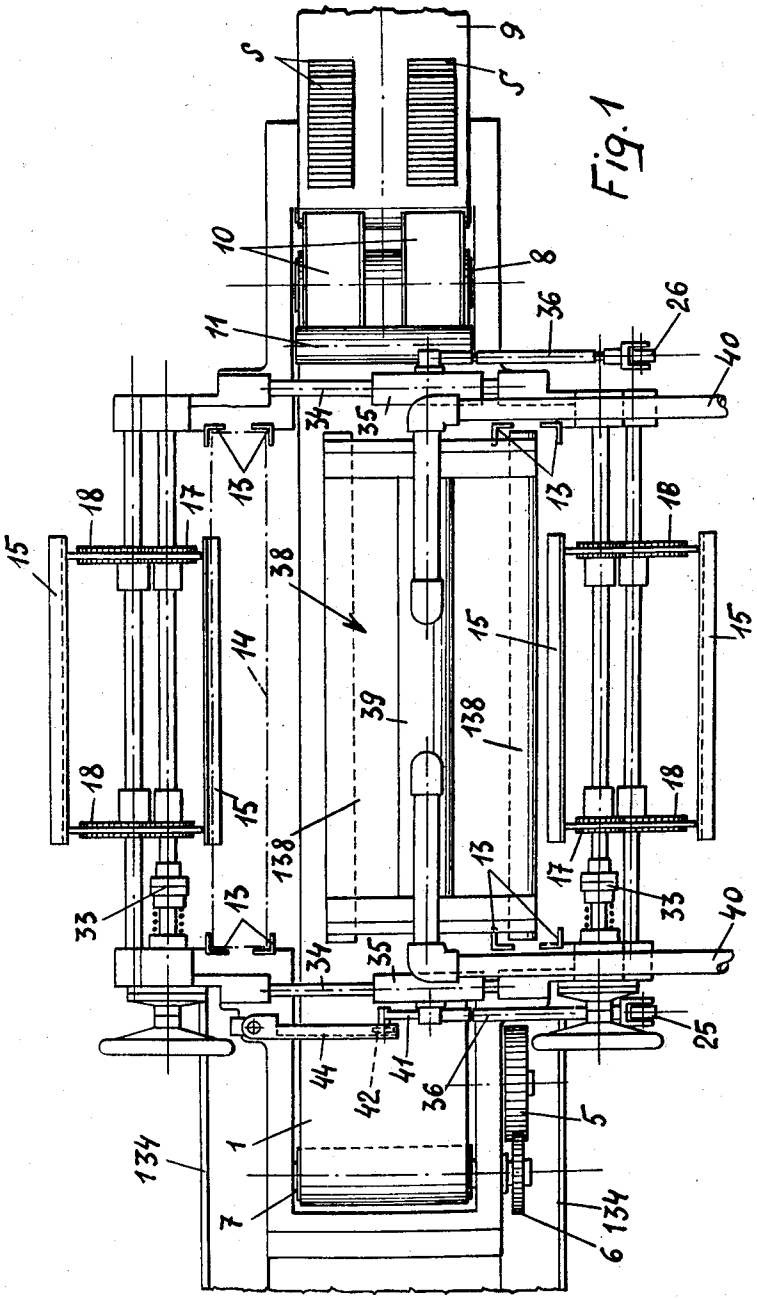
Feb. 28, 1961 S. INNOCENTI 2,972,845

DEVICE FOR PICKING UP BY SUCTION THE CIGARETTES ADVANCING IN ROWS ON CONVEYOR TAPES, FOR DISCHARGING SAME INTO BOXES, AND FOR CARRYING AWAY THE FILLED BOXES

