May 24, 1938. G. W. GWINN ET AL 2,118,508

CIGARETTE CATCHER

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FIG. 1

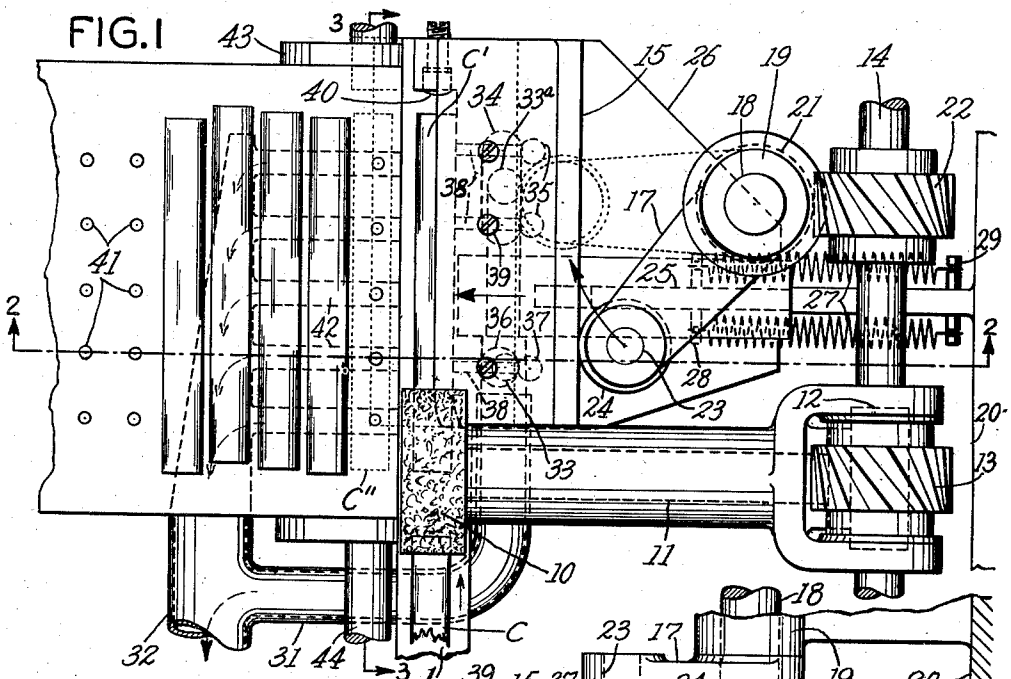

FIG. 2

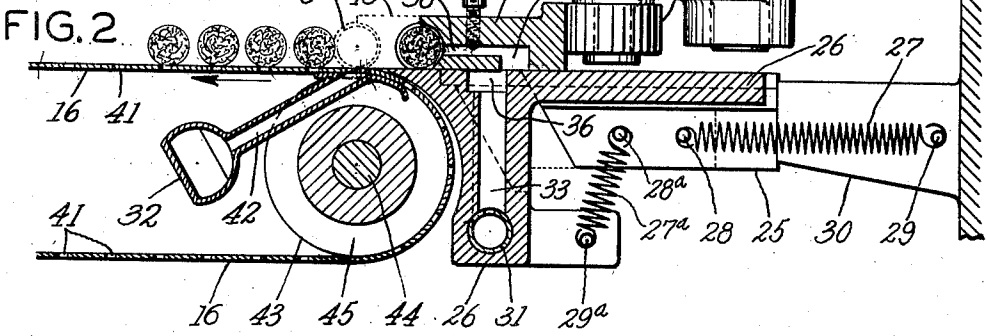

FIG. 3

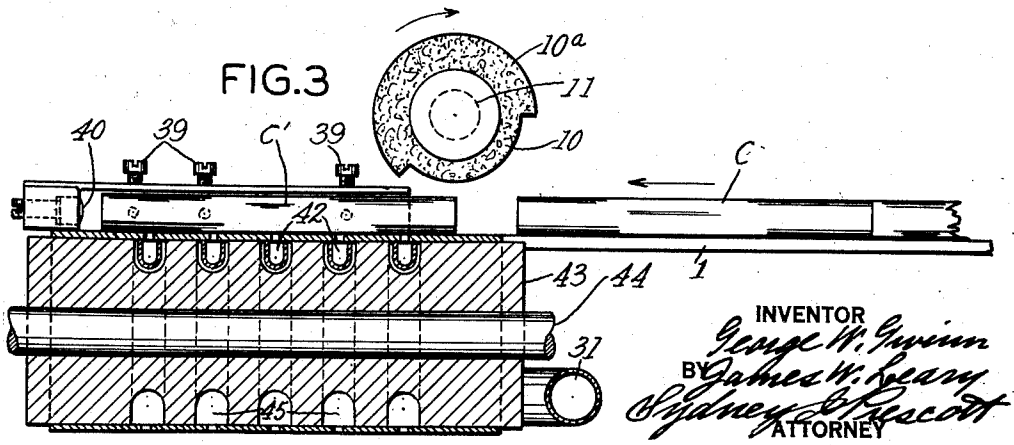

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FIG. 4

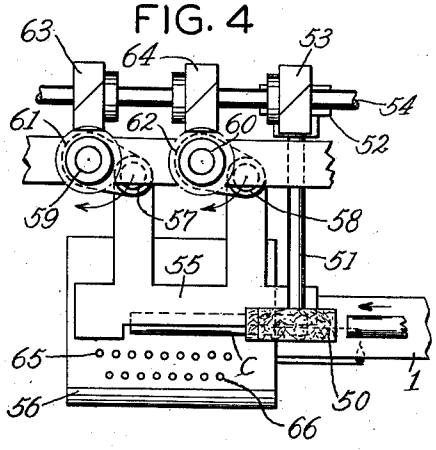


FIG. 7

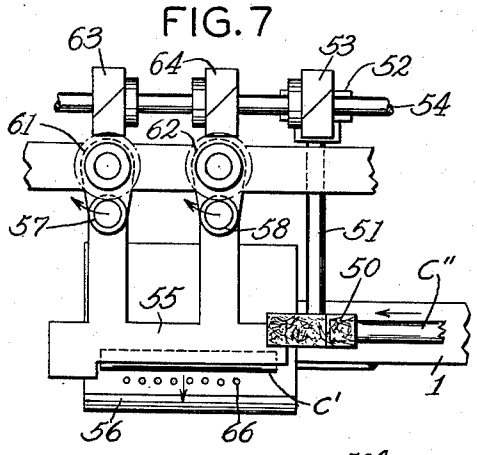


FIG. 5

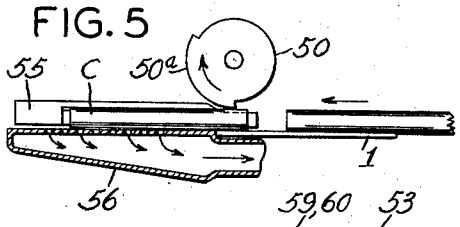


FIG. 8

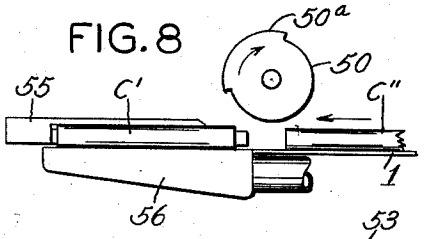


FIG. 6

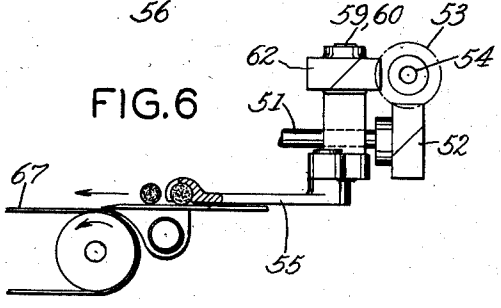
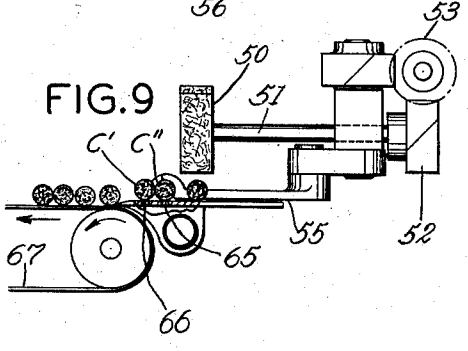


FIG. 9



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UNITED STATES PATENT OFFICE

2,118,508

CIGARETTE CATCHER

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Application February 15, 1935, Serial No. 6,734

11 Claims. (Cl. 198—24)

This invention relates to an improvement in cigarette machine catchers or collectors of the type intended to receive the cigarettes as they issue, in a single file, from the cigarette machine cutoff and to deliver them in side-by-side row formation.

