

Sept. 23, 1941.

F. F. RUAU

2,256,598

CONVEYER FOR THE FEEDING OF CIGARETTES OR OTHER ROD SHAPED ARTICLES

Filed April 17, 1940

3 Sheets-Sheet 1

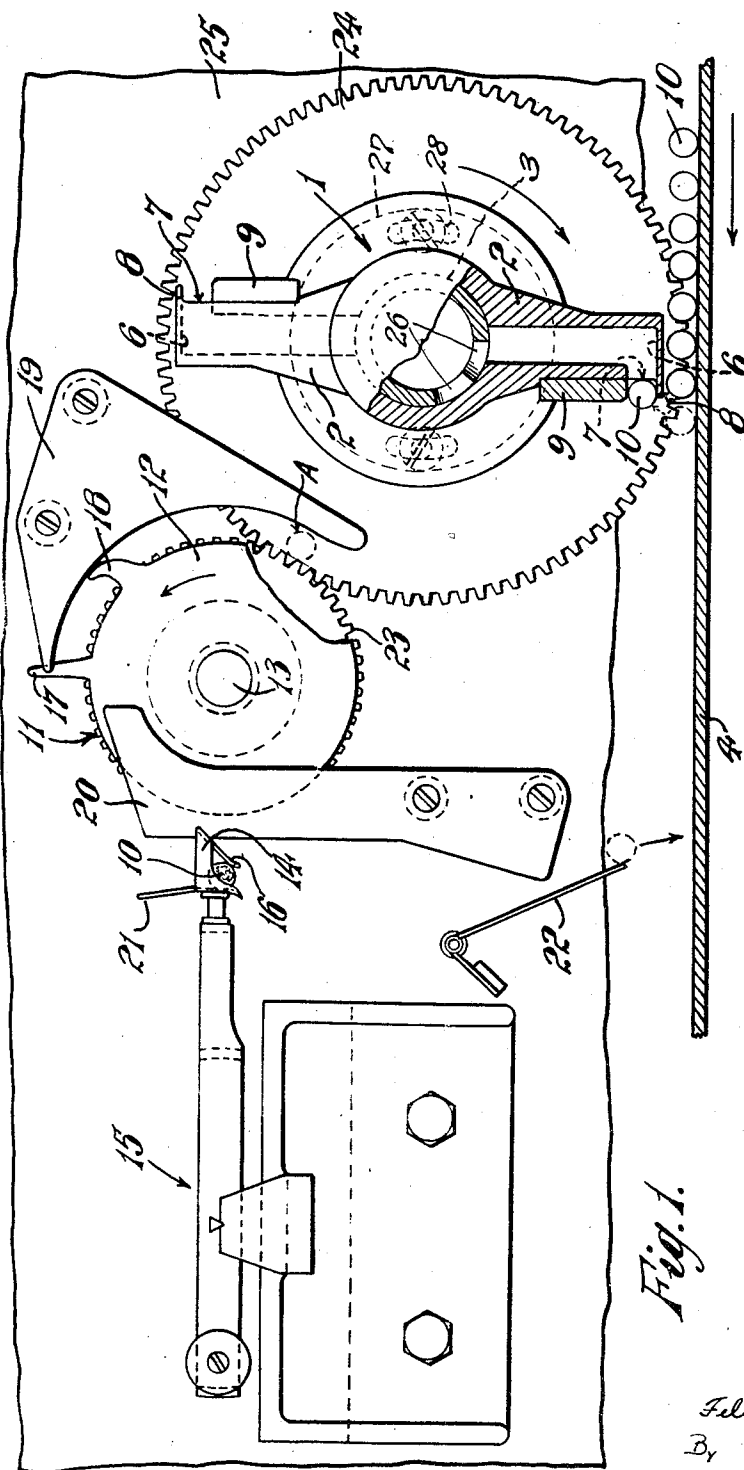


Fig. 1.

Inventor
Felix Frederic Ruau
By

Nation, Cole, Grundle & Nation ATTORNEYS

Sept. 23, 1941.