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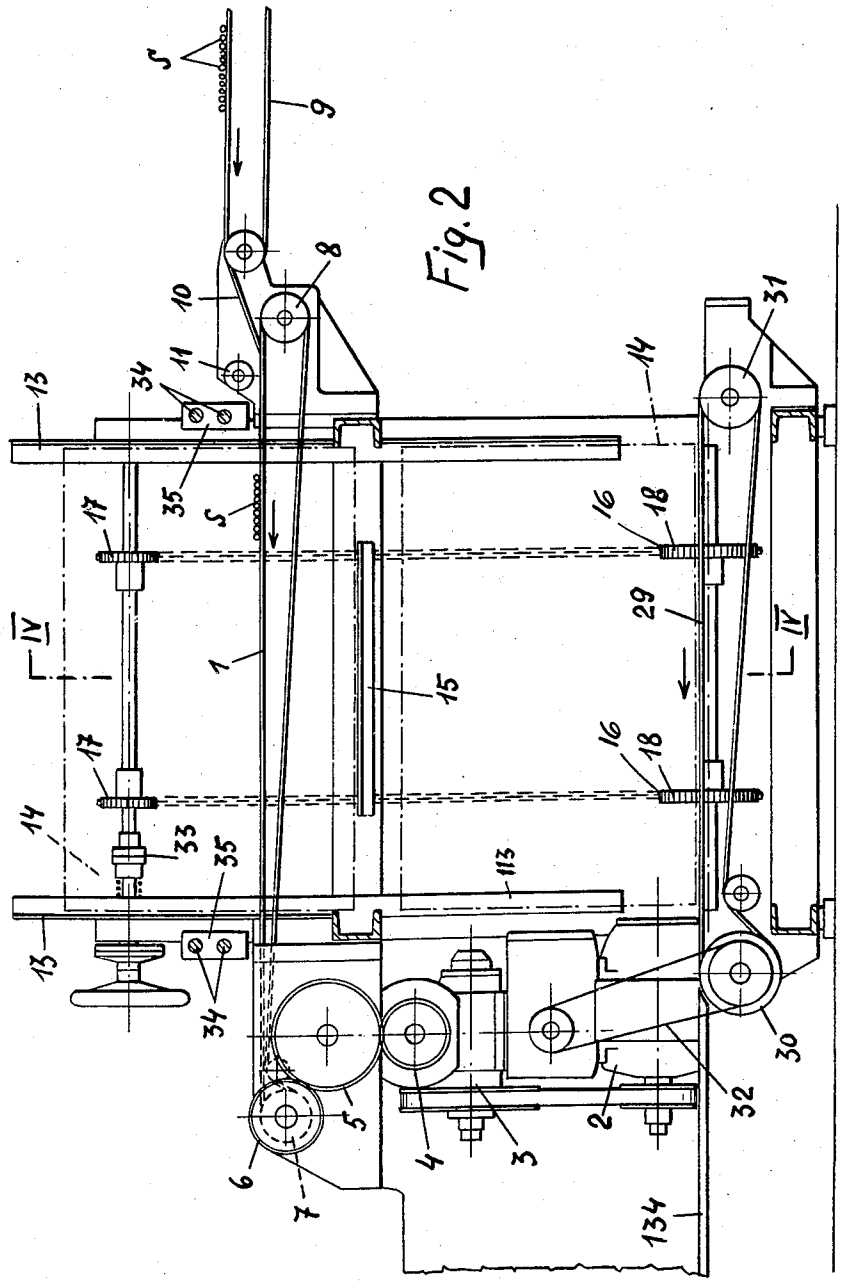


