement of the cigarettes while
they are being carried in said arcuate path, whereby each
successive cigarette received by said rotatable member,
by moving sideways along the latter, leaves room for the
next succeeding cigarette to be received alongside and in
overlapping relationship therewith. The rotatable mem-
ber may be a suction drum having rows of suction ports
in its peripheral surface extending lengthwise of the
drum, said ports communicating with a stationary helical
suction chamber within the drum, whereby as the drum

2

rotates suction is applied momentarily to successive ports
in each row, and cigarettes are caused to roll sideways
along said rows of ports. The said helical suction cham-
ber may extend substantially halfway around the drum,
so that suction is cut off from the ports holding a cigarette
when the latter has been carried by the drum through
substantially 180°.

In either case the apparatus may be provided in com-
bination with means for feeding two rows of cigarettes
side by side, the said apparatus being arranged to reverse
the orientation of the cigarettes in one only of said rows.

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 side elevation, partly in section,

FIGURE 2 is a plan view taken on the line II—II,
FIGURE 1,

FIGURE 3 is a side elevation of an alternative con-
struction, and

FIGURE 4 is a view in the direction of the arrow A,
FIGURE 3.

Referring first to FIGURES 1 and 2, mouthpiece
cigarette assemblages are fed sideways in flutes 1 of a
fluted carrier wheel 2. Each assemblage consists of a
pair of cigarette lengths joined by a uniting band to a
double-length mouthpiece portion or stub which lies be-
tween them. The carrier wheel 2 comprises spaced por-
tions between which a rotating disc knife 3 extends to
cut the assemblages midway along the stub portions, thus
forming individual mouthpiece cigarettes.

Plates 4 extending between the spaced parts of the wheel
3 and forming a ramp strip the mouthpiece cigarettes
from the flutes 1 and guide them downwardly. It will
be seen that the freshly cut cigarettes are at this stage
in two side-by-side rows with the mouthpiece ends of the
cigarettes in one row pointing towards those of the cig-
arettes in the other row.

Beyond the ramp 4 is a short roller 5, see also FIGURE
2, cooperating with an arcuate plate 6 arranged above it,
the plate 6 being mounted on an arm 7 which is pivoted
at 8 and can be swung upwardly to move the plate away
from the drum. The drum 5 and plate 6 receive between
them the mouthpiece ends of cigarettes received from the
ramp 4, as shown in FIGURE 2, and the roller 5 rotates
in the direction of the arrow, FIGURE 1, thereby rolling
the mouthpiece cigarettes between the roller surface and
the concave undersurface of the plate 6. This rolling
action has the effect of restoring the mouthpiece portions
to substantially circular cross-section if they have been
deformed by the knife.

The roller 5 is mounted on a shaft 9, on which are also
mounted discs 10, two on each side of the roller 5.
These discs support and guide pairs of endless chains 11,
11a, which pass around the discs and also around
sprockets 12, FIGURE 1. The chains of each pair are
connected by rods 13, FIGURE 2. The chains are re-
cessed at 14 to receive cigarettes from the roller 5 so as
to carry such cigarettes sideways.

In an alternative arrangement, not illustrated, two addi-
tional rollers of the same diameter as the roller 5 are
arranged one on either side of the latter, each being dis-
posed between two chains of a pair, and act as supports
for the ends of the cigarettes which extend outwardly
from the roller 5 and plate 6. In that case the rods 13
are omitted in order to accommodate the additional
rollers.

The pairs of chains 11a which receive the cigarettes
of the right-hand row, considered in their direction of
movement (that is, the row in the upper part of FIG-
URE 2) extend a greater distance than do those of the
other pair, as best seen in FIGURE 1. A short ramp
15 is disposed just beyond the right-hand pair of chains

3

11a to receive cigarettes from them and guide such cigarettes onto the right hand side 16 of a catcher band, FIGURE 2.

Arranged just beyond the shorter pair of conveyor chains 11 (i.e. the left-hand pair considered in the direction of movement of the cigarettes) is a rotatable transfer member which is arranged to receive cigarettes one at a time from the conveyor chains and carry them generally lengthwise in an arcuate path so as to reverse their orientation while transferring them to the left-hand side 17 of the catcher band. Two sections 16 and 17 of the catcher band are divided by a partition 17a.

This transfer member comprises a disc 18 mounted on a shaft 19 which is rotated by means of helical gears 20 and 21, the latter being carried by a shaft 22 rotatable in a sleeve 23 which extends from a side frame of the machine. The disc 18 has formed in its peripheral surface twelve equi-spaced grooves 24, two of which are shown in FIGURE 1. It will be seen that the grooves 24 are arranged slantwise relatively to the plane in which the disc 18 rotates. Each of these grooves communicates by an opening 25, with one of a series of twelve holes 26 formed in the disc 18. The upper surface of the disc 18 is recessed to receive a disc 27 which is also secured to the shaft 19 so as to rotate with the disc 18 and is provided with holes which form continuations of the holes 26.

