July 21, 1936. C. W. MULLER 2,048,281

APPARATUS FOR ARRANGING AND STACKING A PLURALITY OF ROWS OF CIGARETTES IN SUPERPOSED LAYERS

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Fig.2

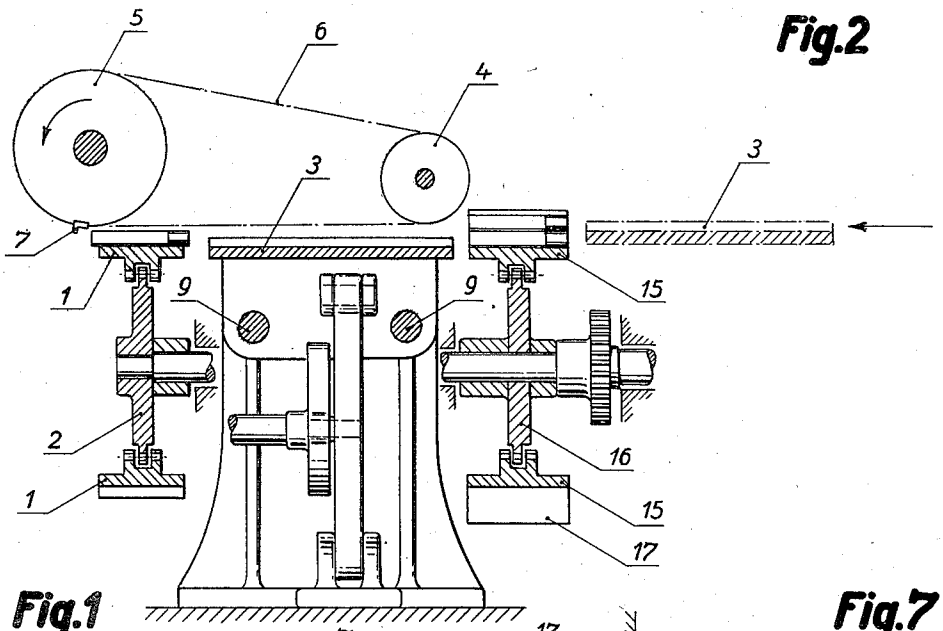


Fig.1

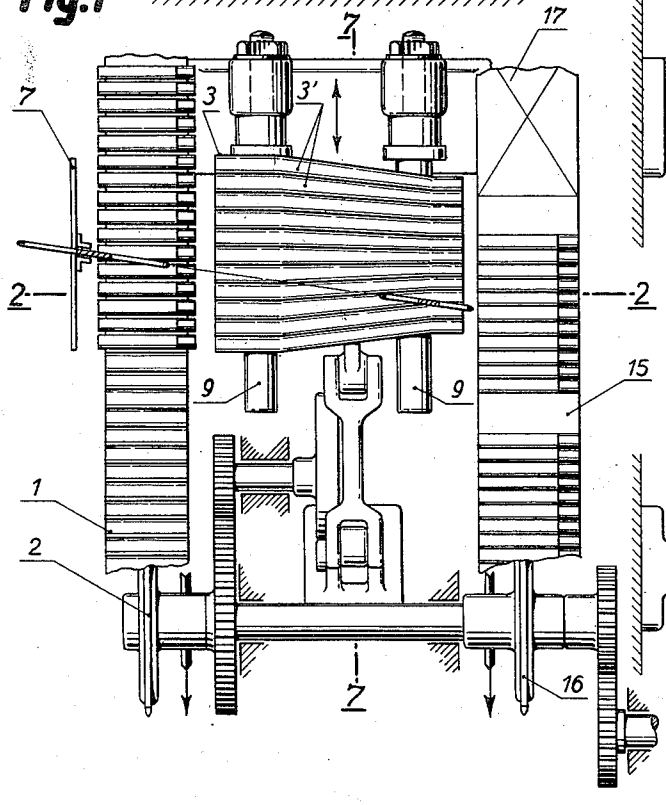
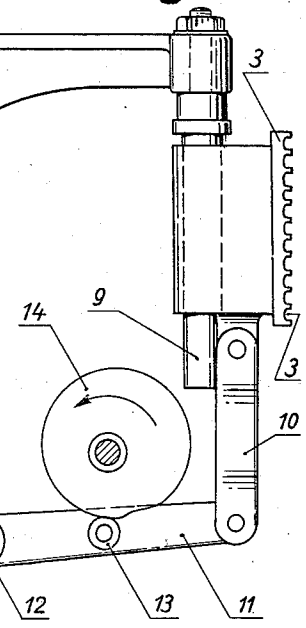