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Fig. 2

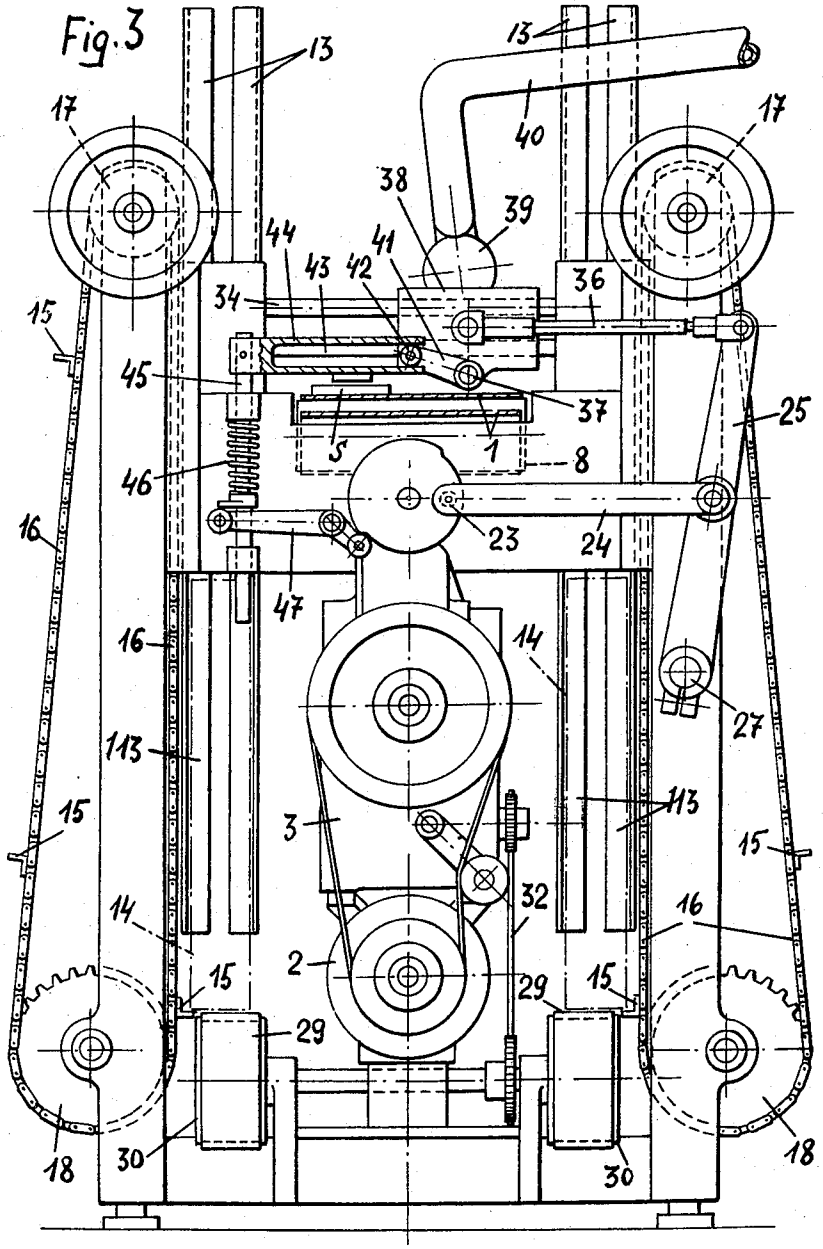


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Fig. 3

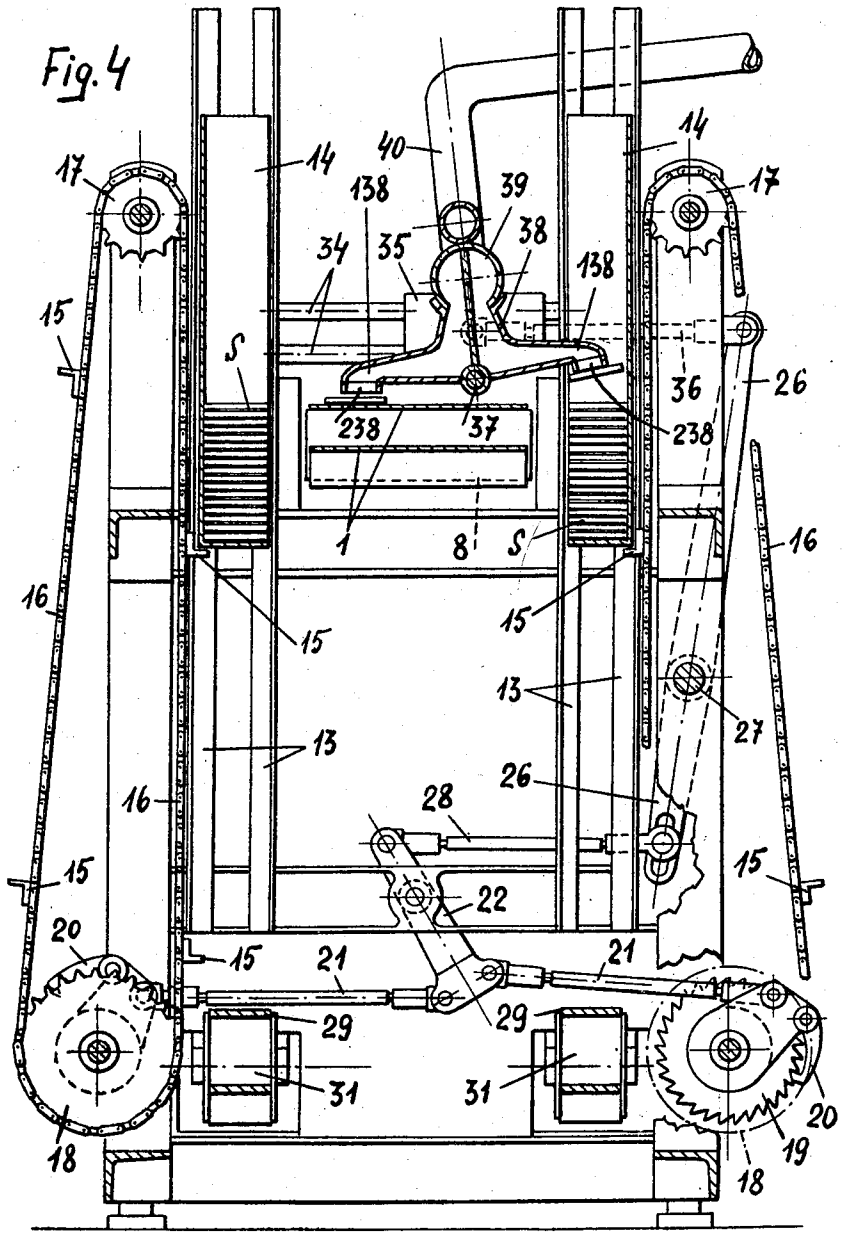


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Fig. 4



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2,972,845

DEVICE FOR PICKING UP BY SUCTION THE CIGARETTES ADVANCING IN ROWS ON CONVEYOR TAPES, FOR DISCHARGING SAME INTO BOXES, AND FOR CARRYING AWAY THE FILLED BOXES

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5 Claims. (Cl. 53—236)

This invention relates to the collecting devices annexed to cigarette-making machines and aims to provide means for picking up the cigarettes from the delivery tape of a conventional cigarette ranger annexed to cigarette-making machines and for discharging same into collecting boxes.

The main object of the invention is to provide means for picking-up by suction the cigarettes in batches from the delivery tape of a cigarette ranger and for feeding same into collecting boxes arranged at the sides of said delivery tapes.

Another object of the invention is to provide box-holding devices provided with means for stepwise shifting down said collecting boxes so as to maintain the height of the upper layer of cigarettes substantially constant during the feeding therein of the cigarettes and for automatically carrying away said cigarette boxes when filled, while at the same time the box-holding means are prepared to receive an empty cigarette-collecting box.

Other objects and advantages of the invention will appear from the following specification of a preferred embodiment thereof, which is shown as non-limiting example on the attached drawing, in which:

Fig. 1 is a plan view of a device according to the invention and of the end of the cigarette-feed tape.

Fig. 2 is a longitudinal vertical section of the same device.

Fig. 3 is a front elevation and

Fig. 4 is a section taken on line IV—IV of Fig. 2.

With reference to Figures 1 and 2, of the drawings, the cigarettes S are delivered from the delivery tape 9 of a cigarette-making machine and through a conventional cigarette ranger (not shown) and a chute 10 in a continuous row to the conveyor tape 1 of the collecting device now to be described. This device comprises said conveyor tape 1, which is supported by rollers 7 and 8, one of which (the roller 7) is driven by a motor 2 through gears 3, 4, 5 and 6.

