Jan. 1, 1952 D. W. MOLINS ET AL 2,580,940

LENGTH SORTING DEVICE

Filed Nov. 21, 1949 3 Sheets-Sheet 1

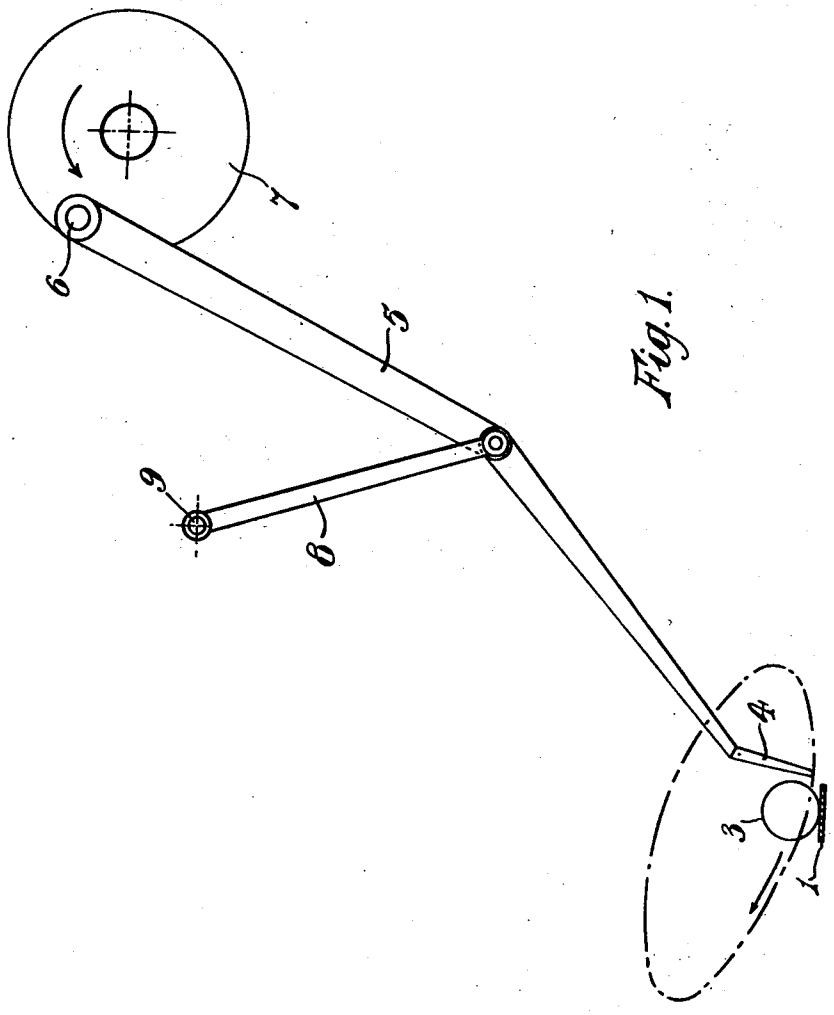


Fig. 1.

