

[54] **DEVICE FOR TRANSFERRING BATCHES OF CIGARETTES FROM A FORMATION LINE TO A PACKING LINE FOR THEM TO BE PACKETED**

[75] Inventors: Ariosto Seragnoli, deceased, late of Bologna, Italy; by Leonina Ricci Seragnoli, heir and legal representative, Bologna, Italy; by Giorgio Seragnoli, heir and legal representative, Bologna, Italy; by Daniela Seragnoli, heir and legal representative, Bologna, Italy

[73] Assignee: G.D. Societa in Accomandita Semplice di Enzo Seragnoli e Ariosto Seragnoli, Italy

[22] Filed: Dec. 10, 1973

[21] Appl. No.: 423,222

[30] **Foreign Application Priority Data**

Mar. 5, 1973 Italy ..... 3346A-73

[52] U.S. Cl. .... 198/20 C; 198/210; 198/243; 214/1 BD

[51] Int. Cl.<sup>2</sup> ..... B65G 37/00

[58] Field of Search ..... 214/1 Q, 1 QA, 1 R, 1 B; 198/20 R, 20 C, 211, 107, 210, 25, 242, 243

[56] **References Cited**

**UNITED STATES PATENTS**

3,501,023 3/1970 Seragnoli ..... 198/210 X  
3,606,951 9/1971 Sather et al. .... 214/1 Q

**FOREIGN PATENTS OR APPLICATIONS**

1,345,498 10/1963 France ..... 214/1 Q

Primary Examiner—Frank E. Werner  
Attorney, Agent, or Firm—Robert E. Burns;  
Emmanuel J. Lobato; Bruce L. Adams

[57] **ABSTRACT**

Disclosed herein is a device for transferring batches of cigarettes or similar from a batch formation line to a line where the said batches are actually packeted. The device in question comprises: an inching rotating head, provided with (a) a pair of four radial surfaces, two by two, parallel and spaced proportionately to the thickness of the layers that form a packet of cigarettes and (b) a pair of grippers, each of which provided with fork shaped jaws which encompass the said radial surfaces; means for cyclically parting the jaws; a movable vertical wall which extends parallel to the cigarettes so as to retain them whilst they are being inserted in between the said four radial surfaces and when the jaws of the grippers are open.

The batches of cigarettes are collected and transferred in succession to the processing units further along the line by a pusher, at the side of which there are two parallel vertical walls which move with it in order to keep the cigarettes properly positioned whilst they are being transferred.

Thanks to the protection afforded by the retaining walls, no harmful pressure is applied to the cigarettes during the time they are being moved.