The main object of the invention is to suctionally retard and, if desired, stop the longitudinal movement of the cigarettes as they issue from the cigarette machine cutoff while pushing them sidewise on to the collecting belt.

To this end in the present invention, each cigarette, after having been cut from the cigarette rod, is pushed under a rotating roller formed of or covered with rubber or similar material and provided with a raised segment which engages the cigarette and speeds it up, thus separating it from the following cigarettes. Just as the raised segment of the roller is about to release the cigarette, a pusher contacts with the side of the cigarette and pushes it out of the line of the cigarette rod and delivers it to a belt conveyor constituting the collecting belt.

The pusher may be provided with suction ports terminating in its front face, and when the said face contacts with the side of the cigarette it acts to retard the same and thus reduce the momentum imparted to the cigarette by the speed-up roller and, if desired, stop its longitudinal motion. As the pusher continues its advance, it delivers the cigarette on to the continuously moving collecting belt. The collecting belt is provided with a plurality of spaced rows of suction holes which successively register with the branches of a conduit connected to the source of suction, at the time a cigarette is being deposited thereon by the pusher. Thereupon the suction applied to the suction ports of said pusher is shut off and the cigarette is suctionally retained on the collecting belt while the pusher retreats into position to advance the next cigarette, and the cigarette is carried away on the collecting belt. In so doing, the next row of suction holes in the belt is brought into register with the branches of the suction conduit to receive the next cigarette from the pusher. A further object of the invention, therefore, is to suctionally retain the cigarette on the collecting belt while the pusher is retreating, in order to prevent clinging of the cigarette to the retreating pusher.

A modified form of cigarette catcher is provided in which the cigarette, after having been cut from the cigarette rod, is pushed under a rotating roller, similarly formed of or covered with soft friction material and provided with a raised segment, which accelerates the cigarette and separates it from the cigarette rod. When the raised segment of the latter roller is about to terminate its engagement with the cigarette, a pusher traveling in an orbital path contacts with the side of the cigarette and pushes it out of line of the cigarette rod and advances it across a set of rows of suction holes provided in the top of a stationary suction chamber.

As the front face of the pusher contacts with the side of the cigarette it acts to frictionally retard the same slightly and thus slightly reduce the momentum imparted to the cigarette by the speed-up roller, and, as the pusher arm continues its orbital motion and delivers the cigarette over the first row of holes provided in the stationary suction chamber, the suction in the latter gradually stops the longitudinal motion of the moving cigarette. The pusher then retreats and advances the next cigarette across the suction chamber in the same manner. In advancing, the second cigarette pushes the previously delivered cigarette ahead to a second row of suction holes which arrests the same. The next advance of the pusher deposits another cigarette on the first row of holes, and, in so doing, the leading cigarette is pushed on to a collecting belt. In being stopped on the second row of suction holes, the cigarettes are kept from being misaligned before reaching the collecting belt.

Accordingly, still another object of the invention is to suctionally retard and stop the cigarettes before they reach the collecting belt, without misaligning them. With these and other objects not specifically mentioned in view, the invention consists in certain constructions and combinations hereinafter fully described and then specifically set forth in the claims hereunto appended.

In the accompanying drawings which form a part of this specification and in which like characters of reference indicate the same or like parts:

Fig. 1 is a plan view of the preferred form of cigarette collector;

Fig. 2 is a sectional side elevation taken on line 2—2 of Fig. 1;

Fig. 3 is a sectional end elevation taken on line 3—3 of Fig. 1;

Fig. 4 is a schematic plan view of a modified form of cigarette collector, showing the cigarette being propelled by the speed-up roller;

Fig. 5 is a side elevation of the same;

Fig. 6 is an end elevation thereof;

Fig. 7 is a schematic plan view of the modified

cigarette collector, showing the cigarette being advanced by the pusher;

Fig. 8 is a side elevation of the same; and

Fig. 9 is an end elevation thereof.