INVENTOR

D. W. Molins & F. F. Rusan

By Watson, Cole, Grindle & Watson

Jan. 1, 1952 D. W. MOLINS ET AL 2,580,940

LENGTH SORTING DEVICE

Filed Nov. 21, 1949 3 Sheets-Sheet 2

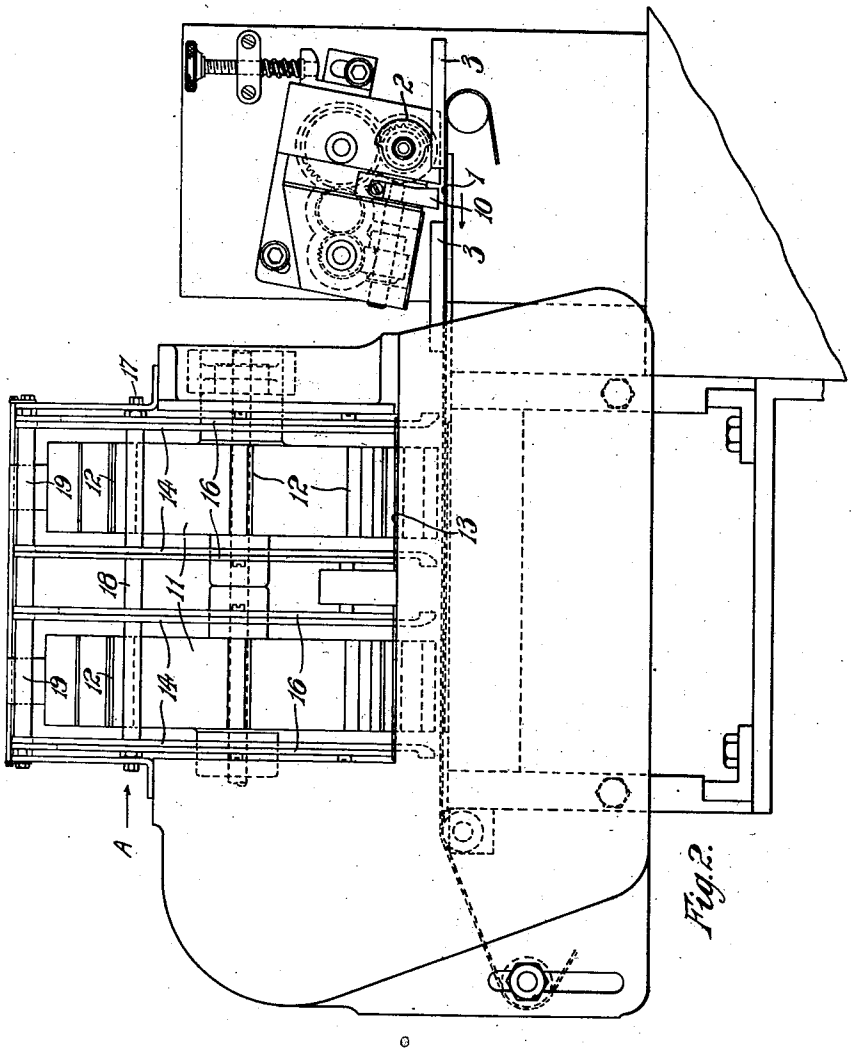


Fig. 2.