At each side of said conveyor tape 1, four vertical guides 13 are fitted. These guides are preferably in form of angle irons at their upper part, with the concavity turned inside, as clearly shown in Figures 1 and 3, while the lower sections of the two guides on the outlet side of the device are in form of flat bars 113, with their plane directed parallel to the said tape 1. The bars are so spaced as to slidably guide between them the cigarette-collecting boxes 14 (Figures 1, 3 and 4) to be slidably retained therebetween while said flat lower bar sections 113 permit of said boxes to be slid out of the guides, in the outlet direction of the machine.

Laterally of the outer pairs of guides 13, 113 a pair of carrier chains 16 running on sprocket wheels 17 and 18 is mounted. The pairs of chains are connected between them at intervals that are slightly greater than the height of the cigarette-collecting boxes 14 (now to be described) by means of horizontal angle bars 15 or like supporting members for the said cigarette-collecting boxes 14, which, as clearly shown in Figure 4, comprise a bottom, a rear wall and two side walls whose width substantially correspond to the length of a cigarette, and are open at their top and front end. The pairs of chains 16 are driven stepwise in such a manner as to allow the respective boxes 14 to descend within the guides 13 alternately, each step being of a length which substantially corresponds to the diameter of a cigarette. For this purpose, the lower sprocket wheels 18 fitted on opposite sides of the belt 1 are driven stepwise by ratchet wheels and pawl drive 19, 20 (Figure 4) whereby the pawls 20 are connected by means of links 21 to the same end of a central balance lever 22, in such a manner that one of the wheels 19 is driven while the other wheel is stopped. A crank pin 23 (Figure 3) driven by a step-down gear 3 rocks at the same time by means of connecting rod 24 two substantially vertical parallel levers 25 and 26 keyed on the same horizontal shaft 27. The lever 26 is connected by means of link 28 to the balance lever 22 and thus drives the driving pawls 20 which drive the said ratchet wheels 19 and thus drive the two chain pairs 16. The upper sprocket wheels 17 are provided with adjustable friction brakes 33.

Under the lower ends of the vertical guides 13 of the boxes 14 horizontal conveyor belts 29 are mounted on rollers 30 and 31 driven by the motor and step-down gear 2, 3 by means of a chain or belt drive 32. Upon these belts the collecting boxes 14 are deposited when the corresponding angle bar 15 passes thereby and are carried by said belts 29 towards outlet guides 134 (Figure 2).

Above the belt 1 and at the outside of the vertical guides 13 two pairs of parallel, fixed transversal guides 34 are provided on which two slides 35 are mounted. Each slide 35 is hinged by means of a link 36 with one of the rocking levers 25, 26 (Figures 1, 3 and 4) so that both slides 35 come to be reciprocated in synchronism transversally of the belt 1. A longitudinal horizontal shaft 37 connects at their middle parts the two slides 35 and is rotatably supported thereby. On this shaft 37 a suction head 38 is fastened which is provided at its lower end with two lateral and parallel hollow longitudinal extensions 138, which are open at their lower flat surface which is turned towards the belt 1, so as to provide suction pick-up mouths 238.

The two pick-up mouths 238 which constitute the operating parts of the head 38 extend transversely to the feed direction of belt 1 by a fraction, for example one half of the length of a cigarette S and longitudinally by almost the whole width of the lateral connecting boxes 14, into which said mouths 238 may be introduced through their open top and side. The head 38 is reciprocated transversely of the belt 1 together with the slides 35 and its lower pick-up mouths 238 are spaced between them so that while one of them comes to be above one of the two parallel rows of adjoining cigarettes S carried by the tape 1, the other pick-up mouth is introduced into the collecting box 14 which lies on the corresponding belt side, as shown in Figure 4. Furthermore the head 38 is rocked on the longitudinal shaft 27 in such a manner as to lower its mouth 238 which lies on the collecting box, whereas the opposite pick-up mouth 238, which comes to be at the same moment above the belt 1, picks up by suction a section of the row of cigarettes S and then is lifted. For this purpose on one end of the rotatable shaft 37 a lever arm 41 is keyed (Figures 1 and 3) whose end, which is provided with a roller 42, engages the slot 43 of a slotted horizontal arm 44 so as to be guided without interfering with the transversal shifting of the slides 35. The slotted arm 44 is carried by a slidable vertical rod 45 urged in one direction by a spring 46 and driven in opposite direction by a cam 23 (Figure 3), through a balance lever 47. In this manner