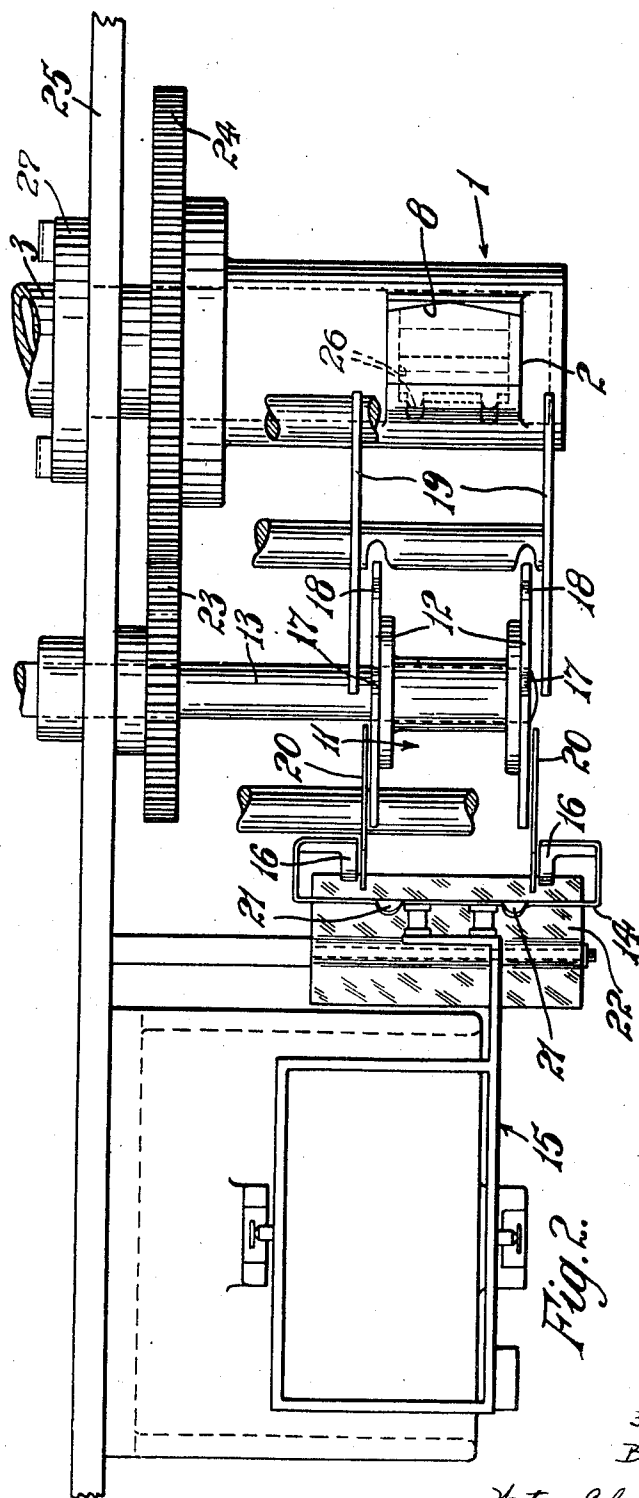
F. F. RUAU

2,256,598

CONVEYER FOR THE FEEDING OF CIGARETTES OR OTHER ROD SHAPED ARTICLES

Filed April 17, 1940

3 Sheets-Sheet 2



Inventor:
Felix Frederic Ruau
By
Horton, Cole, Grindle & Horton
ATTY.

Sept. 23, 1941.

