Oct. 29, 1935. B. A. E. JOHNSON ET AL 2,019,080

APPARATUS FOR SHAPING AND PACKAGING CIGARS

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Fig. 1.

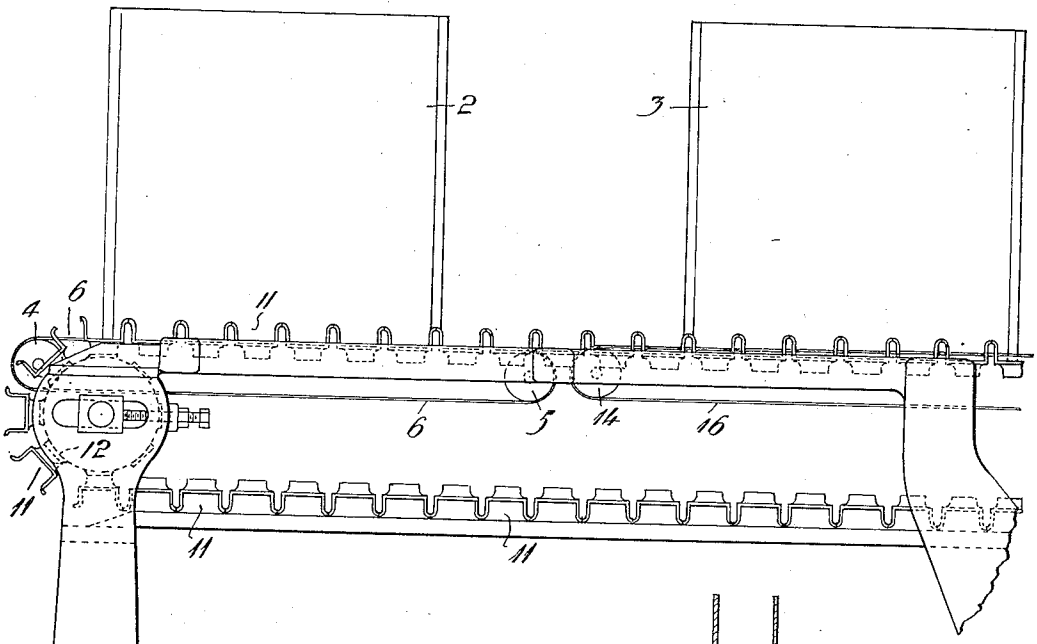


Fig. 8.

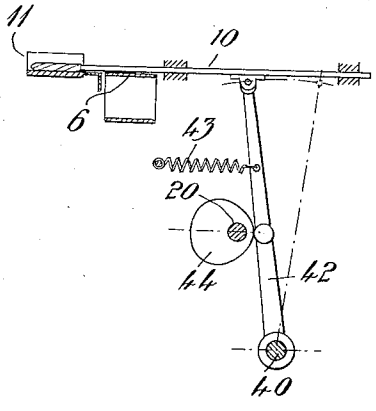
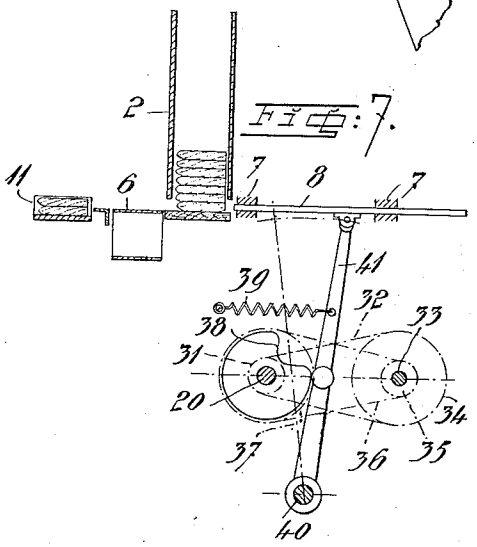


Fig. 7.