the slotted guide arm 44 is lifted and lowered alternately and parallelly to itself in synchronism with transversal movement of the pair of slides 35, thus varying the inclination of the lever arm 41 and promoting the required rocking of shaft 37 and of the whole pick-up head 38.

The pick-up head 38 carries at its upper part a longitudinal distributing conduit 39 which is provided with two separate longitudinal chambers, each of which communicates with one of the hollow extensions 138 and with the corresponding pick-up mouth 238 as well as with an upper pipe 40. The two pipes 40 are connected alternately with a source of vacuum, for example a suction pump, by means of a suitable automatic distributing valve (of conventional type, and which therefore is not particularly shown) and in such a manner, in synchronism with the transversal movement of the said head 38, as to generate a suction through that mouth 238 of the head 38 which comes to be on the cigarettes S on the belt or tape 1 and to connect with the atmosphere the opposite mouth 238 which comes to be introduced into the collecting box 14. Therefore, at each transversal shifting in one direction of the head 38, one of the mouths 238 thereof takes up by suction all the underlying cigarettes of one of the cigarette rows on the belt and by its successive transversal shifting in a direction opposite to the adjoining side collecting box 14 carries said cigarettes in correspondence of said box and drops same therein while the opposite mouth 238 effects the same operation in phase opposition, by sucking the cigarettes from the other row on the belt 1 and by carrying same into the adjoining collecting box 14, that is opposite to the first one.

It may be mentioned that from each cigarette row on the tape or belt 1 at each pick-up operation a continuous cigarette row section is taken up, which is of a length which corresponds substantially to the width of the boxes 14 and thus these boxes are filled uniformly along their whole width with successive complete cigarette layers. After the loading of a cigarette layer in each of the boxes 14, these are lowered automatically in the described manner and for a length which corresponds to the diameter of a single cigarette thus permitting the successive loading of a complete cigarette layer. When the filled boxes 14 come to the height of the belts 29, they are engaged by said belts 29, slid out of the guide sections 113 and carried on the horizontal outlet guides 134. In the meantime two fresh boxes, inserted manually from above between the guides 13, are filled with cigarettes, as described, and come to be with their bottoms substantialy at level with the belt 1.

Of course the invention is not limited to the above described and shown embodiment, but may be amply varied and modified, principally as regards the constructive embodiment of the different operating parts and/or of the control part, without departing from the spirit of the invention as set out and as will be claimed hereinafter.

Thus for instance the principle of the invention may be extended without further modification to cigarette-making machines which deliver the cigarettes in a single continuous row, whereby in this construction the pick-up head is provided with a single suction mouth. Furthermore, said pick-up head, as well as the distributing members which connect same alternately to a source of vacuum may be constructed in any conventional manner, even different from that which has been just described and particularly by incorporating the automatic distributing device in the said pick-up head and causing same to be controlled by its same transversal and/or rocking movements.