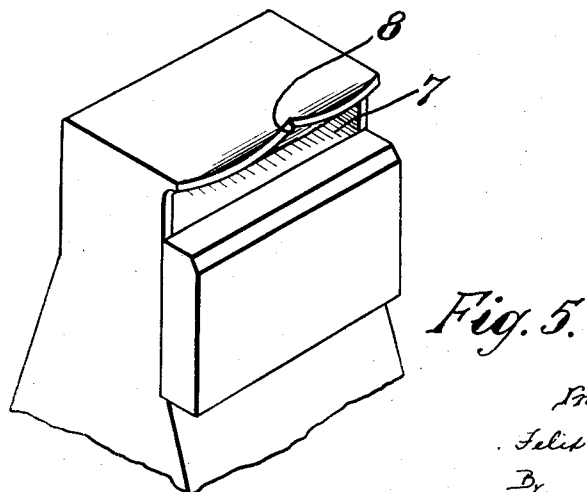
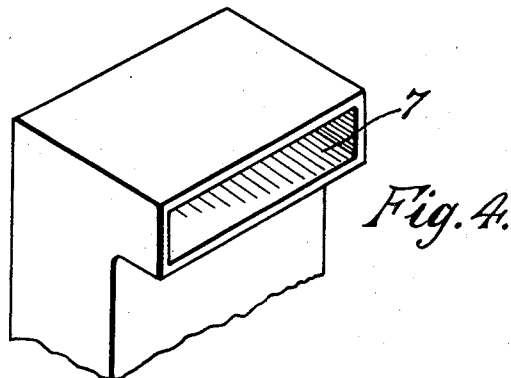
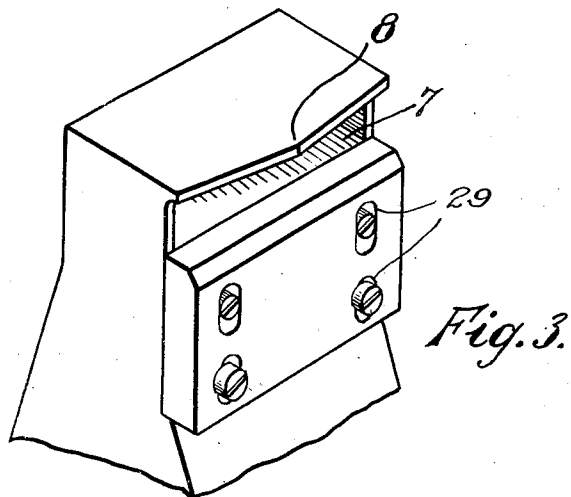
F. F. RUAU

2,256,598

CONVEYER FOR THE FEEDING OF CIGARETTES OR OTHER ROD SHAPED ARTICLES

Filed April 17, 1940

3 Sheets-Sheet 3



Inventor

Felix Frederic Ruau

By
Hatson, Cole, Grindle & Watson
ATTY.

UNITED STATES PATENT OFFICE

2,256,598

CONVEYER FOR THE FEEDING OF CIGARETTES OR OTHER ROD SHAPED ARTICLES

Félix Frédéric Ruau, Deptford, London, England,
assignor to Molins Machine Company, Limited,
London, England

Application April 17, 1940, Serial No. 330,229
In Great Britain April 26, 1939

13 Claims. (Cl. 198—25)

This invention is for improvements in or relating to conveyers for the feeding of cigarettes or other rod shaped articles, and it is an object of the invention to provide means whereby such articles may be taken from a source of supply and delivered to a position or to a receptacle for further treatment.

For example, the invention may be employed where cigarettes are to be delivered from a source of supply to weighing apparatus adapted to weigh cigarettes singly and if desired to record the weight.

In the manufacture of cigarettes by machine it is common practice to weigh a certain proportion of the produce of the machine and it is sometimes customary to select single cigarettes at intervals and weigh them individually in order to keep close control over the performance of the machine. It is therefore necessary to provide means whereby single cigarettes may be abstracted periodically from the cigarettes produced by the machine, and various devices including suction devices have been proposed for this purpose. It will be clear that the greater the proportion of the cigarettes produced which are tested, the more accurate will be the record of the machine's performance and this in turn involves rapid selection and weighing of the test cigarettes.

The cigarettes produced on a continuous rod machine are delivered on to a travelling band known as the catcher band on which they are transversely disposed, and it is convenient to remove the cigarettes to be weighed from this band so that after weighing they may be returned thereto if desired. If the removal of cigarettes from the band is effected by a rotary suction device, for example a drum, which has suction apertures on its periphery, it is sometimes found that two cigarettes will cling to a single aperture and thus the proper functioning of the weighing apparatus will be hindered.

According to one form of the present invention there is provided a suction device for removing single articles from a row lying transversely to their direction of movement, comprising a movable nozzle adapted to move above and near to the articles to abstract an article from the row, said nozzle having a suction aperture so disposed that at the moment when the article is taken up the aperture is facing substantially in the direction of movement of the article supporting surface.