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APPARATUS FOR SHAPING AND PACKAGING CIGARS

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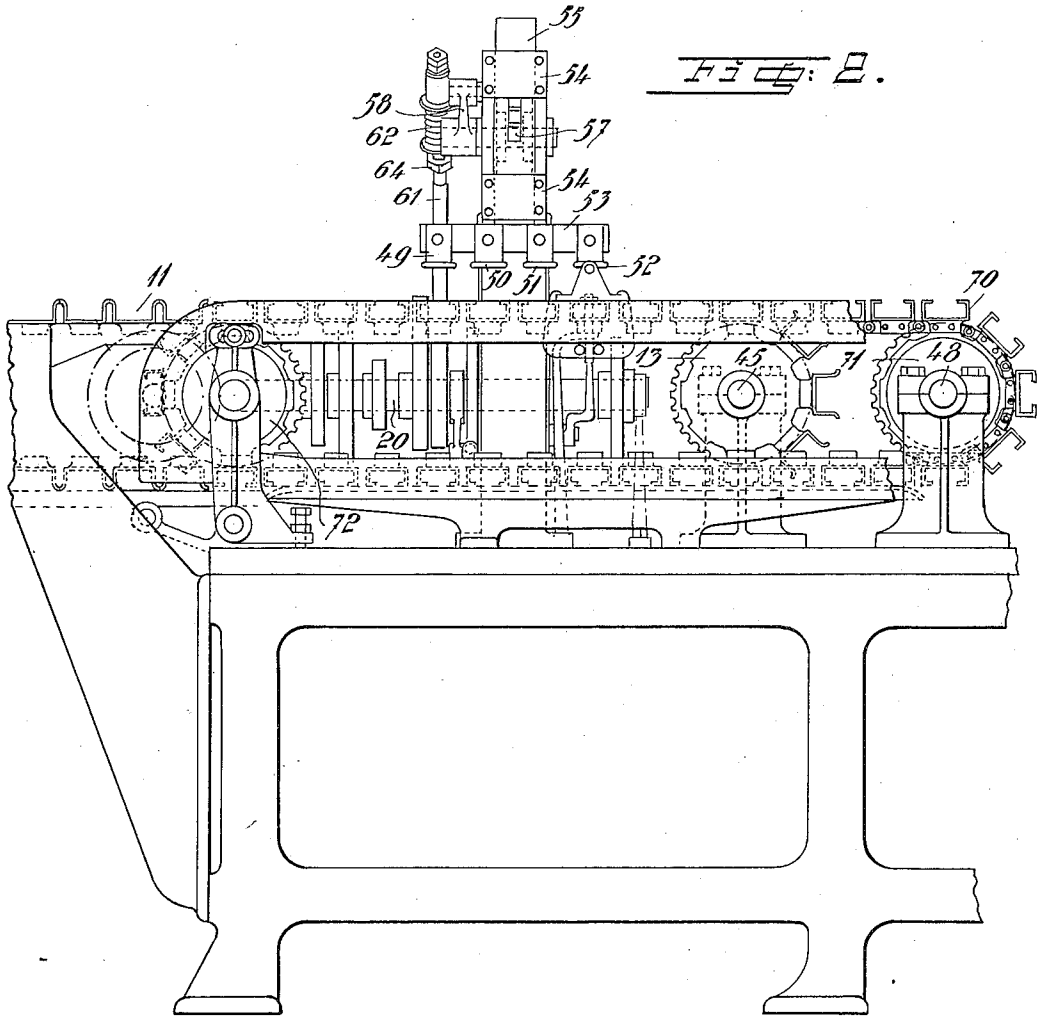
Fig. 2.