Fig.7



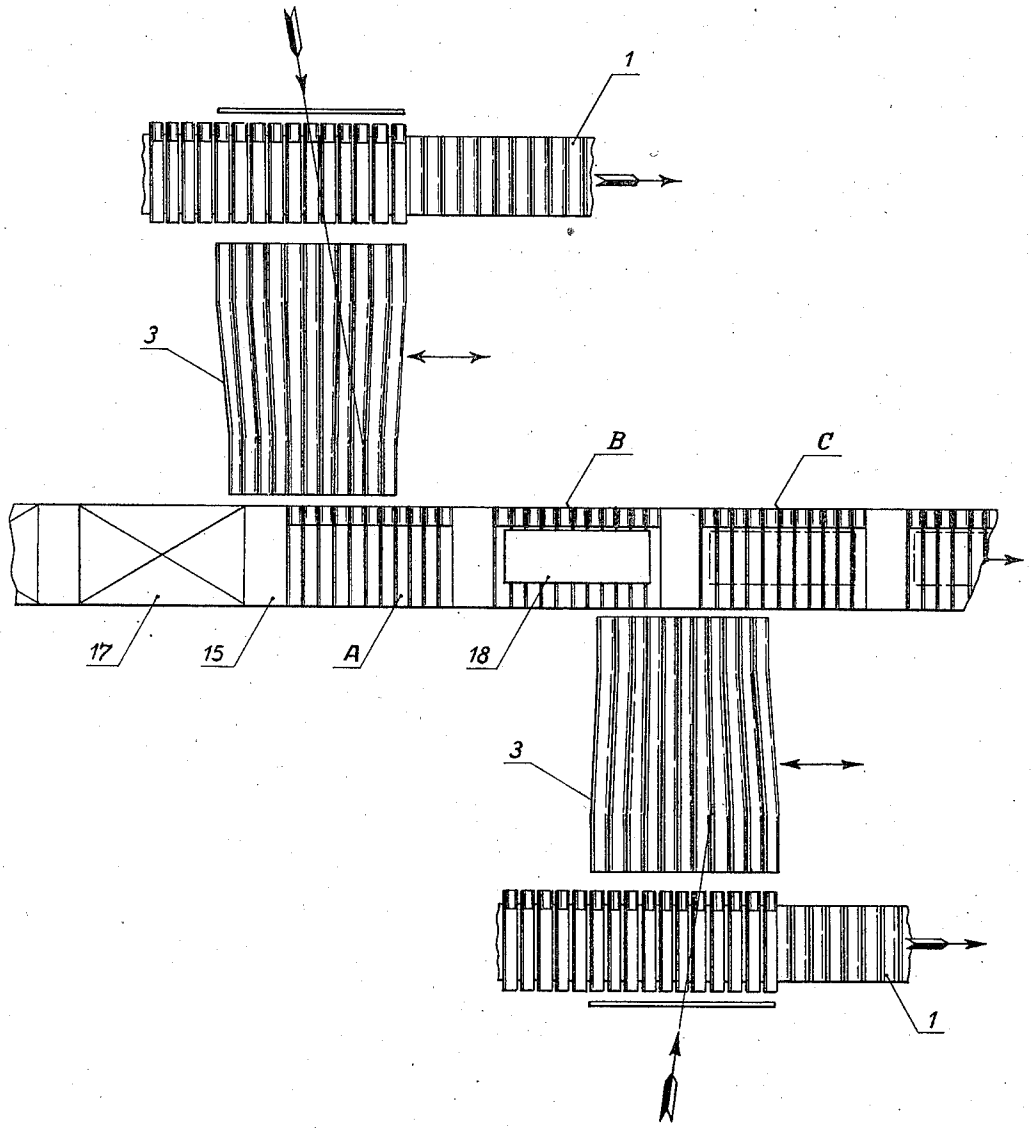
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Fig.3