INVENTOR

D. W. Molins & F. J. Ruan

By Watson, Cole, Grindle & Watson

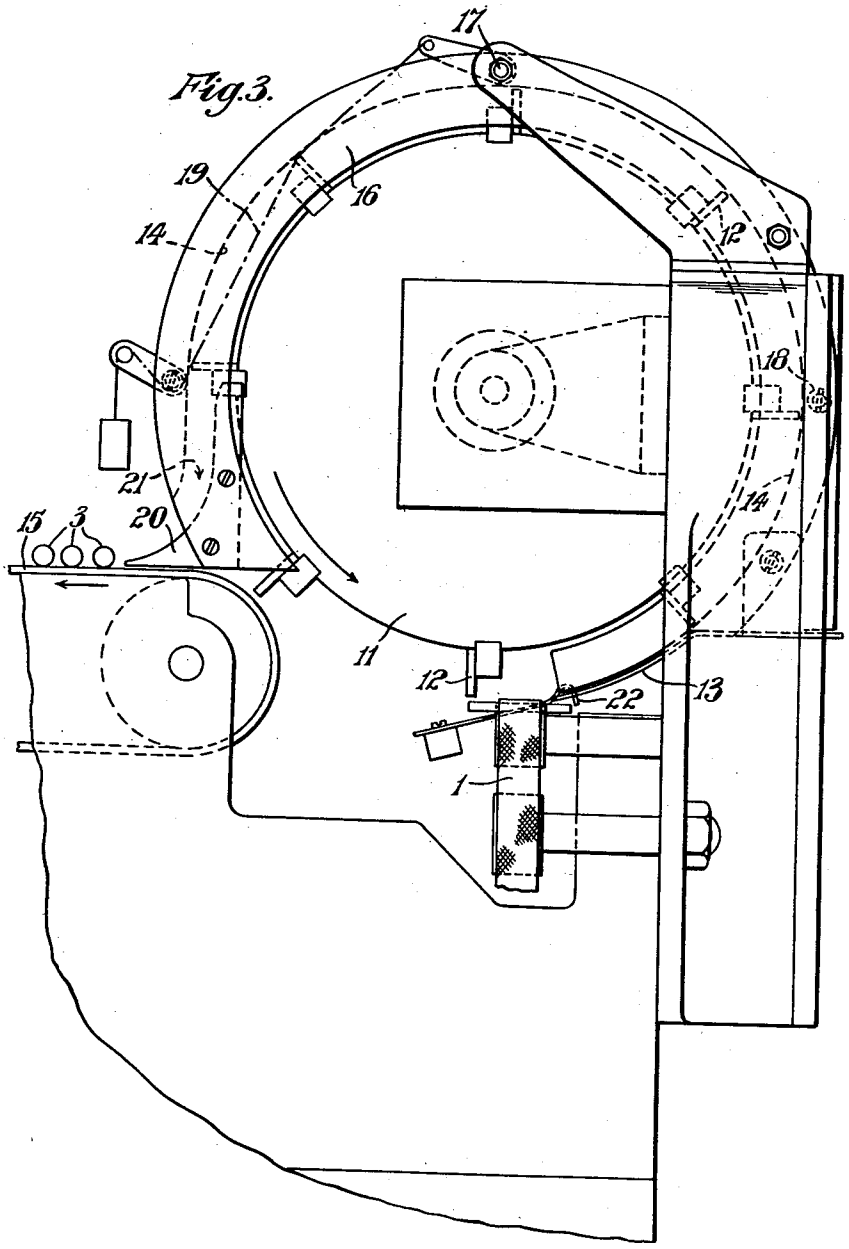
Jan. 1, 1952 D. W. MOLINS ET AL 2,580,940

LENGTH SORTING DEVICE

Filed Nov. 21, 1949

3 Sheets-Sheet 3

Fig. 3.



INVENTOR

D. W. Molins & F. J. Ruan

By Watson, Cole, Grindle & Watson

Patented Jan. 1, 1952

2,580,940

UNITED STATES PATENT OFFICE

2,580,940

LENGTH SORTING DEVICE

Desmond Walter Molins and Felix Frederic Ruau, Deptford, London, England, assignors to Molins Machine Company Limited, London, England, a British company

Application November 21, 1949, Serial No. 128,514
In Great Britain November 26, 1948

1 Claim. (Cl. 209—75)

1

This invention concerns improvements in or relating to continuous rod cigarette making machines and more particularly that part of a cigarette machine where cigarettes are cut from the continuous rod and forwarded (axially spaced) to a deflector which deflects them from the rod line and delivers them on to the catcher band.

The forwarding device, which also separates the cigarettes as explained below, often comprises an endless tape or delivery tape on to which the cigarettes move as they are cut from the rod and cooperating with the tape is a rotary wheel or sector mounted above the tape and having a groove in its rim so that a cigarette is engaged between the tape and groove of the wheel and positively forwarded by the tape at a speed exceeding the rod speed whereby successive cigarettes are axially separated. The separation is necessary so that each cigarette arrives at the deflector position sufficiently in advance of the succeeding cigarette to allow for the operation of the deflector and the amount of separation is of importance so that the cigarettes arrive at the deflector at the exact time.

When the machine is stopped for any reason and is then restarted, a few moments elapse before the rod is forming properly and moving at proper speed and therefore the rod is usually bent out of the rod line by the operator to prevent it from passing to the cut-off. As soon as the operator is satisfied with the shape, quality and speed of the rod he breaks off the bent part and the following rod moves forwards to the cut-off. It will be seen that the first piece cut from the rod will be defective as it will have a ragged leading end and it will also be too long or too short. During the day's work there will thus occur times when short, long or defective cigarettes will be produced for brief periods. The present invention provides an automatic device for ejecting such defective cigarettes or pieces of rod. Ragged pieces or long pieces should be ejected from the machine before they reach the deflector or they may cause jamming or other troubles. Short pieces should also be ejected but as the device about to be described may at times allow a short piece to pass, special provision may be made at the deflector to cause such pieces to be discarded.