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APPARATUS FOR SHAPING AND PACKAGING CIGARS

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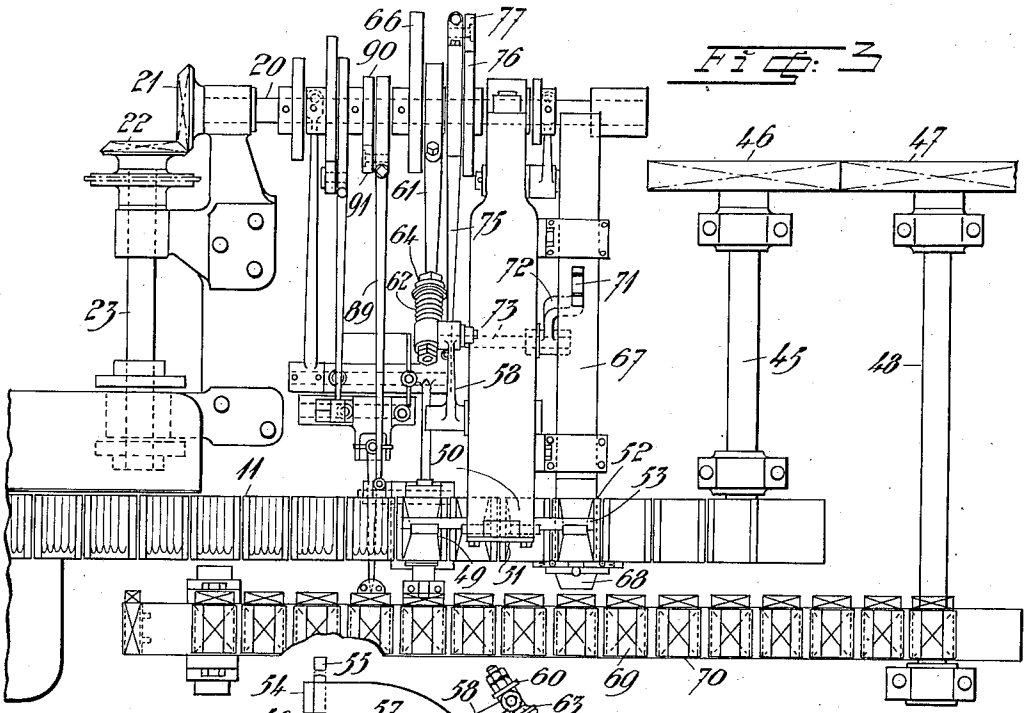

Fig. 3

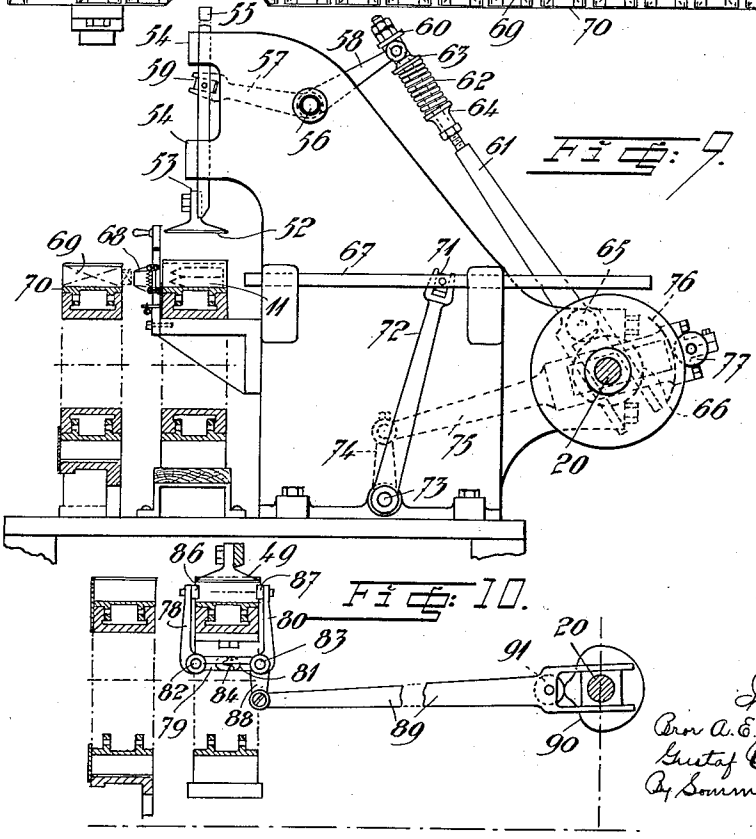

Fig. 9

Fig. 10.