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APPARATUS FOR ARRANGING AND STACKING A PLURALITY OF ROWS OF CIGARETTES IN SUPERPOSED LAYERS

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Fig.5

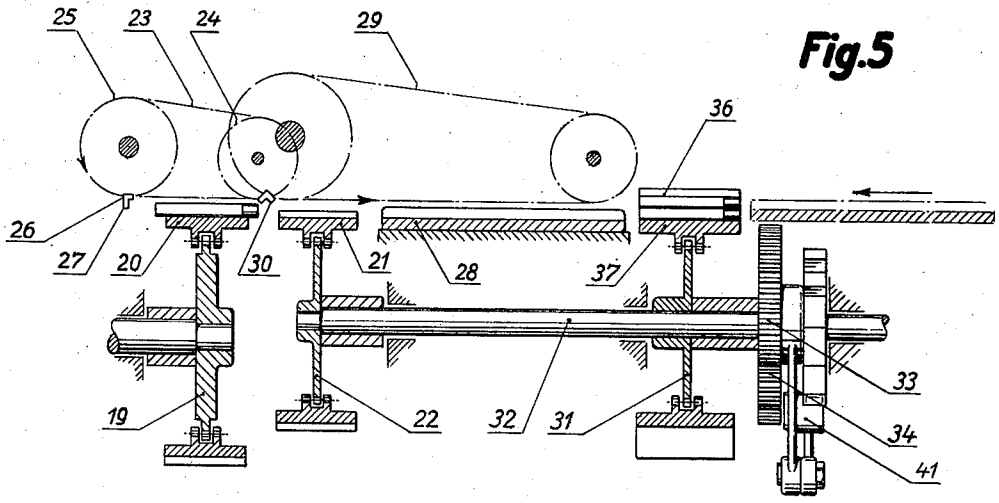
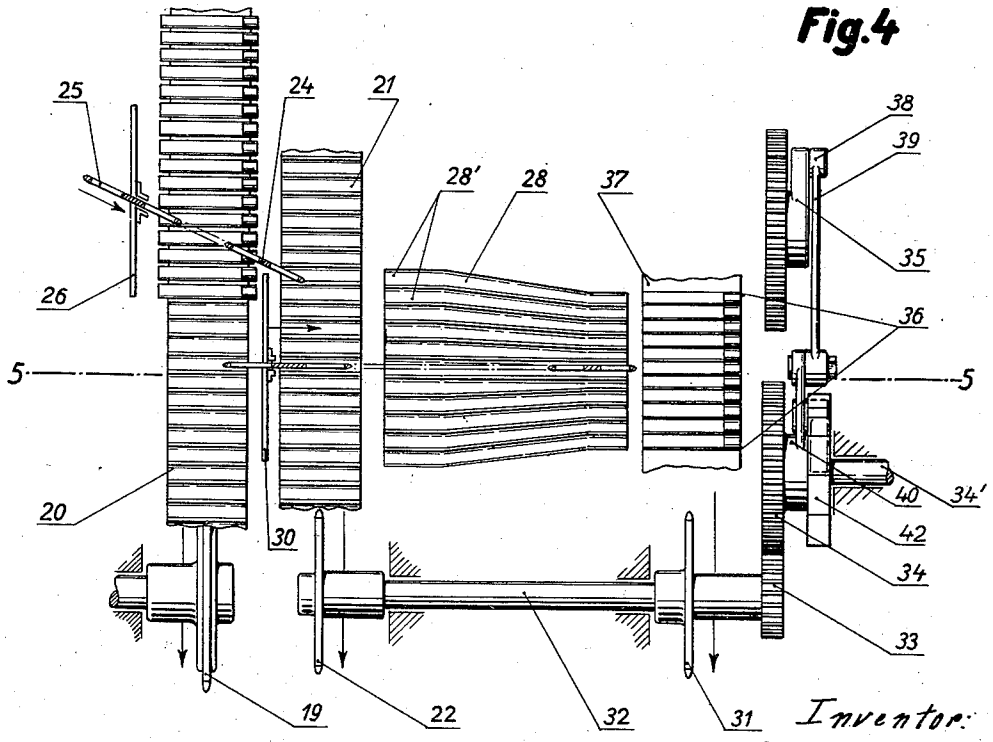