Above the disc 27 is a fixed disc 28 provided with an arcuate slot 29 which extends a little less than 180° around the disc. This slot puts the holes 26 in communication with a suction chamber 30, which is connected by a flexible pipe 31 with a suction fan or other suitable source of suction to exhaust air from the chamber.

A housing 32 for the shaft 19 and gears 20, 21 is carried by the sleeve 23, and a compression spring 33 surrounding the shaft 19 between the housing 32 and suction chamber 30 presses the latter downwardly to ensure firm contact between the stationary disc 28 and the rotating disc 27 and thus provide an adequate air-tight connection.

A ramp 34 is located at a suitable position to guide cigarettes from the transfer device onto the catcher band 17.

An arm 35, FIGURE 1, extends alongside the chains 11 at the left-hand side, and has an incurved tip 36 which projects into the path of the end portion of a cigarette which is just about to drop from the chains. The purpose of this will be explained shortly.

The operation of the apparatus so far described is as follows.

Successive assemblages are subdivided by the knife 3 while being carried by the carrier wheel 2, and the mouthpiece cigarettes so formed are stripped from the flutes 1 by the ramps 4, and are received between the roller 5 and the plate 6 and roll between the roller and plate as described above.

As they pass from the roller 5 they are received by the chains 11.

The cigarettes in the row at the right-hand side, considered in their direction of movement, are simply carried by the chains 11a to the ramp 15, over which they roll on to the part 16 of the catcher band, FIGURE 2.

The cigarettes in the other row, however, are to be reversed before they are delivered to the part 17 of the catcher band.

The disc 18 is rotated in suitable timed relationship with the feed of the cigarettes by the chains 11, such that at the moment when a groove 24 is about to pass the oncoming cigarettes, one such cigarette drops from the chains and is immediately pulled by suction into the groove 24. This is assisted by the tip 36 of the arm 35, which as stated above extends into the path of the left-hand end of a cigarette which is falling from the chains 11, and momentarily supports it so as to tilt the falling cigarette somewhat, so that the cigarette while falling is

4

disposed slantwise at an angle which may approximately correspond to that of the groove 24.

Thus each cigarette in turn is received and suctionally held in a groove 24 and carried generally lengthwise, in an arcuate path about the axis of the rotating transfer device.

It will be seen that suction is applied through the arcuate slot 29 to openings 25 and holes 26 which are passing from the position at which cigarettes are delivered from the chains 11, to the position at which they are to be delivered to the catcher band, at which latter position the suction is cut off.

The slantwise arrangement of the cigarettes about the transfer device can be seen from both FIGURES 1 and 2. FIGURE 2 shows seven cigarettes held by the transfer device simultaneously, although it will be understood that one of these has just been received from the chains 11, while another is just on the point of falling from the device, the suction having already been cut off from it. In FIGURE 1 only a few cigarettes are shown, in order to enable the construction of the transfer device to be illustrated.

It will be appreciated that by the arrangement whereby the cigarettes are received and carried slantwise around the periphery of the rotating transfer device, it is possible to maintain a high rate of feed of the cigarettes, suitable for the high speeds of operation of modern cigarette machines, while at the same time the cigarettes can be moved reasonably slowly, owing to the fact that they are arranged in overlapping relationship and can thus be fed in much closer succession than could be the case if they were conveyed, say, end to end.

The cigarettes having been carried around in an arcuate path by the transfer device, and thus having had their orientation reversed, roll down the ramp 34 on to the catcher band, where they are disposed as shown in FIGURE 2. It will be seen that the mouthpiece ends of the cigarettes on both sections 16 and 17 of the catcher band point in the same direction.

FIGURES 3 and 4 illustrate an alternative construction, in which cigarettes while being carried generally lengthwise in an arcuate path by a rotating transfer member, at the same time roll along the transfer member, so that each successive cigarette received by the transfer member, by moving sideways along the latter leaves room for the next succeeding cigarette to be received alongside it and in overlapping relationship with it.

Cigarettes are fed sideways one after the other on to a sloping ramp formed by the edges of a pair of plates 101, one of which is shown in FIGURE 3. As they move down the ramp they are controlled by a spring blade 102 which presses lightly on the leading cigarette so as to allow only one cigarette at a time to move past it.

A rotatable drum 103 with twelve flat faces 104 formed on its outer surface is rotatably mounted on a fixed cylindrical body 105. The drum is arranged to be rotated in any suitable way; for example the rim 106 of the drum may be formed as a gear which is driven through a suitable train of gears.