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APPARATUS FOR SHAPING AND PACKAGING CIGARS

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FIG. 4.

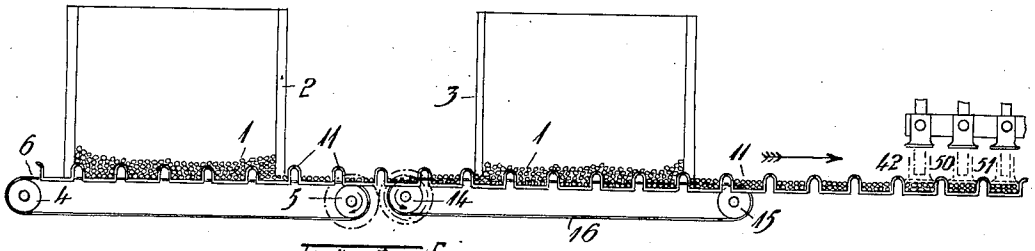


FIG. 6.

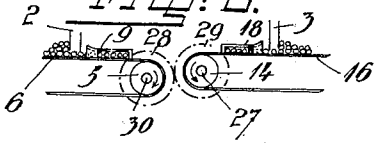
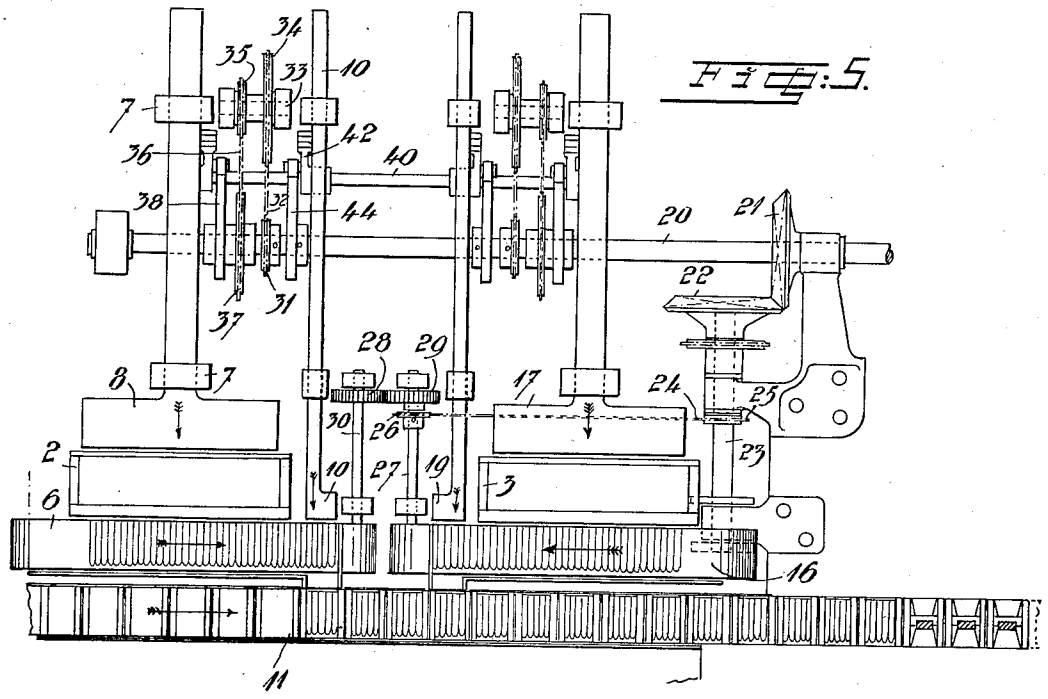


FIG. 5.