According to the invention there is provided a cigarette machine of the kind referred to comprising a member movable in timed relationship with the rod and adapted to pass through the spaces between successive cigarettes whereby

2

improperly positioned cigarettes or portions of cigarette rod will be removed by said member. The member may be of such size relatively to the actual space between succeeding cigarettes and the portion of such space available due to the axial movement of the rod, as just to pass through the space between properly spaced cigarettes whereby insufficiently spaced cigarettes will be intercepted by the member and ejected from the rod line. As is well known it is necessary to traverse the knife of a cigarette cut-off so as to compensate for the time taken to pass through the rod and produce a square cut but in the present case the member need only have a simple movement transverse to the rod and therefore it is made narrower than the actual width of the space between two cigarettes the size of the member depending on rod speed and the member's speed of transverse movement, the net effect being that the plate is wide enough just to pass between successive cigarettes correctly spaced. If it is desired to give the member a movement having a component in the direction of movement of the rod the member may be wider, for example substantially equal to the normal space between successive cigarettes. Thus long cigarettes must be insufficiently spaced and will be ejected, cigarettes of proper length but wrongly spaced will be ejected while some of the short cigarettes will be insufficiently spaced and will be ejected. But it will happen at times that short pieces produced will be spaced sufficiently for the member to pass between succeeding cigarettes without intercepting a cigarette.

Further according to the invention there is provided a cigarette machine as set forth in the preceding paragraph wherein the deflector comprises a drum having deflector blades spaced around its periphery each blade being adapted to deflect a cigarette from the rod line and carry it upwards and around with the drum and delivery it to the catcher band, a guide shrouding the periphery of the drum for a short distance above the deflecting position and guides extending beyond said first guide, around the remaining periphery of the drum and spaced apart by an amount slightly exceeding the minimum permissible length of a cigarette whereby short cigarettes carried upwards by the blades will fall off the blades through the space between the spaced guides.

The member passing between successive cigarettes may be a pivotally mounted flat plate whose width is such that it will just pass through the

correct space between successive cigarettes as previously explained and it may be operated by a crank and connecting rod or other suitable mechanism so that on the forward stroke it crosses the cigarette rod line and on the return stroke it is raised and clears the cigarette passing at that moment beneath it. Alternatively the member may be a rotary device.

The invention will be more fully described with reference to the accompanying drawings in which:

Figure 1 is an elevation of one arrangement of a movable member, showing its path across the cigarette rod line.

Figure 2 is a front elevation of the left hand end of a cigarette making machine showing a different form of movable member and the cigarette deflectors of the machine.

Figure 3 is an end elevation of Figure 2 looking in the direction of the arrow A.

Referring first to Figure 2, the delivery tape 1 of the machine has a cooperating rotary sector 2 mounted above it at the end near the cut-off (not shown). As a cigarette 3 passes from the cut-off it is seized between the tape and sector and so accelerated that a space of about 30 mm. is formed between said cigarette and the following one. Just beyond the sector there is provided an ejecting device. A simple form of ejecting device is illustrated in Figure 1 and has the merit that it is very easily fitted to existing machines. It consists of a small flat plate 4 wide enough to pass through the aforesaid 30 mm. space without undue clearance and without fouling the ends of correct length cigarettes correctly spaced, the width of the plate being determined on consideration of the rod speed and the speed at which the plate passes between the cigarette. The plate is fixed to the free end of a connecting rod 5, the other end of which is attached to a crank pin 6 which is on a crank disc 7 rotated at the same speed as the sector 2, i. e. one revolution per cigarette produced. Between the crank pin and the free end of the rod, the rod is pivoted to one end of a link 8 pivoted on a fixed pin 9 and when the crank disc is rotated, the plate 4 moves through a substantially elliptical path as shown in chain lines. As the connecting rod makes a forward stroke the plate passes through the space between two cigarettes but on the return stroke, owing to the linkage, the plate swings up over the cigarette which is then passing beneath it.