**6 Claims, 3 Drawing Figures**

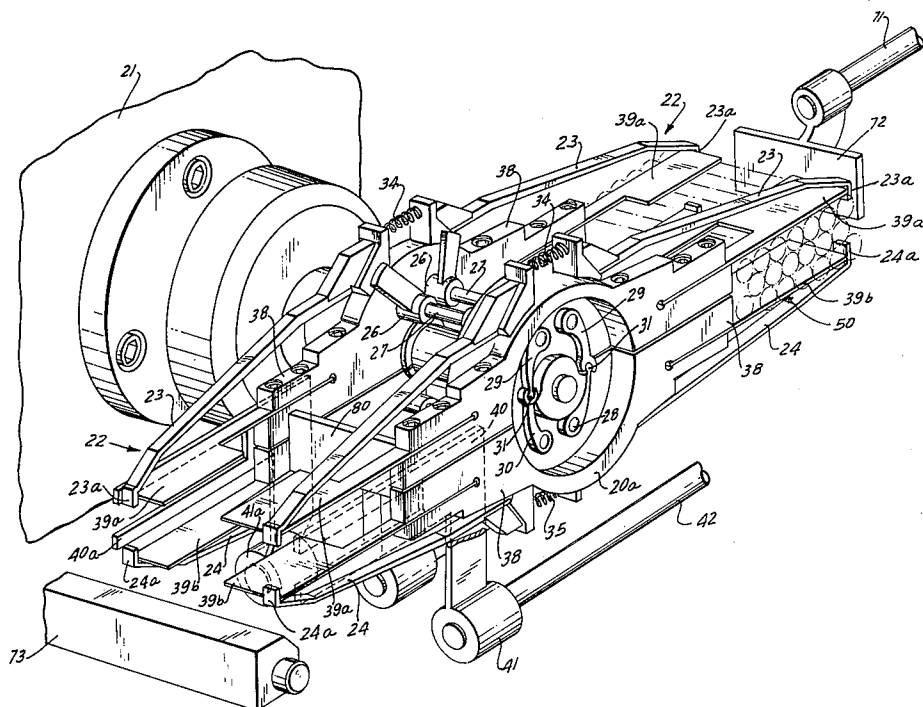
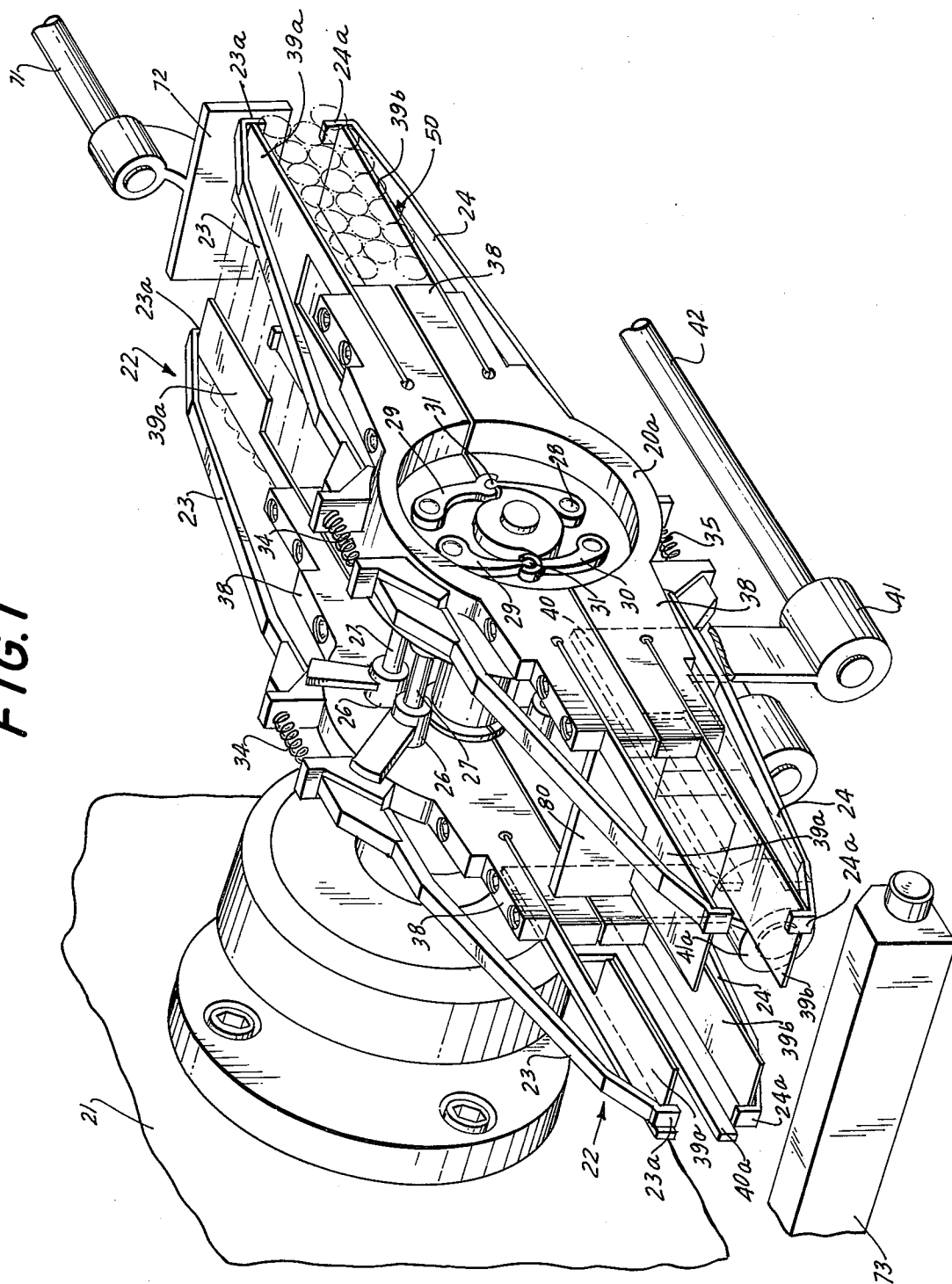