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APPARATUS FOR SHAPING AND PACKAGING CIGARS

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Fig. 11

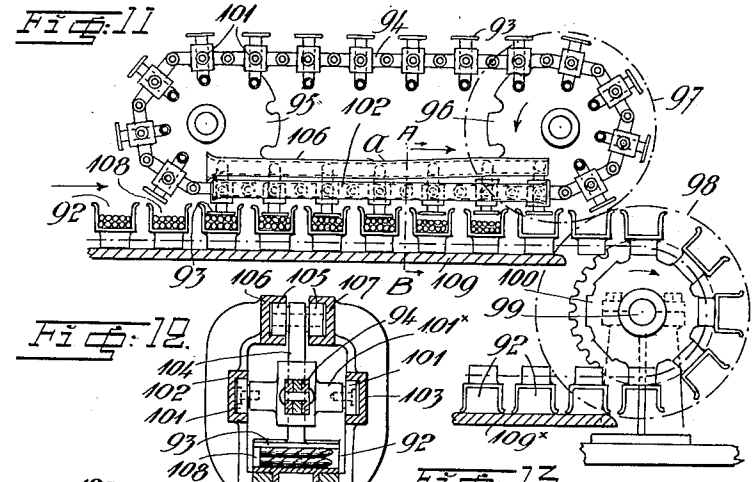


Fig. 12.

Fig. 13.

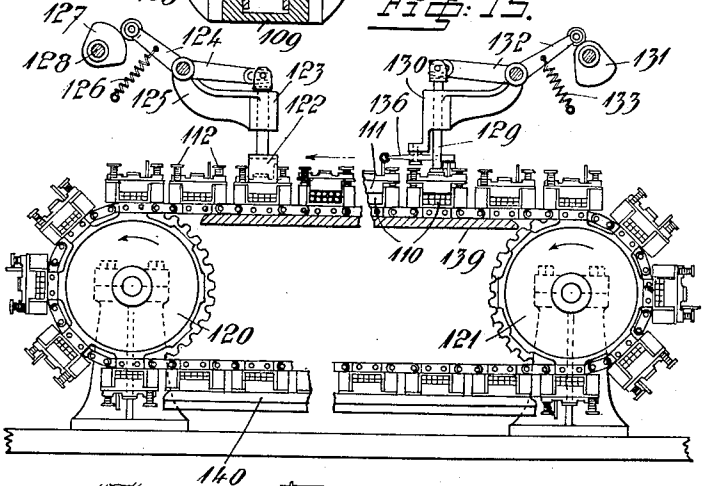


Fig. 14.

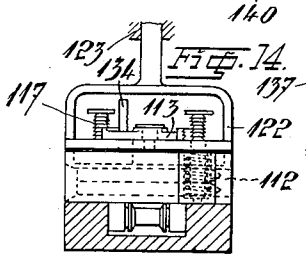


Fig. 15.

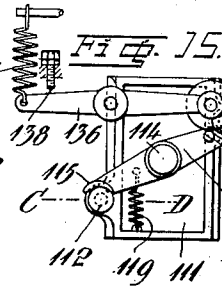
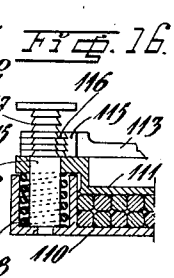


Fig. 16.



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UNITED STATES PATENT OFFICE

2,019,080

APPARATUS FOR SHAPING AND PACKAGING CIGARS

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Application May 16, 1932, Serial No. 611,736
In Germany April 5, 1932

5 Claims. (Cl. 226—5)

Little cigars and also certain types of cigars generally are manufactured in a shape substantially square in cross-section. Among the reasons herefor may be mentioned that the little cigars etc. require smaller boxes or other packings. For imparting to the little cigars which originally are cylindrical, the said square shape, the little cigars hitherto have been disposed in a great number, for instance 1000 little cigars, in superposed rows in a box and then subjected to a pressure during a comparatively long period. Practical experiments however have proved that little cigars subjected separately or in a small number of rows for instance one or two rows to a repeated pressure or a continuous pressure during a comparatively short period assume the said square cross-sectional shape which they then maintain, if immediately introduced into the box etc. The present invention is based upon this experience.