According to another form of the present invention there is provided a suction device for removing single articles from a row of trans-

versely moving articles comprising a movable nozzle adapted to move above and near the articles and to pick up an article from the row, said nozzle having a suction aperture so disposed that at the moment when an article is taken up the latter is in advance of the position of the aperture and is drawn backwards into contact therewith while a partition between the aperture and the row of articles prevents neighbouring articles from being drawn into contact with the nozzle.

The nozzle may be pivoted or otherwise arranged to swing through an arc to deliver the selected cigarette to a weighing or other apparatus, but preferably the nozzle is arranged to rotate through a circle. Two or more nozzles may be arranged on a common carrier rotatably mounted on a spindle.

Further, according to the invention there is provided a device as set forth above wherein each nozzle is provided with a projection or lip at that edge which approaches nearest to the travelling row of articles, such lip forming a stop or abutment which effectually prevents a second article from being attracted into contact with the nozzle.

One way of carrying the invention into effect will be described with reference to the accompanying drawings, which show the invention arranged to remove cigarettes from the catcher band of a cigarette making machine and deliver them to a weighing apparatus:

In the drawings:

Figure 1 is a front elevation.

Figure 2 is a plan of Figure 1.

Figure 3 is a perspective view of a suction nozzle.

Figure 4 is a perspective view of a modified form of suction nozzle.

Figure 5 is a perspective view of a further modified form of suction nozzle.

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

Referring to the drawings, a carrier 1 having two opposed radially projecting arms 2 is rotatably mounted on a fixed spindle 3 arranged above and parallel to the catcher band 4 of a cigarette making machine. The axis of the spindle is transverse to the direction of movement of the band.

The spindle 3 and the carrier arms 2 are hollow and the spindle is connected to a suction pump (not shown) whereby air may be drawn through apertures in the arms. A rotary valve is provided which may, for example, comprise

ports 26 in the hollow spindle 3 which cause suction to be started and stopped in the suction apertures at any desired points during the revolution of an arm. The spindle 3 thus constitutes both a support and a valve device. Such constructions are well known and no further description is necessary. Means may be provided for adjusting the cut off point, for instance, by moving the spindle around with respect to the frame 25 so that the cut-off occurs earlier or later as desired. Such an adjustment is shown in Figure 1, where the spindle 3 is fastened to the frame by a flange 27 having slots 28.

The arms are substantially rectangular in cross-section and each arm has a wall 6 at the end remote from the spindle, which closes the end of the arm.

Thus an arm comprises parallel front and back walls and two parallel side walls at right angles to the first pair.

An aperture 7 is made in each arm in one of the side walls and near to the end of the arm so that in fact the end wall 6 constitutes one boundary of the aperture. The aperture is rectangular in shape, its depth (i. e. distance measured towards the spindle) being a little less than the diameter of a cigarette, while its length (i. e. as measured in a direction parallel to the spindle) is, say, two-thirds of the length of a cigarette, see Figure 3. An abutment 9 may be provided to regulate the area of the aperture. This abutment may be adjustable as shown in Figure 3, where it is attached to the arm 2 by screws passing through slots 29.

The apertures in the arms are spaced apart by 180° and further, the apertures are located in those side walls of the arms which are leading when the device rotates in the direction of the arrow. If desired, the apertures may comprise small rectangular tubes projecting from said side walls as shown in Figure 4. The outer edge of each aperture, in the other views, (i. e. the edge adjoining the end wall of an arm) has a small projecting lip 8 which constitutes an extension of such edge.

As viewed in a direction parallel to the plane of the aperture the lip is substantially triangular in shape, see Figure 3, with its apex in the middle of the aperture length. The apex may extend say $\frac{1}{8}$ " beyond the aperture plane and the angular sides extend from the apex to the aperture plane at points near to the side edges of the aperture. Preferably the lip is curved as shown in Figure 5 so that its apex lies farther away from the spindle than does the base of the triangular extension.

In the operation of the device the carrier is rotated so that an arm passing near to the travelling band is moving in the same direction as the band but at a lower speed.