FIG. 1



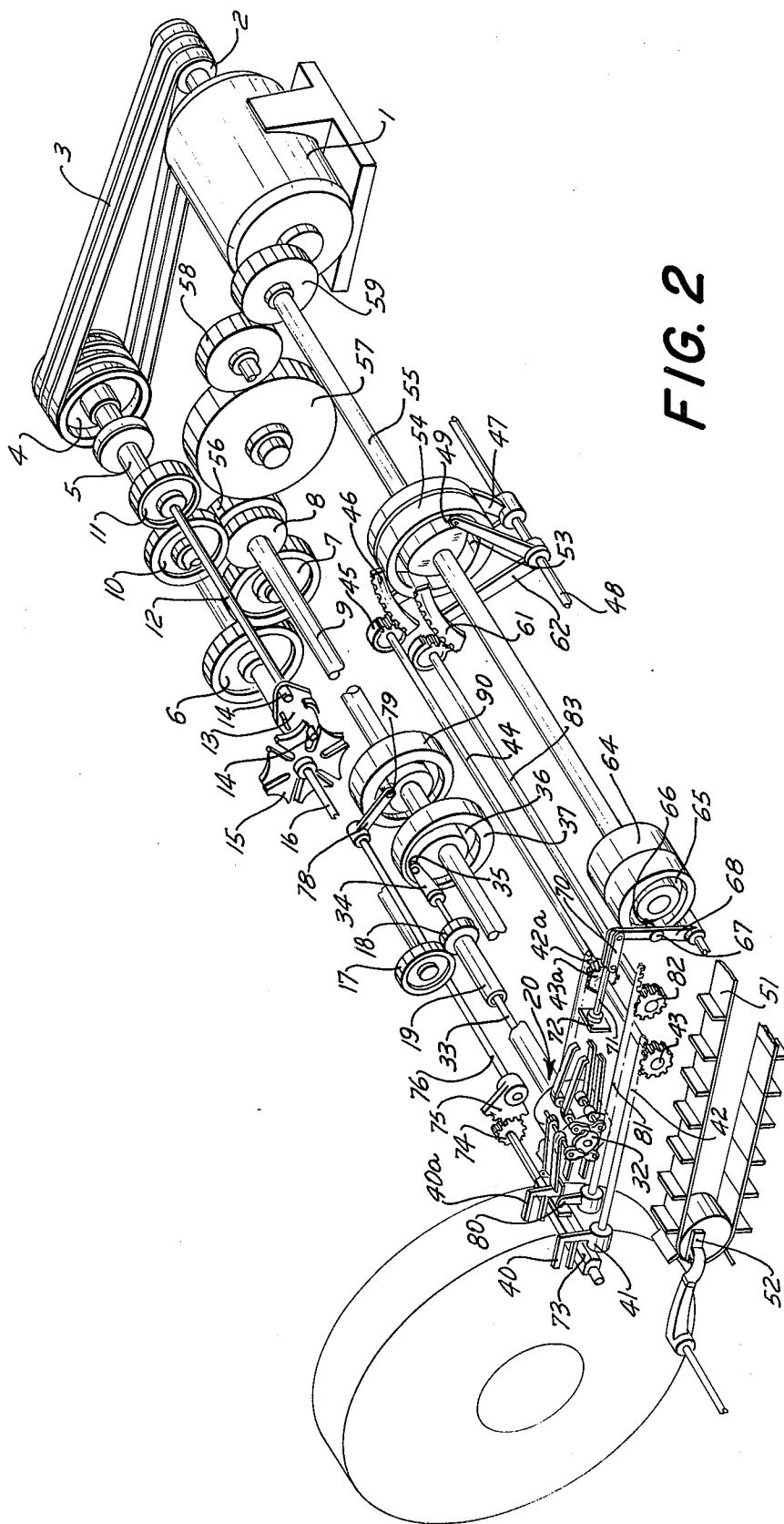