According to one form of execution of the invention the little cigars are transferred from so-called galleys in which they are located in a plurality of superposed rows of for instance 100 little cigars, onto a conveyer band, from which groups of little cigars of, for instance, five pieces are pushed by slides or the like into movable receptacles, two rows for instance of little cigars being placed one upon the other in each receptacle. The said receptacles are moved beyond a number of pistons which one after the other subject each set of little cigars to a repeated pressure. The pressed little cigars are then pushed by a slide or the like from the last pressure piston into the boxes respectively or other packings which are mounted in receptacles moved beyond the said pressure receptacles.

According to a further form of execution of the pressure and packing machine the pressure pistons accompany the pressure receptacles during a part of their path and keep the sets of little cigars subjected to a continuous pressure during a longer period.

A further modification consists in placing the little cigars in receptacles provided with pressure members which at one point of the path of the movable receptacles are forced downwards into their pressing position and are locked in the same and at another point of the said path are disengaged so that the little cigars may be introduced into the boxes etc.

Some forms of execution of the pressure and packing machine are shown as examples in the accompanying drawings. Fig. 1 is a front view of the left part of the machine arranged in accordance with one form of execution. Fig. 2 is a front view of the right part of the said machine, so that Fig. 2 constitutes a continuation of Fig. 1. Fig. 3 is a plan view of the part of the machine shown in Fig. 2. Fig. 4 shows diagrammatically and on a reduced scale the left part of the machine and some pressure pistons and illustrates the manner in which the little cigars are introduced into the pressure receptacles. Fig. 5 is a plan view of the left part of the machine. Fig. 6 shows a detail. Fig. 7 shows a slide and its driving mechanism for the transferring of the little cigars from a galley to the transport band. Fig. 8 shows a slide and its driving mechanism for transferring a set of little cigars from the conveyer band into a pressure receptacle. Fig. 9 shows in a cross section a chain carrying the pressure receptacles and a chain carrying the boxes supplied with little cigars and in side view one of the pressure pistons and the driving mechanism of the same. Fig. 10 shows a device for bringing the ends of the little cigars in a pressure receptacle into a flush position. Fig. 11 is a side view of a form of execution of pressure device in which the pressure pistons accompany the pressure receptacle during a part of their path. Fig. 12 is a section along the line A—B of Fig. 11 and on a greater scale. Fig. 13 is a side view of a pressure device in which the pressure receptacles are provided with lockable members for pressing the little cigars in the receptacles. Fig. 14 is an end view of one of the pressure receptacles and the locking mechanism for the pressure member. Fig. 15 is a top view of the pressure receptacle and the means for disengaging the locking mechanism. Fig. 16 is a section on a greater scale along the line C—D of Fig. 15.

The little cigars 1 are placed in superposed rows in frames or galleys 2 and 3, two frames being provided in the machine in question, Figs. 1, 4 and 5. A conveyer-band, belt or the like passing round rollers 4 and 5 is provided in front of the galley 2. A slide 8 movable in guides 7 pushes the lowermost row of little cigars in the galley onto the top part of the band 6. The said band 6 is driven continuously in the direction indicated by the arrow, Fig. 5. A stationary pocket 9 open toward the galley 2 is provided at the right part of the band 6, in which pocket the set of little cigars carried by the band and moved forward by the same is stopped. In the present case the said pocket is adapted to contain a set of five little cigars or a somewhat greater number located in a compact row and laterally of each other. The pocket is open at its sides so that a slide 10 mov-

able transversely of the band may push a set of five little cigars into a receptacle 11, which together with other receptacles are moved in an endless path, for instance constitute an endless chain, running round rollers 12 and 13.

A similar conveyer band 16 supported by rollers 14 and 15 is located in front of the galley 3. A slide 17 transmits the lowermost row of little cigars from the galley 3 to the said band. At the left part of the band 16 a stationary pocket 18 is provided, Fig. 6, which may contain a set of five little cigars or a somewhat greater number. The sets of little cigars are transferred one after the other by a slide 19 to the receptacles 11. The conveyer band 16 is located at such a higher level than the conveyer band 6, that the set of little cigars transmitted from the band 16 to a receptacle 11 is placed on the set transmitted from the band 6 into the same receptacle as perceived from Fig. 4.