Fig.4



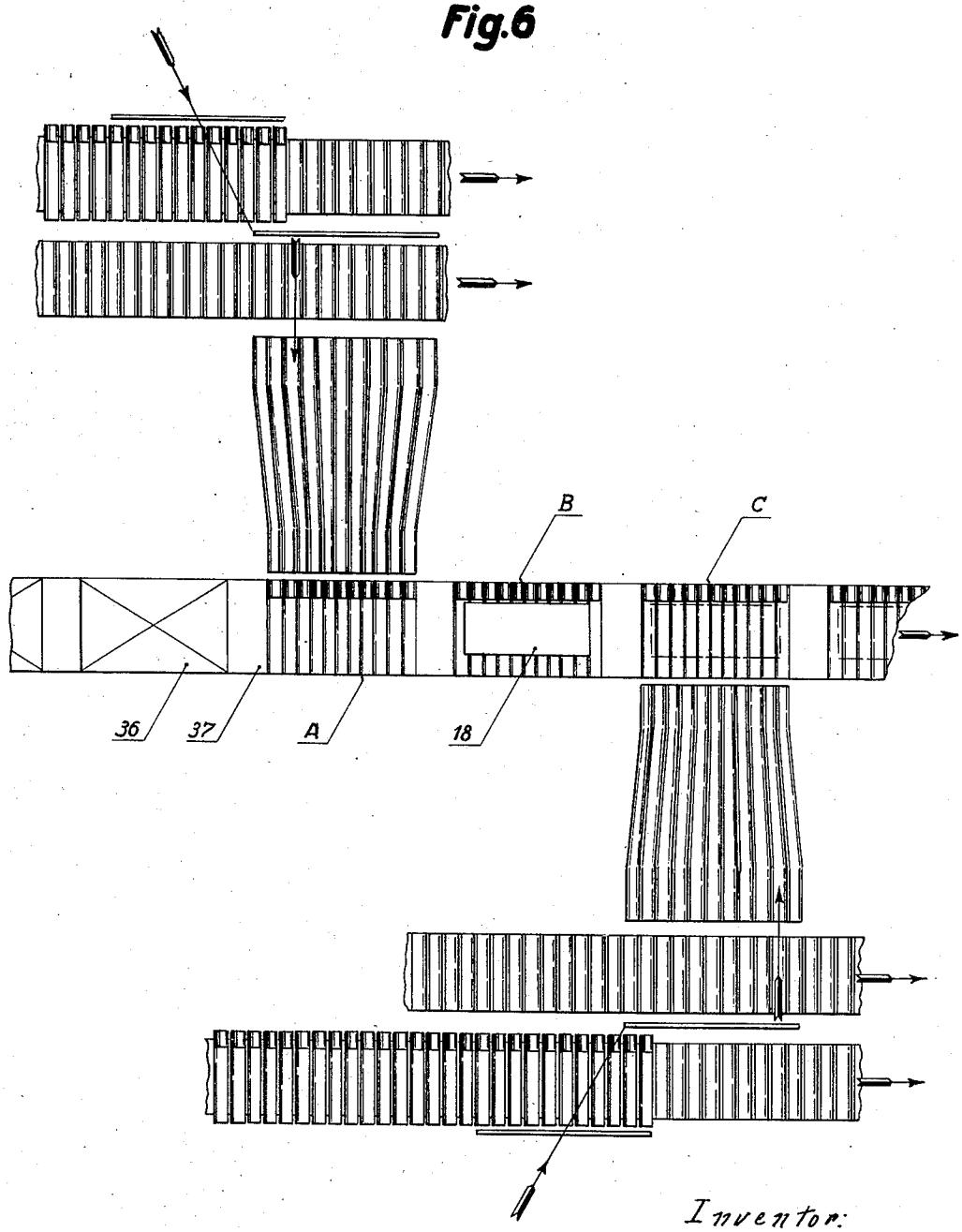
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APPARATUS FOR ARRANGING AND STACKING A PLURALITY OF ROWS OF CIGARETTES IN SUPERPOSED LAYERS