Thus the cigarettes 10 on the band, which travels in the direction of the arrow, Figure 1, move beneath the arm and overtake the same. When a cigarette has passed a little beyond the arm and the end of the latter is at its lowest position (i. e. when the plane of the aperture is substantially normal to the band 4) such cigarette will come under the influence of the suction through the aperture and will rise and cling to the aperture. The curved lip helps to align such cigarette on the aperture so that it is firmly held. Moreover, a following cigarette cannot be effectively influenced by the suction because the lip 8 and the outer surface of the wall 6 form a partition between the aperture 7 and the row

of cigarettes thus preventing neighbouring articles from being drawn into contact with the nozzle.

It is therefore possible to use considerable suction to ensure that one cigarette is picked up while at the same time the suction cannot be effective on more than one.

After the arm has passed through say 90° from the lowest position suction may be cut off and the cigarette is then simply supported by the arm which then acts as a mechanical conveyer. At any point after the cut off takes place the cigarette may be removed from the arm, for example, by a movable fork which engages the ends of the cigarette which protrude beyond the width of the arm.

A suitable arrangement is shown in Figures 1 and 2, where a conveyer 11 consisting of a pair of discs 12 spaced apart on a common rotatable spindle 13 is used to deliver the cigarettes to a pan 14 of a weighing device 15. The pan comprises a pair of flexible prongs 16 between which the discs 12 are movable, and the parts are so arranged that a cigarette 10 carried by the discs as hereafter described may be delivered into the pan so that the back of the pan and the flexible prongs respectively contact with the periphery of the cigarette 10 as shown in Figure 1. The discs are each provided with two prongs 17 and 18 on their edges, the prongs being spaced apart on the circumference of the disc as shown, and the prong 18 is shorter than the other prong 17. The two discs are fixed on the spindle 13 with their prongs in alignment. The shorter pair of prongs 18 constitute conveying means whereby a cigarette delivered on to the edges of the discs by a suction nozzle may be retained in position thereon and moved around with the discs.

In operation the discs are rotated in timed relationship with the carrier 1 and a cigarette is fed on to the short prongs at each half revolution of said carrier.

A cigarette is transferred from a nozzle to the conveyer 11 at about the position indicated by the reference A, Figure 1. At this position the prongs 18 of the conveyer which are moving at a slightly greater speed than the nozzle overtake the latter and lift the cigarette therefrom. The suction is cut off by the aforementioned valve at or before this time. A pair of guides 19 shield the conveyer and prevent accidental displacement of a cigarette carried by the prongs.

The longer pair of prongs 17 are leading as the discs 12 rotate and consequently as they move between the prongs 16 of the scale pan they positively move any cigarette in such pan out of the bottom thereof, the prongs of the pan bending under the pressure exerted by the prongs 17 away from the back of the pan to allow this. While this movement is taking place the short pair of prongs deliver another cigarette, as described below, into the pan where it is retained for weighing by the flexible prongs 16 which move inwards again as soon as the first cigarette has passed out of the bottom of the pan.

In order to facilitate the entry of the cigarette into the pan a pair of fixed guides 20 are arranged near the delivery position. The cigarette eventually engages the guides and rolls down them or is urged to do so by the prongs 18. As the pan may be moving during this operation, further guides 21 in the form of upstanding projections on the back of the pan are provided to

control the path of the cigarette. The guides 20 continue downwards and in conjunction with a pivoted flap 22 form a passage to guide weighed and discharged cigarettes back to the catcher band 4. The conveyer 11 and carrier 1 are driven in timed relationship by a gear 23 on the spindle 13 which meshes with a gear 24 on the carrier 1. The spindle 13 is driven from the weighing apparatus, which is a mechanically operated device.

Although the invention has been described with reference to the removal of cigarettes from a travelling band, it will be clear that it is adaptable to other arrangements, for instance, the cigarettes might be conveyed on a fluted wheel as is common in the art.

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

1. A device for removing single articles from a moving row in which the articles lie transversely to their direction of movement, comprising a conveyer for a row of articles, a nozzle having a suction aperture, said nozzle being mounted for movement in a fixed path located above said conveyer and at a distance therefrom which is slightly greater than the height of a row of articles on the conveyer, and means to move the nozzle in a manner such that when an article is removed thereby from the conveyer the nozzle has a component of movement in the direction of movement of the conveyer and the suction aperture faces substantially in the direction of movement of the conveyer.