The drum 103 is provided with suction ports 107 arranged in double rows, one such double row extending along the length of each flat face 104. As can best be seen in FIGURE 4, each double row consists of pairs of ports, the ports of each pair converging as they extend inwardly through the drum 103 so as to form a single opening 108 at the internal surface of the drum. Thus each double row of holes extending along a flat face 104 communicates with the interior of the drum by a single row of holes or openings 108.

The cylindrical body 105 has a helical groove 109 formed on its cylindrical surface. This groove extends half-way around the body 105 and along nearly the whole of its length. The groove 109 communicates, by way of conduits 110 and 111, to a suitable source of suction whereby a negative air pressure is established in the

5
groove 109, which thus constitutes a helical suction chamber.

As can be seen in FIGURE 3, where a few of the holes 108 are shown, rotation of the drum 103 about the cylindrical body 105 causes the holes 108 of any one row to register one after another with the groove 109. Thus as the drum 103 rotates, successive holes 108 and corresponding pairs of ports 107 are brought into and removed from communication with the suction chamber.

The drum 103 is located between the ramp formed by the plates 101 and a further ramp consisting of plates 112, FIGURE 3, each of which has a projecting part 113 which is intended to receive cigarettes from the drum 103. The plates 112 have curved upper edges to correspond with the peripheral surface of a roller 114 located above them and spaced from them a distance equal to or a little less than the diameter of a cigarette. The function of this roller is to impart a rolling motion to cigarettes resting on the curved edges of the plates 112 so as to feed them along the plates. Beyond the plates 112 is a ramp 115 which slopes downwardly to a conveyor band 116. A top guide 117 is located above the ramp 115.

The operation of the device will now be described.

The cigarettes being fed, as in the arrangement described with reference to FIGURES 1 and 2, are mouth-piece cigarettes comprising stubs or filters at their mouth-piece ends, and as in the previous case are formed by subdividing assemblages each consisting of a double-length stub arranged between two cigarette lengths and joined to the cigarette lengths by an encircling band. The arrangements for subdividing these assemblages and feeding them in two rows may be similar to those described in the case illustrated in FIGURES 1 and 2. In the alternative construction now being discussed, only one row is shown, namely the row of cigarettes which are to be reversed, and it will be understood that the cigarettes in the other row are merely fed sideways as in the case previously described. The row of cigarettes to be reversed in the present construction is the right-hand row considered in the direction of movement of the cigarettes.

The cigarettes of this row are fed in any convenient way on to the ramp formed by the plates 101, and roll down this ramp under the control of the spring blade 102. One cigarette at a time passes the blade 102 and rolls down to engage one of the flat faces 104 of the drum 103, where it is immediately held by suction acting through a pair of ports 107.

As the drum rotates, in the direction shown by the arrow, FIGURE 4, the cigarette so held is carried lengthwise in an arcuate path which is indicated in the drawing, in which the cigarettes shown can be considered as indicating successive positions of any one cigarette.

At the same time as the cigarette is thus moved endwise, the rotation of the drum causes the pair of ports 107 which first hold the cigarette, to move out of register with the helical suction chamber 109, while the next pair of ports comes into register with the suction chamber. This causes the cigarette to roll along the flat face 104 of the drum from the one pair of ports to the next, and the same process continues as the drum rotates through 180°. Thus as each cigarette is carried endwise in an arcuate path, it simultaneously travels sideways along the length of the drum. It will be seen that this sideways movement of each cigarette leaves room for a further cigarette to be accommodated on the drum after a very short interval of time, during which the first-mentioned cigarette has travelled only a short distance in its arcuate path. As a result, cigarettes are disposed in staggered or overlapping arrangement about the drum, as best shown in FIGURE 4.

By the time a cigarette has reached the opposite end of the drum to that at which it was received, it has been swung through 180° and its orientation has thus been reversed. In this position it is momentarily held by suction applied through the last pair of ports 107, and on

6
further rotation of the drum these ports pass out of register with the chamber 109 and the cigarette drops from the drum on to the projecting parts 113 of the plates 112. As can be seen in FIGURE 3, the plates 112 are cut away beneath the parts 113 so as to avoid fouling cigarettes as they approach the position from which they are to be delivered from the drum on to the parts 113.

The cigarettes roll downwardly along the plates 113 and are engaged by the roller 114, which continues their sideways rolling motion until they pass on to the ramp 115 and thence to the conveyor 116.