In carrying the invention into effect there is provided means for accelerating cigarettes delivered from a cigarette machine cutoff in end-to-end relation and thereby separating them lengthwise, a traveling collecting belt arranged transversely of the line of cigarettes delivered from the cigarette machine cutoff, mechanism for pushing the separated cigarettes sidewise on to the belt, and suction means operating to stop the longitudinal movement of the cigarettes while they are advanced sidewise. In the best constructions contemplated the suction means may include a suction chamber having a perforated top on to which the cigarettes are propelled by the accelerating means. The cigarette pushing mechanism may include a slidable pusher provided with suction ports terminating in its operating face, springs normally holding said pusher in retracted position, a rotating crank arranged to periodically engage and advance the pusher to push a separated cigarette sidewise, and stationary vacuum chambers registering with the port holes of the suction ports, whereby the longitudinal movement of the cigarette will be suctionally retarded while it is advanced sidewise by the pusher; or the cigarette advancing mechanism may include a pusher and means for moving said pusher to push the separated cigarettes across the top of the suction chamber, whereby the longitudinal movement of the separated cigarettes will be retarded and stopped.

These various means and parts may be widely varied in construction within the scope of the claims for the particular devices selected to illustrate the invention are but two of many possible concrete embodiments of the same. The invention, therefore, is not to be restricted to the specific constructions shown and described.

As the invention is applicable to any cigarette machine of the continuous rod type, a description of the latter is deemed unnecessary. The following description will be confined to an illustration of how the cigarettes, after they have been cut off from the cigarette rod, are picked up and passed through the cigarette catcher in such a manner as to be lined up in side-by-side formation on the collecting belt.

Referring now to Figs. 1, 2, and 3, the cigarette C, after having been cut off from the cigarette rod and pushed along by it over a stationary table or plate 1, passes under a speed-up roller 10. The latter may be formed of sponge rubber or other suitable material mounted on one end of shaft 11, on the other end of which is a helical gear 12 meshing with and driven by a helical gear 13 on a shaft 14 suitably driven from the main shaft of the cigarette machine. At a predetermined point the cigarette will be engaged by the raised segment 10*a* of the roller 10 and its speed increased, thus separating it from the rod, as the peripheral speed of the raised segment 10*a* of roller 10 is greater than the linear speed of the cigarette rod. The rotation of the roller 10 is so timed that its segment 10*a* will initially engage the cigarette behind its leading end and disengage the cigarette in advance of its trailing end to prevent crushing the cigarette ends.

At the instant the segment 10*a* of roller 10 releases the cigarette the pusher 15 engages the cigarette and pushes it sidewise out of the line of the rod and on to a collecting belt 16.

A reciprocating motion may be imparted to the pusher 15 by means of a crank 17 fastened to a vertical shaft 18 journaled in a bearing 19 of a bracket 20. The shaft 18 carries a helical gear 21 which meshes with a helical gear 22 mounted on shaft 14. A stud 23 on the arm 17 supports a roller 24, said roller during a portion of each rotation of arm 17 engaging with and advancing the pusher 15.

The pusher 15 is equipped with a rib 25 which is guided in a slot provided in a bracket 26 having spaced communicating vacuum or suction chambers hereinafter described. Springs 27, spanned between spring posts 28 and 29, normally hold the rib 25 of the pusher 15 against a stop lug 30 of the bracket 20. In this position the pusher is ready to engage and advance the cigarette, and the spring 27*a* spanned across posts 28*a* and 29*a* holds the pusher down in engagement with the slot in the bracket 26.

A suitable source of suction, such as an exhaust fan or vacuum pump (not shown), is connected with the vacuum chambers of the bracket 26 through a pipe 31 which branches from a main pipe 32. The pipe 31 is in open communication with the suction chamber 33 of the bracket and with the chamber 33*a* which is provided at its top with an elongated vent or slot 34 which normally registers with the port holes 35 of two suction ports 38 in the pusher 15. At its top the chamber 33 is provided with an enlarged vent 36 which registers with a port hole 37 of a third suction port 38 in the pusher 15. These ports 38 extend from the front or operating face of the pusher to their port holes 35 and 37, and in this manner the suction is maintained at the front face of the pusher, thus gradually retarding and, if desired, stopping the longitudinal movement of the cigarette after it has left the speed-up roller 10. By this means each cigarette may be stopped at practically the same predetermined position. The suction ports 38 are equipped with needle valves 39 which permit regulating the degree of suction in the individual ports. In case of overtravel the cigarette will stop against an abutment 40 adjustably mounted on the pusher.