2. A device for removing single articles from a moving row in which the articles lie transversely to their direction of movement, comprising a conveyer for a row of articles, a nozzle having a suction aperture, said nozzle being mounted for movement in a fixed path located above said conveyer and at a distance therefrom which is slightly greater than the height of a row of articles on the conveyer, means to move the nozzle in a manner such that when an article is removed thereby from the conveyer the nozzle has a component of movement in the direction of movement of the conveyer and the suction aperture faces substantially in the direction of movement of the conveyer, whereby an article from a row on the conveyer is drawn backwards into contact with the nozzle, and a partition between said aperture and the conveyer to prevent neighbouring articles from being drawn into contact with the nozzle.

3. A device for removing single articles from a moving row in which the articles lie transversely to their direction of movement, comprising a conveyer for a row of articles, a nozzle having a suction aperture, said nozzle being mounted for rotation on an axis substantially normal to the direction of movement of said conveyer and at a distance therefrom such that when the nozzle is nearest the conveyer the distance between the nozzle and the conveyer is slightly greater than the height of a row of articles on the conveyer, said suction aperture being so disposed in the nozzle that when an article is removed thereby from the conveyer the aperture faces substantially in the direction of movement of the conveyer, and means to effect rotation of the nozzle.

4. A device for removing single articles from a moving row in which the articles lie transversely to their direction of movement, comprising a conveyer for a row of articles, a nozzle having a suction aperture, said nozzle being mounted

for rotation on an axis substantially normal to the direction of movement of said conveyer and at a distance therefrom such that when the nozzle is nearest the conveyer the distance between the nozzle and the conveyer is slightly greater than the height of a row of articles on the conveyer, said suction aperture being so disposed in the nozzle that when an article is removed thereby from the conveyer the aperture faces substantially in the direction of movement of the conveyer, whereby an article from a row on the conveyer is drawn backwards into contact with the nozzle, means to effect rotation of the nozzle, and a partition between said aperture and the conveyer to prevent neighbouring articles from being drawn into contact with the nozzle.

5. A device for removing single articles from a moving row in which the articles lie transversely to their direction of movement, comprising a conveyer for a row of articles, a nozzle having a suction aperture, said nozzle being mounted for movement in a fixed path located above said conveyer and at a distance therefrom which is slightly greater than the height of a row of articles on the conveyer, means to move the nozzle in a manner such that when an article is removed thereby from the conveyer the nozzle has a component of movement in the direction of movement of the conveyer and the suction aperture faces substantially in the direction of movement of the conveyer, and a projection extending from that face of the nozzle which approaches nearest to a row of articles on the conveyer, said projection forming a stop to prevent more than one article from being drawn into contact with the nozzle.

6. A device for removing single articles from a moving row in which the articles lie transversely to their direction of movement, comprising a conveyer for a row of articles, a nozzle having a suction aperture, said nozzle being mounted for rotation on an axis substantially normal to the direction of movement of said conveyer and at a distance therefrom such that when the nozzle is nearest the conveyer the distance between the nozzle and the conveyer is slightly greater than the height of a row of articles on the conveyer, said suction aperture being so disposed in the nozzle that when an article is removed thereby from the conveyer the aperture faces substantially in the direction of movement of the conveyer, means to effect rotation of the nozzle, and a projection extending from that face of the nozzle which approaches nearest to a row of articles on the conveyer, said projection forming a stop to prevent more than one article from being drawn into contact with the nozzle.

7. A device for removing single articles from a moving row in which the articles lie transversely to their direction of movement, comprising a conveyer for a row of articles, a nozzle having a suction aperture, said nozzle being mounted for movement in a fixed path located above said conveyer and at a distance therefrom which is slightly greater than the height of a row of articles on the conveyer, means to move the nozzle in a manner such that when an article is removed thereby from the conveyer the nozzle has a component of movement in the direction of movement of the conveyer and the suction aperture faces substantially in the direction of movement of the conveyer, and a movable abutment on said nozzle to regulate the area of said aperture.