I claim:

1. In an automatic device for collecting cigarettes from a cigarette-conveyor tape, on which the cigarettes are fed in at least one continuous row, and for feeding the collected cigarettes in a plurality of layers into a

cigarette-collecting box advanced at one side of said tape, spaced upright guides, comprising outer guides, and inner guides, at least at said one side of said cigarette conveyor-tape arranged in such a manner as to permit a rectangular cigarette-collecting box to be slidably inserted therein, sprocket pairs arranged at the outer side of said guides, one of said sprockets being driven stepwise; endless chains mounted on each pair of said sprockets and having their inner run running substantially parallel in the space between said outer guides; horizontal bars having bracket-like portions connecting said chain pairs at intervals and measuring not less than a cigarette box height, said bracket-like portions projecting between said guides in such manner that the box may be supported thereon when inserted between said guides; the lower end of said guides being so shaped as to permit the boxes to be slid thereout in a horizontal direction towards the outlet end of the device; a substantially horizontal endless belt mounted on rollers under said guides, and means for driving the upper run of said conveyor belt towards the outlet end of the collecting device, the whole being so arranged that, as soon as said cigarette-collecting box in its stepwise downward movement comes into contact with said conveyor belt it is shifted out of said guides towards the outlet end of the device.

2. In an automatic device for collecting cigarettes from a cigarette-conveyor tape on which the cigarettes are fed in at least one continuous row, and for feeding the collected cigarettes in a plurality of layers into a cigarette-collecting box arranged at one side of the tape, a cigarette pick-up head constituted by a hollow body having at its lower part at least one mouth, means for alternately shifting said pick-up head with its mouth onto said cigarette-conveyor tape and laterally with respect thereto to said one side of the tape; and valve means for putting said mouth into communication with a source of suction when the mouth is on the tape and for connecting same to a vent valve when it is shifted to said one side of the tape; whereby said pick-up head being alternately shifted onto the tape and in correspondence with the collecting box, picks up a batch of cigarettes from the conveyor tape and discharges same into the collecting box; in combination with spaced upright guides, comprising outer guides and inner guides, at least at said one side of the cigarette-conveyor tape arranged in such manner as to permit a rectangular cigarette-collecting box to be slidably inserted therein; sprocket pairs arranged at the outer side of said guides, one of said sprockets being driven step-wise downwardly in timed relation with the shifting of the pick-up head to maintain the height of the upper layer of cigarettes in the box substantially constant during the feeding therein of the cigarettes; endless chains mounted on each pair of said sprockets and having their inner run running substantially parallel in the space between said outer guides; horizontal bars between said outer guides, said horizontal bars having bracket-like portions connecting said chain pairs at intervals and measuring not less than a cigarette box height, said bracket-like portions projecting between said guides in such a manner that the box may be supported thereon when inserted between said guides; the lower ends of said guides being so shaped as to permit the boxes to be slid thereout in horizontal direction towards the outlet end of the device; a substantially horizontal endless belt mounted on rollers under said guides; and means for driving the upper run of said belt towards the outlet end of the collecting device, whereby, as soon as the cigarette-collecting box in its step-wise downward movement comes into contact with said belt, it is shifted out of said guides towards the outlet ends of the device.

3. In an automatic device for collecting cigarettes from a cigarette-conveyor tape on which the cigarettes are fed in two parallel rows and for feeding the collected cigarettes in a plurality of layers into cigarette-collecting

boxes provided at each side of the conveyor tape, a pick-up head provided with two parallel pick-up mouths, each having a length which corresponds substantially to the width of the cigarette-collecting boxes, whereby each mouth picks up each time from the tape a cigarette row section which substantially corresponds to the width of the collecting boxes; means for shifting said head alternately to place one of the mouths in correspondence with one of the cigarette rows and to place the other mouth within one of the cigarette-collecting boxes; guides for receiving said cigarette-collecting boxes provided at each side of said conveyor tape; means for connecting that mouth which is placed on the cigarette row, with a source of vacuum and for connecting to a vent the mouth which is placed in the cigarette-collecting box; chain pairs for step-wise shifting downwardly the cigarette-collecting boxes, inserted within the guides, substantially at the same rate as the level of the cigarettes collected therein goes up; in combination with bracket-like members connecting said chain pairs and projecting into said guides so as to support the boxes inserted therebetween; sprockets for guiding and step-wise driving said chains; and a substantially endless horizontal belt arranged under said guides for taking up the cigarette-collecting boxes as they come out of said guides and carrying same away towards the outlet end of the device.