The cigarette C (Fig. 3), after having been severed from the cigarette rod, is advanced by the rod until it passes under and is contacted by the raised segment 10*a* of the speed-up roller 10 which thereupon separates the same from the rod. As the cigarette advances to position C' it moves along the front face of the pusher, the suction applied to said face gradually retarding or, if desired, halting the longitudinal movement of the cigarette. At this time the roller 24 on crank 17 engages and advances the pusher to a dotted position 15'; and the cigarette C' is thereby advanced to a dotted position C'' on the collecting belt 16. While the pusher is advancing to this position the suction is cut off as the port holes 35 and 37 of the ports 38 move out of register with the suction chambers 33 and 33*a*. The collecting belt is provided with a plurality of rows of spaced perforations 41 which successively register with the branches 42 of the pipe 32, as hereinafter described. When the cigarette reaches the C'' position it is suctionally retained on the belt 16 while the pusher retreats into position to advance the next cigarette. Since the cigarette C'' is suctionally retained on the belt 16 any possibility of the cigarette sticking to the pusher is eliminated. The suction through

the perforations in the belt also serves to retard and stop any continued longitudinal movement of the cigarettes after the pusher has advanced them into the range of action of the suction through the belt.

The cigarette is suctionally retained on the belt 16 at the position C'', by means of branches 42 of the pipe 32 which are placed in such a manner that the perforations 41 of the belt 16 pass over and register with the open ends of the branches 42. The belt 16 runs over an idler pulley 43 mounted on shaft 44 and over a pulley (not shown) which is driven from the main shaft of the cigarette machine. The pulley 43 is provided with a number of spaced annular grooves 45 which receive the ends of the branches 42 and are large enough to clear the same.

Figures 4 to 9, inclusive, illustrate schematically a modified form of cigarette collector. In this arrangement the cigarettes, as previously mentioned, enter under the speed-up roller 50 mounted on one end of a shaft 51, the other end carrying a helical gear 52 meshing with a helical gear 53 mounted on shaft 54. At a predetermined point the cigarette is contacted by the raised segment 50*a* of the roller 50 and its speed is increased, thus separating it from the rod, as the peripheral speed of the segment 50*a* is greater than the linear speed of the cigarette rod.

At the instant the segment 50*a* of roller 50 releases the cigarette the pusher 55 has swung alongside the cigarette, and as it continues its orbital path it pushes the cigarette sidewise on to a stationary suction chamber 56 which may be connected to a suitable source of suction.

The orbital motion of the pusher 55 is produced by its mounting on crank pins of the cranks 57 and 58 fixed on the lower ends of vertical shafts 59 and 60, respectively, on the upper ends of which are mounted helical gears 61 and 62 meshing with helical gears 63 and 64, respectively, on a counter-shaft 54 driven from the cigarette machine.

When the segment 50*a* is about to release the cigarette, the front face of the pusher 55 engages and pushes the cigarette sidewise over a row of holes 65 in the top of the suction chamber 56 which gradually stop the longitudinal movement of the cigarette C' as shown in Fig. 7. The cigarette C' is thus suctionally retained on the holes 65 while the pusher retreats into position to engage and advance the next cigarette, and in advancing the latter the previously delivered cigarette C' is pushed to a second row of suction holes 66 which hold the cigarette C' while the cigarette C'' is held by suction holes 65 as shown in Fig. 9. During its next advance the pusher forwards the next cigarette against the cigarettes which are suctionally retained on the chamber 56, whereby the leading cigarette will be deposited on a traveling collecting belt 67 and the following cigarette will be stopped on the suction holes 66. In stopping on the second row of suction holes 66 the cigarette is kept from being misaligned before reaching the collecting belt.

What is claimed is:

1. The combination with means for accelerating cigarettes delivered endwise from a cigarette machine cutoff and thereby spacing them lengthwise, of a traveling collecting belt arranged transversely of the line of cigarettes delivered from the cigarette machine cutoff, mechanism for pushing the spaced cigarettes sidewise on to said belt and a suction device for retarding the lengthwise motion of the cigarettes after they have been displaced by said mechanism, said device operating to stop the longitudinal motion of said cigarettes prior to their delivery to said belt.