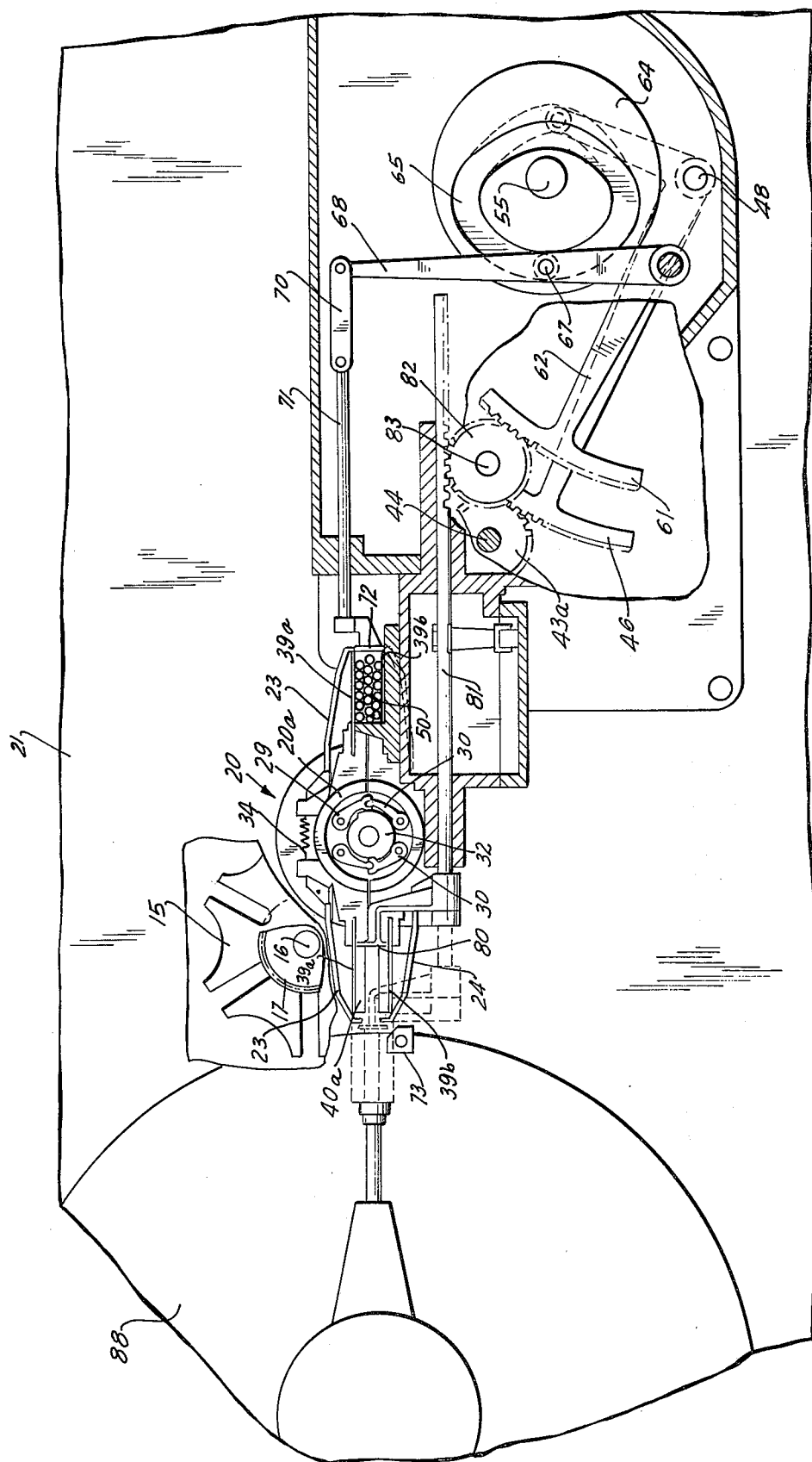