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Fig.6



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2,048,281

APPARATUS FOR ARRANGING AND STACKING A PLURALITY OF ROWS OF CIGARETTES IN SUPERPOSED LAYERS

Carl Wilhelm Muller, Dresden-Weisser Hirsch, Germany

Application February 26, 1931, Serial No. 518,579
In Germany August 18, 1930

16 Claims. (Cl. 226—5)

In cigarette packing machines the problem encountered is always that a number of groups of cigarettes are to be arranged and disposed in packing boxes in superposed layers. By "arranged" is meant in this case that the cigarettes lie symmetrically and overlap one another scalewise.

If the cigarettes are introduced into a funnel-shaped magazine, to the base of which vertical shafts are connected, in which the cigarettes are already disposed in separate vertical series, it is then not difficult to divide the separate groups into correctly aligned layers by means of transverse rams.

However, if the cigarettes are to be passed separately by means of a conveyer device, past an examining position in order to bring them into the correct symmetrical position, another problem arises. Now the cigarettes are passed to a conveyer device on which they are arranged in parallel relationship and in serial order and spaced a certain distance apart, whilst their longitudinal axes are oblique to the direction of travel. The conveyer device generally consists of a troughed conveyer, each trough of which carries a cigarette.

The present invention is concerned with the problem of surrounding the oncoming cigarettes and disposing them in separate groups in superposed layers in the packing boxes or in a chamber the dimensions of which correspond to those of the packing box.

This problem is solved in that a group of adjacent cigarettes is thrust by a lug, moving with the conveyer device transversely to the forward movement, into a guide which holds the cigarettes and, by means of converging grooves transfers them into a scale-like layer, which guide during the reception of the group of cigarettes participates in the movements of the conveyer device whilst the arranged group is removed from this guide by means of the same or a special lug, into the packing box or into a container provided on a conveyer belt or the like, the dimensions of which correspond to those of the packing box.

Symmetrically arranged relatively to the conveyer device of the packing box or of the containers corresponding to the packing boxes are two parallel conveyer devices with converging guides arranged in an offset manner according to the height so that a group of cigarettes from one conveyer device comes into position over those coming from the other conveyer device, on the central conveyer device in the packing boxes or the reception chamber.

The arrangement may be such that the converging guides, as well as the conveyer device carrying the container corresponding to the packing boxes, during the transfer of the group of cigarettes, are displaced in the same forward direction at the same forward speed, whilst the movement of the converging guides after the transfer of the cigarettes, is reversed and return to their initial position is effected at increased speed.

The arrangement can, however, also be such that between the conveyer device and a stationary converging guide an intermediate conveyer device is inserted which, during the transfer of the cigarettes moves at the same speed and in the same direction as the main conveyer device, but which remains stationary in relation to the converging guide so that the group of cigarettes carried by the intermediate conveyer device can be thrust by a second ram into the converging guides from which the arranged groups of cigarettes are delivered to the containers of the conveyer device which moves intermittently.