8. A device for removing single articles from

a moving row in which the articles lie transversely to their direction of movement, comprising a conveyer for a row of articles, a nozzle having a suction aperture, said nozzle being mounted for movement in a fixed path located above said conveyer and at a distance therefrom which is slightly greater than the height of a row of articles on the conveyer, means to move the nozzle in a manner such that when an article is removed thereby from the conveyer the nozzle has a component of movement in the direction of movement of the conveyer and the suction aperture faces substantially in the direction of movement of the conveyer, a projection extending from that face of the nozzle which approaches nearest to a row of articles on the conveyer, said projection forming a stop to prevent more than one article from being drawn into contact with the nozzle, and a movable abutment on said nozzle at a position between said projection and the axis of rotation of the nozzle to regulate the area of said aperture.

9. A device for removing single articles from a moving row in which the articles lie transversely to their direction of movement, comprising a conveyer for a row of articles, a nozzle having a suction aperture, said nozzle being mounted for movement in a fixed path located above said conveyer and at a distance therefrom which is slightly greater than the height of a row of articles on the conveyer, means to move the nozzle in a manner such that when an article is removed thereby from the conveyer the nozzle has a component of movement in the direction of movement of the conveyer and the suction aperture faces substantially in the direction of movement of the conveyer, means to cut off suction from said nozzle, and a transfer conveyer to remove an article from the nozzle.

10. A device for removing single articles from a moving row in which the articles lie transversely to their direction of movement, comprising a conveyer for a row of articles, a nozzle having a suction aperture, said nozzle being mounted for movement in a fixed path located above said conveyer and at a distance therefrom which is slightly greater than the height of a row of articles on the conveyer, means to move the nozzle in a manner such that when an article is removed thereby from the conveyer the nozzle has a component of movement in the direction of movement of the conveyer and the suction aperture faces substantially in the direction of movement of the conveyer whereby an article from a row on the conveyer is drawn backwards into contact with the nozzle, a partition between said aperture and the conveyer to prevent neighbouring articles from being drawn into contact with the nozzle, means to cut off suction from said nozzle, and a transfer conveyer to remove an article from the nozzle.

11. A device for removing single articles from a moving row in which the articles lie transversely to their direction of movement, comprising a conveyer for a row of articles, a nozzle having a suction aperture, said nozzle being

mounted for rotation on an axis substantially normal to the direction of movement of said conveyer and at a distance therefrom such that when the nozzle is nearest the conveyer the distance between the nozzle and the conveyer is slightly greater than the height of a row of articles on the conveyer, said suction aperture being so disposed in the nozzle that when an article is removed thereby from the conveyer the aperture faces substantially in the direction of movement of the conveyer, means to effect rotation of the nozzle, means to cut off suction from said nozzle, and a transfer conveyer to remove an article from the nozzle.

12. A device for removing single articles from a moving row in which the articles lie transversely to their direction of movement, comprising a conveyer for a row of articles, a nozzle having a suction aperture, said nozzle being mounted for rotation on an axis substantially normal to the direction of movement of said conveyer and at a distance therefrom such that when the nozzle is nearest the conveyer the distance between the nozzle and the conveyer is slightly greater than the height of a row of articles on the conveyer, said suction aperture being so disposed in the nozzle that when an article is removed thereby from the conveyer the aperture faces substantially in the direction of movement of the conveyer, means to effect rotation of the nozzle, a projection extending from that face of the nozzle which approaches nearest to a row of articles on the conveyer, said projection forming a stop to prevent more than one article from being drawn into contact with the nozzle, means to cut off suction from said nozzle, and a transfer conveyer to remove an article from the nozzle.

13. A device for removing single articles from a moving row in which the articles lie transversely to their direction of movement, comprising a conveyer for a row of articles, a nozzle having a suction aperture, said nozzle being mounted for movement in a fixed path located above said conveyer and at a distance therefrom which is slightly greater than the height of a row of articles on the conveyer, means to move the nozzle in a manner such that when an article is removed thereby from the conveyer the nozzle has a component of movement in the direction of movement of the conveyer and the suction aperture faces substantially in the direction of movement of the conveyer, a projection extending from that face of the nozzle which approaches nearest to a row of articles on the conveyer, said projection forming a stop to prevent more than one article from being drawn into contact with the nozzle, a movable abutment on said nozzle at a position between said projection and the axis of rotation of the nozzle to regulate the area of said aperture, means to cut off suction from said nozzle, and a transfer conveyer to remove an article from the nozzle.

FÉLIX FRÉDÉRIC RUAU.