FIG. 2

FIG. 3



# **DEVICE FOR TRANSFERRING BATCHES OF CIGARETTES FROM A FORMATION LINE TO A PACKING LINE FOR THEM TO BE PACKETED**

## **BACKGROUND OF THE INVENTION**

This invention relates to cigarette wrapping/packeting machines and, in particular, to the devices used on the said machines to supply them with the batches of cigarettes to be wrapped.

To be more exact, the invention concerns a device of the type used to transfer batches of cigarettes from a formation line to a packing line for them to be packeted on high output speed wrapping/packeting machines, such as, for example, the machine according to U.S. Pat. No. 3,628,309 by the same Applicants.

## **DESCRIPTION OF THE PRIOR ART**

As is known, cigarette wrapping/packeting machines according to the above mentioned U.S. Pat. No. 3,628,309 have recently been designed by the same Applicants as herein, on which both during the stage when the cigarettes are being batched in packet configuration and when they are actually being wrapped in finished packet form, they move along the processing line with their axis positioned transversely to the infeed direction so as not to ever be subjected to axial pressure, which could damage them and which usually occurred with the forerunners of these particular high speed units.

In conformity with the aforementioned principle, these high speed machines employ a device with which to transfer the batches of cigarettes from a batch formation line to a packing line where the packeting is done and this essentially consists in a rotatable wheel with radial grippers, each of which is formed by a fixed arm and a movable arm which is also provided with surfaces for transversely grasping the individual cigarettes in the layer of cigarettes located by the side of the movable arm, the closing and opening movements of which to grasp and release, respectively, the batch of cigarettes are synchronized with the rotation of the gripper wheel and with the units for the delivery and the collection, respectively, of the said batches to and from the said gripper wheel (see, for example, U.S. Pat. No. 3,501,023 by the same Applicants).

With the continual increase in the speed of the aforementioned high speed wrapping/packeting machines, the said rotatable wheel device with radial grippers for the transfer of the batches of cigarettes from the batch formation line to the packing line where the batches are packeted, has shown itself to be inadequate because of its configuration and structure, thereby causing frequent breaks in the succession of the batches being infeed to the packing line, the consequential result of which is stoppages on the part of the wrapping/packeting machine and thus a lower global output than there should really be.

## **SUMMARY OF THE INVENTION**

The main object of the present invention is to enable high speed wrapping/packeting machines of the type in question, to operate at their maximum potential and to guarantee that they are continuously supplied with an unbroken succession of batches of cigarettes to be packeted.

A further consequential object of the invention is, therefore, to provide a device of the type mentioned above for transferring the cigarettes, the configuration and structure of which are such that it is able to definitely operate at the same speed as the wrapping/packeting machine itself.

Essential features of a transfer device of this nature are, in fact, an inching rotating head, provided with (a) a pair of four radial surfaces, two by two, parallel and spaced proportionately to the thickness of the layers that form a packet of cigarettes and (b) a pair of grippers, each of which provided with fork shaped jaws that extend in a radial direction and encompass the said radial surfaces, the termination of each jaw being curved in a direction perpendicular to the axis along which the grippers themselves extend; means for cyclically parting the said jaws so as to change from a first position in which both are open in order to accept or transfer a batch of cigarettes, to a second closed position whilst the rotating head is turning; a movable vertical wall which extends parallel to the cigarettes so as to retain them whilst they are being inserted in between the said four radial surfaces and when the jaws of the grippers corresponding to the said four surfaces are open; and a pusher for collecting a batch of cigarettes when the grippers are open and transferring it to the subsequent processing units further along the line.

## **BRIEF DESCRIPTION OF THE DRAWINGS**

Further characteristics and advantages of the invention will emerge more clearly from the following detailed description of a preferred but not the sole form of embodiment for the device in question, illustrated purely as an example in the accompanying drawings in which:

FIG. 1 is a front perspective view of the device forming the subject of the invention, mounted on a cigarette packeting machine;

FIG. 2 is a perspective view, in diagrammatic form, of all the mechanism which operates the moving parts in the device;

FIG. 3 is a front view, on a reduced scale compared to FIG. 1, of the device and part of the drive mechanism.

## **DESCRIPTION OF THE PREFERRED EMBODIMENT**

With reference to the above mentioned figures and, in particular, to FIG. 2, the shaft of an electric motor 1 has rigidly mounted on it a grooved wheel 2 which is mechanically linked, by means of the belts 3, to a sheave 4 keyed on to a shaft 5 supported by a fixed frame 21 (see FIGS. 2 and 3), inside which the complete motor unit described below, is housed.

Rigidly mounted on the shaft 5 there is a gearwheel 6 which meshes with an intermediate gearwheel 7 keyed to a shaft supported by the fixed frame 21. The said intermediate gearwheel 7 meshes with a gearwheel 56 rigidly mounted on a shaft 9 supported by the said fixed frame. The shaft 9 also carries a gearwheel 8 which meshes, in turn, with an intermediate gearwheel 10 and this transmits the movement to a gearwheel 11 keyed on to a shaft 12, one end of which has mounted on it a plate 13 carrying two needle bearings 14 which cyclically penetrate in the grooves in a Geneva wheel 15 rigidly mounted on a shaft 16.

The shaft 16 which thus rotates intermittently, has keyed on to it a gearwheel 17 which meshes with a

gearwheel 18 rigidly mounted on a hollow shaft 19 which protrudes from the fixed frame and with which a rotatable head, referred to in its entirety as 20, is integral. The rotation of head 20, being thus derived from Geneva wheel 15, accordingly is intermittent (or "inching", as it is sometimes called herein).