Two forms of construction of the invention are illustrated in the annexed drawings, in which:—

Figs. 1–3 show one example, and

Figs. 4–6 show a second example.

Fig. 7 illustrates a special form of construction.

In these drawings:—

Fig. 1 is a plan.

Fig. 2 is a vertical cross section taken on the line 2—2 of Fig. 1, and

Fig. 3 is a plan of the whole device.

Fig. 4 is a plan.

Fig. 5 is a vertical cross section taken on the line 5—5 of Fig. 4, and

Fig. 6 is a plan of the whole device.

Referring first to Figs. 1–3, the endless troughed chain 1, which passes over the sprocket wheel 2, carries a guide member 3 which is provided in known manner with converging grooves in order to assemble the oval cigarettes, which are originally introduced level, that is to say with their major axes horizontal, and thereby arranged so as to overlap one another scalewise. Further, a driving chain 6 passing over the sprocket wheels 4 and 5 is arranged over the troughed chain 1 and the guide member 3. The sprocket wheels 4 and 5 are staggered and arranged obliquely in such manner that the driven side of the chain comes into position obliquely to the troughed chain. Bars 7 are arranged on the conveyer chain. These bars pass over the troughs of the troughed

chain 1, and while the latter continues its uniform movement, thrust the cigarettes therefrom into the converging grooves 3' of the guide 3. Now the latter is displaceably mounted on the bolts 9. The lever 11 (cf. Fig. 7), pivotally mounted on the pin 12, is attached to this guide 3 by means of the arm 10. The roller 13 on the lever comes into contact with the cam 14, by which the guide member 3, while the cigarettes are being thrust through the converging grooves 3' by the rod 7, is moved at equal speed and in the same direction as the troughed chain 1. At the discharge side of the converging grooves 3 there is arranged a conveyer belt 15, which passes over the guide wheels 16. In this mode of construction, on the conveyer belt 15 is arranged the container 17 into which the groups of cigarettes are thrust. It is, of course, possible, instead of using the container 17 to fit the packing boxes on the conveyer belt 15 and to introduce the cigarettes into them. In this form of construction, however, the cigarettes, before reaching the packing boxes, are covered in known manner with wrapping strips at right angles to one another. As soon as the cigarettes are transferred from the guide member 3 to the conveyer belt 15, the guide member 3 is returned at increased speed to its initial position as shown in Fig. 1. It is now so arranged that the guide member 3 arrives in its initial position just at the moment when a new group of cigarettes is on the troughed chain 1 in front of the converging grooves 3' of the guide 3. The process is then repeated.

When it is a question of packing two or more layers, the process can be carried out advantageously in the manner illustrated in Fig. 3.

In this case, guide members 3 and troughed chains 1 are provided on both sides of the conveyer belt 15. After the first layer of cigarettes has been introduced into the container 17 at the position A, a separating layer in the form of a sheet of cardboard 18 or the like is introduced in known manner at the position B. At the position C the second layer of cigarettes is placed upon the first layer. It is obvious that the second device will be so arranged that the guide member 3 is higher by one cigarette layer, as shown on the right side of Fig. 2.

As regards the form of construction shown in Figs. 4 to 6, by the troughed belt 20 running over the sprocket wheel 19, which band runs at uniform speed, an intermittently driven troughed belt 21 is arranged which passes over the sprocket wheels 22. Above the troughed belts 20, 21 is now passed a conveyer chain 23 which runs over the sprocket wheel 24, 25. Now while the lugs 27 of the rod 26 fixed to the driving chain 23, seize the cigarettes and transfer them to the troughed belt 21 the latter is driven at the same speed as the troughed belt 20. Now when the group of cigarettes taken from the troughed belt 21 has been moved in front of the guide member 28, the troughed belt 21 is stopped. Thereupon the rod fixed to the conveyer chain 29 engages with the group of cigarettes on the troughed belt 21 and thrusts the cigarettes into the converging grooves 28' of the guide member 28.