The members stated above are driven by the main shaft 20 of the machine and the motion transmission means which will now be described. The said shaft 20 rotates by means of a bevel gear 21, 22, a shaft 23, which by means of a chain 24 and sprocket wheels 25 and 26 rotates the shaft 27 carrying the roller 14. A gearing 28, 29 transmits the rotary motion to a shaft 30, carrying the roller 5. Owing to the fact that the slide 8 transmits from the galley 2 to the band 6 a row of little cigars, which is a multiple of the set of little cigars which is transmitted by the slide 10 from the band 6 into a receptacle 11, the slide 8 may be caused to operate only when the slide 10 transmits the last set of the next preceding row transmitted to the band 6. In order to impart to the slide 8 such a movement a sprocket wheel 31, Fig. 7, is fixed to the shaft 20, which by means of a chain 32 rotates a sprocket wheel 34 rotatably mounted on a shaft 33. A sprocket wheel 35 is connected to the sprocket wheel 34 and rotates by means of a chain 36 a sprocket wheel 37 freely mounted on the shaft 20. As perceived from Fig. 7, the stated chain and sprocket gearing is so adapted, that number of revolutions of the sprocket wheel 37 is a fractional part of the number of revolutions of the sprocket wheel 31 and the shaft 20. The ratio of gearing is adapted to the numbers of transmissions, which are to be effected by the slides 8 and 10 separately during a certain period. A cam disc 38 is connected to sprocket wheel 37, which at the proper moment of time permits a spring 39 to move a lever arm 41 swingably mounted on a shaft 40 toward the left, Fig. 7. The said lever arm 41 may be fork shaped and engages a pin provided on the slide 8 and in this manner imparts to the slide the necessary motion.

Motion is imparted to the slide 10 by a fork shaped lever arm 42, Fig. 8, which is swingably mounted on the shaft 40 and by a spring 43 is forced against a cam disc 44 on the shaft 20.

The slides 17 and 19 are actuated by a driving mechanism of the same construction as the driving mechanism of the slides 8 and 10 just described.

After a set of little cigars delivered by the galley 2 and a set delivered by the galley 3 have been introduced into the receptacles 11, the chain is advanced in the direction indicated by the arrow and through a distance equal to the distance between the centre lines of the receptacles. The said intermittent motion is imparted to the chain by the roller 13 mounted on a shaft 45, which is provided with a toothed wheel 46, Fig. 3, engage a toothed wheel 47 on a shaft 48. An intermittent rotary motion is imparted to the said wheel 47 by a driving mechanism (not shown) of any suitable construction and including for instance a pawl and ratchet mechanism.

After the receptacles of the chain 11 have been provided with two sets of little cigars they are successively placed under a number of pressure pistons, in the present case four pistons 49, 50, 51 and 52, Figs. 2 and 3. The said pressure pistons are mounted on a crosshead 53, common to the same and fixed to a slide or rod 55 which is movable upwards and downwards in guides 54 provided in the frame of the machine. The slide together with the pressure pistons is moved downwards at the proper moment by a two-armed lever 57, 58, which is swingably mounted on a pin 56 and the fork-shaped arm 57 of which engages a die 59 provided on the slide 55. The fork-shaped end of a second arm 58 is engaged by a nut 60 on a rod 61 and a ring 63 slidable on the rod 61 and acted upon by a spring 62. The said spring 62 is supported by a nut 64 by means of which the tension of the spring may be controlled. The rod 61, which is fork-shaped and engages the shaft 20 and is guided by the same, has a roller 65 which engages a lateral groove provided in a driving disc 66 on the shaft 20. As the rod 61 is moved upwards by the said grooved disc 66, it forces by means of the spring 62 the pressure pistons 49, 50, 51 and 52 downwards against the little cigars located in the four receptacles 11. The pressure of the pistons on the little cigars may be controlled by adapting the starting tension of the spring 62 by means of the nut 64. As the pressure pistons have been moved upwards the chain 11 is advanced one step so that the little cigars in each receptacle finally have been subjected four times to the pressure of the pressure pistons i. e. to the pressure executed first by the piston 49 then by the piston 50, again by the piston 51 and finally by the piston 52. The little cigars thus pressed have a square cross-sectional shape.