The said rotatable head 20, see FIGS. 1 and 3, is provided with a hub 20a, fixed to the hollow shaft 19 and rotatable with it, as well as to diametrically opposed grippers 22.

Each gripper 22 is made up of an upper jaw 23 and a lower jaw 24, each of which fork shaped and, in actual practice, each gripper can be considered as being constituted by the union of two identical grippers, parallel and side by side.

Both the termination 23a of each fork shaped upper jaw and the termination 24a of each fork shaped lower jaw are curved in a direction perpendicular to the axis along which the grippers extend.

Each upper jaw 23 is integral with a sleeve 26 rigidly mounted on a corresponding spindle 27 with its axis parallel to the axis of rotation of the rotatable head and perpendicular to the direction along which the grippers themselves extend. The said spindles 27 are rotatably supported by the hub 20a of the rotatable head 20.

Likewise, each lower jaw 24 is integral with a corresponding sleeve (not shown in the figures) keyed on to a corresponding spindle 28 rotatably supported by the hub of the rotatable head and parallel to the spindles 27.

One extremity of a shaped lever 29 is pivoted to each spindle 27 whilst its other extremity is fastened to a lever 30 pivoted to the spindle 28 placed on the same vertical axis.

Each of the said levers 29 is connected to the corresponding lever 30 through an articulated joint 31 of the type known as a toggle joint and this is kept constantly pressed up against a cam 32 keyed on to a shaft 33, the profile of which is symmetrical with respect to a vertical axis.

The pressure of the two articulations 31 on the cam 32 is applied by two upper springs 34 and two lower springs 35 (FIGS. 1, 3).

The shaft 33, see FIG. 2, passes inside the hollow shaft 19 so that head 20, on shaft 19, is coaxial (and as shown, concentric) with cam 32 on shaft 33. An outer, forward end of shaft 33 is secured to a radial arm 34', to the end of which is pivoted a rotatable needle roller bearing 35' and this engages in an eccentric groove machined in the face of a disc cam 37 mounted on the shaft 9 from which it takes its movement (FIG. 2).

The above described mechanism 34', 19 causes the cam 32 to undergo an oscillating rotatory movement coaxially with the head 20 and, consequently, to cyclically move each of the two articulations 31, thereby causing the grippers 22 to open cyclically and more about this will be said later on in this text.

Four radial arms 38, each of which is placed in the same vertical plane as a corresponding upper jaw 23 of the grippers, extend from the hub 20a of the rotatable head. Each of the arms 38 is integral with a pair of strips 39a and 39b which serve as the support surface for the cigarettes and which extend along a plane perpendicular to that along which the jaws of the grippers open and close.

The said strips 39a and 39b are placed parallel, two by two, between the jaws of the grippers and their

spacing is proportionate to the thickness formed by the layers of cigarettes that go to make up the packet.

The cigarettes 50, in batches ready to be packeted, carried in the compartments of a conveyor 51 shown diagrammatically in FIG. 2 and forming the subject of another Patent Application, are pushed between the four strips or surfaces 39a and 39b which are located on the right hand side of the rotatable head shown in FIG. 1, by a pusher 52 shown diagrammatically in FIG. 2, the moving parts of which are not illustrated since they are not part and parcel of the present Patent. Two vertical "U" shaped walls 40 and 40a are placed in two vertical and parallel planes.

Each wall is integral with a sleeve 41 and 41a rigidly mounted on a rack 42 and 42a which meshes with a gearwheel 43 and 43a.

Both gearwheels 43 and 43a are keyed on to a shaft 44 which accordingly causes oscillating movements of walls 40, 40a. The shaft 44 also carries a gearwheel 45 which meshes with a toothed quadrant 46 supported by a lever arm 47 pivoted on to a shaft 48 carried by the frame of the machine. The other arm of the lever 47 carries a needle roller bearing, invisible in FIG. 2 but similar to other roller bearings mentioned hereafter. The bearing or cam follower of lever 47 engages inside an eccentric groove machined in a face of a disc cam 54 keyed on to a powered shaft 55.

The shaft 55 takes its movement from the shaft 9 via the gearwheels 56, 57, 58 and 59. At 80 there is a pusher located between the left hand grippers 23 and walls 40, 40a and integral with a rack 81 which meshes with a gearwheel 82 keyed on to a shaft 83.