2. The combination with means for accelerating cigarettes delivered endwise from a cigarette machine cutoff and thereby spacing them lengthwise, of a traveling collecting belt arranged transversely of the line of cigarettes delivered from the cigarette machine cutoff, mechanism for advancing the spaced cigarettes sidewise on to said belt and suctionally retarding their endwise motion while advancing them sidewise, said mechanism including a reciprocating pusher provided with suction ports terminating in its operating face and a suction chamber communicating with said ports, whereby the longitudinal motion of the cigarettes will be suctionally retarded while they are advanced sidewise during the forward stroke of said pusher, and means for suctionally retaining the cigarettes on said belt while said pusher retreats.

3. The combination with means for accelerating cigarettes delivered endwise from a cigarette machine cutoff and thereby spacing them lengthwise, of a traveling collecting belt arranged transversely of the line of cigarettes delivered from the cigarette machine cutoff, and mechanism for advancing the spaced cigarettes sidewise on to said belt and suctionally retarding their endwise motion, said mechanism including an immovable suction chamber having a perforated top, and means for advancing the spaced cigarettes sidewise on to the top of said chamber, whereby their longitudinal motion will be retarded and stopped.

4. The combination with means for accelerating cigarettes delivered endwise from a cigarette machine cutoff and thereby spacing them lengthwise, of a traveling collecting belt arranged transversely of the line of cigarettes delivered from the cigarette machine cutoff, and mechanism for advancing the spaced cigarettes sidewise on to said belt and suctionally retarding their endwise motion, said mechanism including an immovable suction chamber having a top provided with two spaced rows of perforations, and means for advancing the spaced cigarettes sidewise on to the first row of perforations, whereby the longitudinal motion of the cigarettes will be retarded and stopped on the first row of perforations, whence they will be pushed sidewise on to the second row of perforations and then on to said belt when the following cigarettes are delivered on the first row of perforations.

5. The combination with means for accelerating cigarettes delivered endwise from a cigarette machine cutoff and thereby spacing them lengthwise, of a device for pushing the spaced cigarettes sidewise, and immovable suction means operating to retard the longitudinal movement of the cigarettes.

6. The combination with means for accelerating cigarettes delivered endwise from a cigarette machine cutoff and thereby spacing them lengthwise, of a device for pushing the spaced cigarettes sidewise, and immovable suction means operating to retard the longitudinal movement of the cigarettes, said means including a suction chamber having a perforated top on to which the cigarettes are pushed sidewise by said device, whereby their longitudinal motion will be retarded and stopped.

7. The combination with means for accelerating cigarettes delivered endwise from a cigarette machine cutoff and thereby spacing them lengthwise, of mechanism for advancing the spaced

cigarettes sidewise and simultaneously retarding their endwise motion, said mechanism including a moving pusher having an operating face arranged to engage the sides of the endwise moving cigarettes and provided with suction ports terminating in said operating face, and a suction chamber communicating with said ports, whereby the longitudinal motion of the cigarettes will be retarded while they are advanced sidewise by the pusher.

8. The combination with means for accelerating cigarettes delivered endwise from a cigarette machine cutoff and thereby spacing them lengthwise, of mechanism for advancing the spaced cigarettes sidewise and simultaneously retarding their endwise motion, said mechanism including a reciprocating pusher having an operating face arranged to engage the sides of the endwise moving cigarettes and provided with suction ports terminating in said operating face and a suction chamber communicating with said ports during the initial portion of the advancing stroke of said pusher, whereby the longitudinal motion of the cigarettes will be retarded while they are advanced sidewise by said pusher, and the suction will be cut off in said ports substantially at the end of the advancing stroke of the pusher.

9. The combination with a device for pushing endwise traveling cigarettes sidewise, of immovable suction means operating to retard the longitudinal movement of the cigarettes after they have been displaced sidewise by said device.

10. The combination with a device for pushing endwise traveling cigarettes sidewise, of immovable suction means operating to retard the longitudinal movement of the cigarettes after they have been displaced, said means including a suction chamber having a perforated top on to which the cigarettes are delivered by said device.

11. In a cigarette collecting device, the combination with means for advancing a line of cigarettes endwise from a cigarette cutoff, of a suction receiving member positioned adjacent said line for receiving cigarettes displaced from said line, said member having a generally planar perforated portion extending in a substantially horizontal plane substantially coincident with the underside of cigarettes delivered from said line onto said portion and arranged to support a plurality of said cigarettes thereon, means for moving cigarettes from said line onto said portion, and means for creating suction through the perforations in said member to retard the movement of said cigarettes moved onto said portion.

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