4. In an automatic device for collecting cigarettes from a cigarette-conveyor tape on which the cigarettes are fed in at least one continuous row and for feeding the collected cigarettes in a plurality of layers into a cigarette-collecting box arranged at one side of the tape, a cigarette pick-up head constituted by a hollow body having at its lower part at least one mouth extending for substantially the whole width of the cigarette-collecting box in order to pick up each time from said tape a cigarette row section corresponding substantially to the width of the collecting box; means for alternately shifting said pick-up head with its mouth onto the cigarette-conveyor tape and laterally with respect thereto to said one side of the tape; valve means for putting said mouth into communication with a source of suction when the mouth is on the tape and for connecting same to a vent valve when it is shifted to said one side of the tape; whereby said pick-up head being alternately shifted onto the tape and in correspondence with the collecting box, picks up a batch of cigarettes from the conveyor tape and discharges same into the collecting box, and means at said one side of the tape adapted to support the cigarette-collecting box and shift same step-wise downwardly in timed relation with the shifting of the pick-up head to maintain the height of the upper layer of cigarettes in the box substantially constant during the feeding therein of the cigarettes; in combination with spaced upright guides, comprising outer guides and inner guides, at least at said one side of the cigarette-conveyor tape arranged in such manner as to permit a rectangular cigarette-collecting box to be slidably inserted therein; sprocket pairs arranged at the outer side of said guides, one of said sprockets being driven step-wise downwardly in timed relation with the shifting of the pick-up head; endless chains mounted on each pair of said sprockets and having their inner run running substantially parallel in the space between said outer guides, said chains being shifted at each deposition of a cigarette row section in the collecting box by a step corresponding substantially to the diameter of a cigarette; horizontal bars between said outer guides, said horizontal bars having bracket-like portions connecting said chain pairs at intervals and measuring not less than a cigarette box height, said bracket-like portions projecting between said guides in such a manner that the box may be supported thereon when inserted between said guides; the lower ends of said guides being so shaped as to permit the boxes to be slid thereout in horizontal direction towards the outlet end of the device; a substantially horizontal endless belt mounted on rollers under said guides; and means for driving the upper run of said belt towards the outlet end of the collecting device, whereby as soon as the cigarette-collecting box in its step-wise downward movement comes into contact with said belt, it is shifted out of said guides towards the outlet ends of the device.

5. In an automatic device for collecting cigarettes from a cigarette-conveyor tape on which the cigarettes are fed in at least one continuous row and for feeding the collected cigarettes in a plurality of layers into a cigarette-collecting box arranged at one side of the tape, a cigarette pick-up head constituted by a hollow body having at its lower part at least one mouth; means for alternately shifting said pick-up head with its mouth onto the cigarette-conveyor tape and laterally with respect thereto to one side of the tape, said means comprising fixed guides disposed transversely of the cigarette-conveyor tape, at least one slide reciprocable on said fixed guides, said pick-up head being mounted on said slide, and a crank and a suitable lever system for reciprocating said slide on said guides; means for rocking said pick-up head comprising a lever arm integral with said head, a horizontal transversal guide arm having a longitudinal groove therein with which one end of said lever arm is slidably engaged, said guide arm being reciprocable in synchronism with the transverse movements of said head in a vertical direction, and a tappet device for reciprocating said guide arm, a balance lever operative upon said tappet device for moving it in one direction, spring means operative upon said tappet device for moving it in the opposite direction, and a cam rotated by the mechanism of said automatic device to operate said balance lever for controlling rocking of said pick-up head; valve means for putting the mouth of said head into communication with a source of suction when the mouth is on the tape and for connecting same to a vent valve when it is shifted to said one side of the tape; whereby said pick-up head being alternately shifted onto the tape and in correspondence with the collecting box, picks up a batch of cigarettes from the conveyor tape and discharges same into the collecting box, and means at said one side of the tape adapted to support the cigarette-collecting box and shift same step-wise downwardly in timed relation with the shifting of the pick-up head to maintain the height of the upper layer of cigarettes in the box substantially constant during the feeding therein of the cigarettes.

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