The shaft 83 has a gearwheel 60 rigidly mounted on it and this meshes with a toothed quadrant 61 carried by a lever arm 62 pivoted on to the shaft 48. The other arm of the lever 62 carries a needle roller bearing 49 which engages inside a groove 53, the eccentricity of which is the same as that of the groove machined into the other face of the disc cam 54.

Thus the walls 40 and 40a and the pusher 80 are all provided with an identical horizontal cyclic traversing movement.

The shaft 55 also carries a cam 64 provided with an eccentric groove 65 inside which a needle roller bearing 66, carried by a spindle 67 integral with a lever 68 pivoted at 69, engages. The end of the lever arm 68 is pivotally secured to a link rod 70 connected to a rod 71 which carries a plate 72, the surface of which is perpendicular to the horizontal axis of the grippers.

The arm 71, see FIG. 3, is sustained by the frame of the machine in such a way that it is able to traverse horizontally with respect to the frame itself.

At 73 there is a square section bar with a bevelled edge, the axis of which is crosswise with respect to the direction in which the cigarettes are transferred and is beneath the level of the transfer plane.

A gearwheel 74 is fixedly mounted on the axis of the said bar 73 and this meshes with a toothed quadrant 75 keyed on to a shaft 76.

The said shaft 76 also carries an arm 78 on which there is a needle roller bearing 79 that engages in an eccentric groove in a cam 90 rigidly mounted on the shaft 9.

In this way the bar 73 is given a cyclic oscillating movement around its own axis coordinated with the movement of walls 40, 40a and 80. Its task is to continuously provide the surface for transferring the batch of cigarettes from the rotatable head to the packaging

mechanism 88 shown diagrammatically in FIGS. 2 and 3.

A description will now be given of the operation of the device in question, assuming that a batch of cigarettes is being followed from the time it arrives at a point corresponding to where the device forming the subject of the invention is positioned, up until the time it leaves the said device.

The batch of cigarettes 50 is inserted transversely in the rotatable head by the first pusher 52 when one gripper is in the horizontal position at the right side of the cam, opposite this pusher, as perspectively shown in FIG. 2, and when the gripper jaws are forked. The batch is arranged in such a way that the cigarettes with which it is composed are inserted exactly in between the two upper surfaces 39a and the two lower surfaces 39b. Once the batch is inside the aforementioned surfaces 39a and 39b, the jaws 23 and 24 close and their curved parts 23a and 24a, respectively, see to it that the batch is kept in position.

It should be noted that this transfer which is cross-wise with respect to the jaws but axial with respect to the cam, and to the actual cigarettes, does not in any way endanger either the condition or the compactness of the product. Indeed with this particular form of transfer the cigarettes are not knocked but simply pushed and thus there is not the slightest pressure applied that could be harmful.

To prevent the possibility of the batch of cigarettes not remaining in alignment when the jaws 23 and 24 are parted, the vertical plate 72 is provided as an additional pusher. This plate extends parallel to the cigarettes and is positioned, during the said insertion stage, at a point corresponding to the outside extremity of the jaws of the right hand gripper, so as to serve as a containment wall.

The opening and closing of the jaws is determined by the reciprocating rotation of the cam 32.

The rotatory movement of the shaft 19 then takes place and the batch of cigarettes goes to assume a position which is diametrically opposed to that where the insertion took place.

The batch, freed in the said position from the action of the jaws 23 and 24 is held by the strips or surfaces 39a and 39b.

At this juncture, the second pusher 80 comes into operation and pushes the batch of cigarettes, which are also laterally held by the two surfaces 40 and 40a, along to device 88 where the actual packeting operation is performed. During this stage, the batch of cigarettes traverses horizontally along the aforementioned support surface formed by the bar 73.

It should be understood that the operations described herein refer to each individual batch of cigarettes and that the said batches are inserted at a speed compatible with the batch formation process, in between the jaws which, due to the inching rotation of the rotatable head 20, are periodically positioned horizontally on the right of this head as seen in the drawings.