Thus as long as the cigarettes are correct and correctly spaced the plate merely makes idle movements but as soon as the space narrows or gets out of position, due to long or short cigarettes or any sort of defect in operation, the plate will strike one or both cigarettes and cause ejection.

The ejecting device shown in Figure 2 is a rotary device 10 which makes one revolution for each revolution of the sector 2.

As previously explained, short cigarettes may in some cases escape ejection and pass along on the tape to the deflector position. One or more deflector drums 11 (in the present case two) are provided according to the number of rows on the catcher band of the cigarette machine. A drum is fairly large in diameter (e. g. 200 to 250 mm.), and is provided with radial blades spaced around its periphery. The drum rotates anti-clockwise when viewed from a position opposite to the direction of movement of the rod, i. e. in the direction of the arrow A, Figure 2, so that each

cigarette is deflected from the tape and passes upwards and over with the drum and is discharged at the left-hand side on to the catcher. For a short distance from the deflecting position the periphery of each drum is shrouded by a curved plate or guide 13, Figure 3, so that a cigarette is carried some distance (e. g. 60 mm.) from said position without possibility of leaving the drum. Beyond the top of the plate, guides 14 extend around each drum periphery to the point of discharge to the catcher band 15. These guides are formed by two narrow rails near the edges of the drum and the space between them is such that cigarettes of correct length or only slightly less than correct length are prevented from falling or being thrown off the drum. The rails or guides 14 are fixed to outer plates 16 of rather similar shape and all the parts are clamped by the rods and distance pieces 17 and 18 respectively. The lower ends of the plates 16 are flared and these plates also form guides by defining the space between which the cigarettes move, that is they determine the maximum length of cigarette which can be carried round by a drum.

Tapes or like flexible members 19 prevent cigarettes on the delivery side of the drums from falling away from the blades 12. At the delivery side the rails 14 have their ends curved and in co-operation with curved blocks 20 fixed to the plates 16 define channels 21 which guide cigarettes down to the catcher band. In Figure 3 there is shown at 22 a spring which co-operates in a known manner with the blades 12, to control the cigarettes as they are swept off the tape 1. Cigarettes or pieces of rod of less length fall through the space between the guide rails as soon as they have been carried above the top of the shroud and roll along the outer surface of the shroud 13 which is suitably shaped and into a waste box, not shown.

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

In a continuous rod cigarette machine, the combination with a conveyor on which cigarettes are carried lengthwise in axial alignment and with the ends of successive cigarettes in predetermined spaced relation, of a member supported for movement transversely of the path of the cigarettes so as to pass through the spaces between successive cigarettes, said member having a width measured lengthwise of the cigarettes, only slightly less than the predetermined spacing between the cigarettes, means operable in timed relation with the machine for moving said member transversely of the aligned cigarettes, whereby cigarettes improperly located on said conveyor are ejected transversely, a deflector located beyond said member in the direction of conveyor movement, said deflector comprising a drum having deflector blades spaced around its periphery, each blade being adapted to deflect a cigarette laterally from said conveyor and carry it upward and around with the drum, a guide shrouding the periphery of the drum for a short distance above the deflecting position, and arcuate guides extending peripherally of the drum beyond said first guide and spaced apart by an amount slightly exceeding the minimum permissible length of a cigarette, whereby short cigarettes carried upward by the blades will fall off the blades through the space between the spaced guides.

DESMOND WALTER MOLINS.
FELIX FREDERIC RUAU.

(References on following page)

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,885,892	Bronander	Nov. 1, 1932
1,977,239	Molins	Oct. 16, 1934
2,246,107	Ruau	June 17, 1941
2,252,937	Link	Aug. 19, 1941
2,376,556	Ruau	May 22, 1945

FOREIGN PATENTS

Number	Country	Date
473,786	Great Britain	Apr. 28, 1937