The converging grooves 28', which correspond to the converging grooves 3' of the previous example of construction, now assemble the oval cigarettes so that they overlap one another scalewise. Then, by means of the lug 30, the group of cigarettes arranged in this manner is passed into the container 36, several of these being fitted on the conveyer belt 37. It is obvious that the conveyer belt 37 must remain stationary while the cigarettes are passed from the guide member 28 into the container 36. In the present example of construction the sprocket wheel 22 of the troughed belt 21 and the sprocket wheel 31 of the conveyer belt 37 are on the common axis 32 which is driven intermittently by the gear wheels 33 and 34 and the crank mechanism 35. If, however, in order to save time, it is desired to set the troughed belt 21 again in operation while the cigarettes are still being passed through the guide member 28, the troughed belt 21 and the conveyer belt 37 can, of course, also be driven one after the other.

For this purpose, the crank 38 is connected by the connecting rod 39 with the lever 40 mounted loosely about the axle 34' of the gear wheel 34, this lever engaging with the pawl 41 on the ratchet wheel 42. The ratchet wheel 42 (similarly to the gear wheel 34) is mounted rigidly on the axle 34'.

If it is desired to pack in several layers, as can be seen in Fig. 6, it is possible to arrange the device just described on both sides of the conveyer belt 37. Then the bottom group of cigarettes is introduced first of all into the container 36 at the position A. The intermediate member 18 is introduced at the position B and, as in the first example of construction, the second layer of cigarettes is introduced into the container at the position C. It is obvious that with this mode of construction also instead of the container 36, the cigarette boxes can be placed on the conveyer band 37, so that the cigarettes are introduced directly into the packing boxes.

Only in the present case, where the cigarettes are first to be surrounded with wrapping strips, is it necessary to use the container 36.

Having thus described the nature of the said invention and the best means I know of carrying the same into practical effect, I claim:—

1. An apparatus for arranging and stacking articles comprising means for continuously conveying individually arranged articles of oval cross section, means for guiding said articles into overlapping relation, means moving with said conveying means and transversely thereof for transferring said articles from said conveying means to said overlapping guiding means and conveying means for receiving said overlapping articles in assembled relation.

2. An apparatus for arranging and stacking articles comprising continuous conveying means for individually spaced articles, guiding means arranged parallel to said conveying means for guiding said articles into overlapping relationship means moving partially with said conveying means and transversely thereof moving said articles from said conveying means to said guiding means and means for receiving said overlapped articles from said guiding means.

3. An apparatus for arranging and stacking a plurality of articles comprising conveying means for individually arranged articles in spaced relation, reciprocating guiding means arranged parallel to said conveying means for arranging said articles in overlapping relationship, means for transferring said articles from said conveying means to said guiding means, means for synchronizing the motion of said guiding means with said conveying means during the time said articles are being transferred and means for receiving said articles in overlapping relationship from said guiding means.

4. An apparatus for arranging and stacking a plurality of articles comprising an endless con-

veying means for individually arranged and separated articles of oval cross section, guiding means adapted to receive said articles from said conveying means, means for transferring said articles from said conveying means to said guiding means, converging channels upon said guiding means to align said articles in overlapping relationship and means for receiving said overlapped articles from said guiding means.

5. An apparatus for arranging and stacking a plurality of articles comprising an endless conveyor having grooves therein for conveying individually arranged and spaced articles of oval cross section, reciprocating guiding means arranged parallel to said conveying means having converging channels therein to arrange said articles in overlapping relationship, means for synchronizing the movement of said guiding means during a portion of its travel with said conveying means, means for transferring said article from said conveying means to said guiding means and an endless conveyor adapted to receive said arranged articles from said guiding means.

6. An apparatus for arranging and stacking articles comprising a conveyor for individually spaced and arranged articles, guiding means associated with said conveying means for arranging said articles in overlapping relationship, a second conveying means to receive said articles arranged in overlapping relationship, a second conveyor for individually arranged and spaced articles positioned parallel to said first conveying means upon the opposite side of said second conveying means, a second guiding means located between said third conveying means and said second conveying means to arrange said articles received from said third conveying means in overlapping relationship, means for transferring said articles from said first conveying means to said first named guiding means and then transferring the same upon said second conveyer and means for transferring said articles from said third conveying means to said second guiding means and then superposing said articles upon the articles first deposited upon said second conveying means.