It will be appreciated that in the manufacture of cigarettes on modern high-speed machinery, the rate of production is high. If the machine operates at a rate of, say, 1,200 cigarettes per minute, the row of cigarettes whose orientation is to be reversed (being one of two rows) will be travelling at a rate of 600 cigarettes per minute, or ten per second. It will thus be seen that if these cigarettes are to be moved endwise in an arcuate path through 180° to reverse their orientation, this must be done at the rate of 10 cigarettes per second. If the cigarettes were conveyed end to end at this rate, this would necessitate a sudden and violent acceleration which would not only be difficult to achieve but which might, if achieved, be likely to damage the cigarettes. By means of the constructions described above with reference to FIGURES 1 and 2 and to FIGURES 3 and 4, however, it is possible to stagger the arrangement of the cigarettes so that they overlap one another, and it will be clear from FIGURES 2 and 4 that in each of the two constructions illustrated, many more cigarettes can be simultaneously accommodated on the transfer device than could be if the cigarettes were arranged end to end. Accordingly the roller 5 (FIGURES 1 and 2) or drum 103 (FIGURES 3 and 4) can be rotated much more slowly than would be necessary if the cigarettes were not staggered or overlapped in the manner described. This makes it possible to deal with the cigarettes at the required rate without having to swing them endwise too rapidly.

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

1. Apparatus for reversing cigarettes, comprising feeding means to feed cigarettes sideways one after the other, and a rotatable member having a peripheral surface and arranged to receive cigarettes from the said feeding means one at a time and to carry them on said peripheral surface generally lengthwise while swinging them about the axis of said member, so as to reverse their orientation, the said rotatable member comprising more than two cigarette holding devices on said peripheral surface angularly spaced about the axis of rotation of the said rotatable member, the said devices being spaced apart around the said peripheral surface by distances each less than the length of a cigarette to be fed so as to receive and hold cigarettes in overlapping relationship to cigarettes held by adjacent cigarette holding devices.

2. Apparatus as claimed in claim 1, wherein the said rotatable member is provided with suction openings which communicate with a source of suction and by which the cigarettes are held to the rotatable member.

3. Apparatus as claimed in claim 1, wherein the rotatable member is provided with peripheral grooves arranged slantwise relatively to the axis of rotation of said member and also relatively to a plane normal to said axis, each said groove communicating with a source of suction and being adapted to receive a cigarette.

4. Apparatus as claimed in claim 3, comprising means to tilt the cigarettes as they approach the said rotatable member.

5. Apparatus as claimed in claim 4, wherein the means to tilt cigarettes comprises a member arranged to support one end portion of a cigarette while the other end portion is allowed to fall.

6. Apparatus as claimed in claim 1, comprising means associated with the said rotatable member and arranged

7

to continue the sideways movement of the cigarettes while they are being carried in said arcuate path, whereby each successive cigarette received by said rotatable member, by moving sideways along the latter, leaves room for the next succeeding cigarette to be received alongside and in overlapping relationship therewith.

7. Apparatus as claimed in claim 6, wherein the rotatable member is a suction drum having rows of suction ports in its peripheral surface extending lengthwise of the drum, said ports communicating with a stationary helical suction chamber within the drum, whereby as the drum rotates suction is applied momentarily to successive ports in each row, and cigarettes are caused to roll sideways along said rows of ports.

8. Apparatus as claimed in claim 7, wherein the said helical suction chamber extends substantially halfway around the drum, so that suction is cut off from the ports holding a cigarette when the latter has been carried by the drum through substantially 180°.

9. Apparatus as claimed in claim 1, in combination with means for feeding two rows of cigarettes side by side, the said apparatus being arranged to reverse the orientation of the cigarettes in one only of said rows.

10. Apparatus for reversing cigarettes, comprising a rotatable suction drum having suction grooves on its peripheral surface, each said groove being inclined to the axis of rotation of the drum, means to feed cigarettes sideways toward said drum for delivery one at a time to said suction grooves, the said grooves being spaced apart by distances around said peripheral surface each less than the length of a cigarette to be reversed, whereby cigarettes

8

are held in said grooves in overlapping relationship with cigarettes in adjacent grooves, the said drum being arranged to carry the cigarettes generally lengthwise about its axis to reverse their orientation.

11. Apparatus for reversing cigarettes, comprising feeding means to feed cigarettes sideways one after the other, a suction drum rotatable about an axis transverse to the axes of cigarettes fed by said feeding means, said drum having a peripheral surface substantially parallel to its axis, cigarette holding suction grooves formed in said peripheral surface and inclined to the said axis of rotation of the drum, said grooves being arranged to hold cigarettes around part of the said peripheral surface in overlapping relationship with cigarettes in adjacent grooves, the said drum being so disposed in relation to said feeding means as to receive in said grooves successive cigarettes from the feeding means while the drum rotates, and to swing them generally lengthwise about its axis, to reverse their orientation, and means to cut off suction from said suction grooves at a position substantially in line with the direction in which the cigarettes are fed toward the drum by said feeding means, to release reversed cigarettes from the drum.

References Cited in the file of this patent

UNITED STATES PATENTS

2,919,012	Dearsley	Dec. 29, 1959
2,923,397	Parrish	Feb. 2, 1960

FOREIGN PATENTS

425,989	Great Britain	Mar. 21, 1935
---------	---------------	---------------