What is claimed is:

1. A device for transferring batches of cigarettes from a conveyor to packaging device, comprising;

a transferring head having an axis of intermittent rotation; first and second guiding strip means, each for guiding a batch of cigarettes, said first and second strip means being secured to said head on mutually opposite sides of said axis and each comprising a first pair of coplanar guiding strips and a

second pair of coplanar guiding strips the strips of each first pair being parallel to, symmetrical with and, spaced from the strips of the respective second pair and disposed to enable a batch of cigarettes to be moved into and from position wherein the cigarettes of the batch are generally held between the strips; means for effecting intermittent rotation of the head and of the first and second guiding strip means secured thereto, between a first position wherein the first guiding strip means is disposed for receiving a batch of cigarettes and the second guiding strip means is disposed for releasing a batch of cigarettes, and a second position wherein the second and first guiding strip means are, respectively, so disposed;

a first pusher disposed on one side of said axis, for movement parallel to said axis to push a batch of cigarettes from a conveyor to said position of the batch;

a second pusher disposed on the opposite side of said axis between the several coplanar guiding strips for pushing a batch of cigarettes from said portion thereof; and

two parallel vertical walls disposed at sides of the latter pusher and of the guiding strip means to move with the latter pusher and thereby to keep the cigarettes in proper positions while the batch of cigarettes is being transferred from the respective guiding strip means to a packaging device.

2. A device for transferring batches of cigarettes from a conveyor to a packaging device, comprising;

a transferring head having an axis of intermittent rotation; first and second guiding strip means, each having strips secured to said head for slidably guiding a batch of cigarettes; means for effecting intermittent rotation of the head and of the first and second guiding strip means between a first position wherein the first guiding strip means is disposed for receiving a batch of cigarettes and the second guiding strip means is disposed for releasing a batch of cigarettes, and a second position wherein the second and first guiding strip means are, respectively, so disposed;

first pusher means disposed on one side of said axis, for movement parallel to said axis to push a batch of cigarettes from a conveyor to between the strips of one of said guiding strip means;

second pusher means disposed on the opposite side of said axis for pushing a batch of cigarettes from between said strips; and

a bar parallel to said axis of rotation and disposed to move cyclically around an axis of its own parallel to said axis of rotation in order to continuously provide a surface for transfer of a batch of cigarettes to a packaging device.

3. A device for transferring batches of cigarettes from a conveyor to a packaging device, comprising;

a transferring head having an axis of intermittent rotation;

first and second guiding strip means, each for guiding a batch of cigarettes, said first and second strip means being secured to said head on mutually opposite sides of said axis and each comprising a first pair of coplanar guiding strips spaced a part in a plane thereof and a second similar pair of coplanar guiding strips, the strips of each first pair being parallel to, symmetrical with and spaced from the strips of the respective second pair and disposed to

enable a batch of cigarettes to be slidingly moved into and from a position of the batch wherein ends of the cigarettes of the batch are slidably supported by the strips of the respective strip means; means for effecting intermittent rotation of the head and of the first and second guiding strip means secured thereto, between a first position wherein the first guiding strip means is disposed for receiving a batch of cigarettes and the second guiding strip means is disposed for releasing a batch of cigarettes, and a second position wherein the second and first guiding strip means are, respectively, so disposed; first and second jaw means mounted on said head for rotation therewith and for movement relative thereto, extending therefrom along and slightly beyond said strips of said first and second guiding strip means, respectively, for intermittently (a) holding batches of cigarettes slidably supported by the strips of the first and second guiding strip means, and (b) releasing said batches; means for intermittent actuation of the jaw means for said movement relative to the head, coordinated with the intermittent rotation of the head, for (a) said holding during said rotation and (b) said releasing in said first and second positions; first and second pusher means disposed on mutually opposite sides of said axis, respectively for (1) movement parallel to said axis to push a batch of

cigarettes from a conveyor to said position of the batch and (2) movement transverse of said axis to slidingly push a batch of cigarettes from said position of the batch to a packaging device; and means for intermittently actuating said first and second pusher means, coordinated with the intermittent rotation of said head and actuation of said jaw means, for said movements to push respective batches of cigarettes to and from said position thereof.

4. A device according to claim 3 wherein the means for actuation of the jaw means comprise a cam rotatable about said axis and cam followers on both sides of said axis between said cam and said respective jaw means.

5. A device according to claim 3 wherein the means for actuating the first and second pusher means comprises cam means rotatable about an axis parallel to the axis of the transferring head.

6. A device according to claim 3 including third pusher means disposed on the same side of said axis as said first pusher means for pushing the batch of cigarettes toward said axis after the pushing thereof parallel to said axis, before the actuation of said jaw means for said holding; and means for actuating said third pusher means coordinated with said intermittent rotation of said head.

\* \* \* \* \*

30

35

40

45

50

55

60

65