7. An apparatus for arranging and stacking articles comprising means for conveying continuously individually arranged articles disposed transversely to the path of the conveying means, a second conveying means for individually arranged articles disposed transversely to the path of the conveying means spaced from said first conveying means, reciprocating means for arranging said articles in overlapping relationship means for receiving said articles in overlapped relation and means moving partially with said first conveying means and transversely thereof for superposing the articles received from one of said conveying means upon those received from the other conveying means upon said receiving means.

8. An apparatus for arranging and stacking articles comprising conveying means for individually arranged articles, guiding means for said articles to arrange the same in overlapping relationship positioned parallel to said conveying means, means for receiving said articles from said guiding means, means for transferring said articles from said conveying means to said guiding means and means for moving said transferring means in a path oblique to the movement of said conveying means.

9. An apparatus for arranging and stacking articles comprising means for conveying individually spaced articles, an intermittently operated conveying means arranged parallel to said first conveying means, means for transferring said articles from said conveying means to said intermittently operated conveying means, guiding means for arranging said articles in overlapping relationship and means for transferring said articles from said intermittently operated conveying means to said guiding means.

10. An apparatus for arranging and stacking articles comprising means for conveying individually spaced articles, an intermittently operated conveying means arranged parallel to said first conveying means, means for transferring said articles from said conveying means to said intermittently operated conveying means, guiding means for arranging said articles in overlapping relationship, means for transferring said articles from said intermittently operated conveying means to said guiding means and conveying means for receiving said articles from said guiding means.

11. An apparatus for arranging and stacking articles comprising a plurality of continuously operating conveying means for individually spaced and arranged articles, a plurality of guiding means located between said conveying means arranged in staggered relation for guiding said articles into overlapping relationship and means moving partially with one of said conveying means and transversely thereof for transferring said articles from said conveying means to said guiding means.

12. An apparatus for arranging and stacking articles comprising a plurality of spaced conveying means for conveying individually arranged and spaced articles, a plurality of staggered guiding means for guiding said articles into overlapping relationship, a common receiving means located between said guiding means and intermittently operated conveying means located between said first mentioned conveying means and said guiding means.

13. An apparatus for guiding and stacking articles comprising a pair of conveying means for individually spaced and arranged articles, an intermittently operated conveying means located adjacent each of said conveying means, means for transferring articles from said conveying means to said intermittently operated conveying means, guiding means for arranging said articles in overlapping relationship located adjacent said intermittently operated conveying means, means for transferring said articles from said intermittently operated conveying means to said guiding means and a common conveying means adapted to receive said articles from said guiding means.

14. An apparatus for arranging and stacking articles comprising an endless conveyor for conveying individually spaced and arranged articles, a second conveyor arranged parallel to said first conveyor, means for intermittently operating said second conveyor, means arranged obliquely to the travel of said conveyors for transferring said articles from said first conveyor to said intermittently operated conveyor, a guiding means located adjacent said intermittently operated conveyor, means disposed transversely of the path of said conveyors for transferring the said articles from said intermittently operated conveyor to said guiding means and means for receiving said articles from said guiding means.

15. An apparatus for arranging and stacking articles comprising continuously operated conveying means for individually arranged and

spaced articles, guiding means for receiving said articles from said conveying means to arrange said articles in overlapping relationship and means for transferring said articles while in continuous motion to said guiding means.

16. An apparatus for arranging and stacking articles comprising two spaced endless conveyors for continuously conveying individually spaced articles, a pair of guiding means located between said spaced conveyors and positioned in staggered relation, means for transferring articles to said guiding means from said conveying means and receiving means located between said guiding means to receive said articles from said staggered guiding means in superposed relation.

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