After the little cigars have been pressed by the last piston 52 they are ejected from the receptacle by a slide 67, Figs. 3 and 9, which through a mouth piece 68 transmits the little cigars into a box 69, or a packing of other type and located in receptacles provided in a chain 70. As the mechanism for bringing the boxes into the said receptacles is not comprised by the present invention, they are not shown nor described. The chain 70 passes round discs 71 and 72, Fig. 2. Disc 71 is fixed on the shaft 48 and is rotated intermittently, so that the receptacles 70 provided with empty boxes are successively placed in front of the mouth-piece 68. After the boxes have been charged with cigarettes, they are closed and ejected from the chain in any suitable manner.

A pin in the slide 67, provided with a die 71, Figs. 3 and 9, is embraced by the fork-shaped end of an arm 72, which is fixed on a shaft 73 journaled in the frame of the machine, see also Fig. 3. A second arm 74 is fixed to the said shaft 73, to which arm a rod 75 is jointed, which embraces the shaft 20 and is guided by the same. The said rod is provided with a roller 77, which is acted upon by a cam disc 76 on the shaft 20. The cam disc 76 permits a spring (not shown) to move the slide 67 forwards (toward the left in Fig. 9) at suitable moments during which movement the slide pushes the little cigars from the partition 11 into the box 69 in the chain.

Before the little cigars are subjected to the action of the first pressure piston 49, the ends of the little cigars of each group preferably are caused to flush with each other. Fig. 10 shows a mechanism for this purpose. Two elbow-shaped arms 78, 79 and 80, 81 are swingably mounted on stationary pins 82 and 83 and the arms 79 and 81 turned inwards engage one another for instance by means of a notch 84 in the arm 79 and a projection 85 on the arm 81 so that the swinging motion of the elbow-shaped arm 80, 81 is transmitted to the arm 78, 79. The ends of the arms 78 and 80 are provided with ribs 86 and 87 projecting inwards and adapted to enter the receptacle placed under the pressure piston 49 and by pressure on the ends of the little cigars to bring the little cigars into a flush position, as shown in Fig. 10. The elbow-shaped arm 80, 81 has an arm 88, to which is jointed a link 89, which by means of its fork-shaped end is guided by the shaft 20. A cam disc 90 is fixed on the shaft 20 and a roller 91 on the link 89 is forced by a spring (not shown) against the said disc 90. The disc 90 is so shaped, that it permits the said spring to swing the arms 78 and 80 inwards for the purpose stated above, the arms 78 and 80 being then swung outwards by the cam disc 90.

Through the pressure to which the little cigars in the receptacles 11 are repeatedly subjected the little cigars assume the square shape, which is necessary for the introducing of the same into the boxes. Besides, the great advantage is gained that the little cigars are divided into groups, which after the performance of the pressing operation are ready to be introduced into the box etc.

By the provision of pressure molds and pressure pistons of suitable shape another cross-sectional shape than the square shape may evidently be imparted to the little cigars.

In the form of execution of the invention shown in Figs. 11 and 12, pressure pistons 93 co-operate with receptacles or molds 92, which pistons are movable longitudinally in the links 94 of a chain passing round discs or rollers 95 and 96. The said chain is driven by the shaft 99 which carries the driving disc or roller 100 of the receptacle chain. Motion is transmitted to the disc 96 by means of toothed wheels 97 and 98 having the same diameter (the said toothed wheels are shown only by dotted lines). The discs 95, 96 and 100 have the same diameter and the distances between the centre lines of the receptacles 92 and the centre lines of the pressure pistons 93 are equal, so that during the motion of the receptacles and the pistons in the directions, indicated by the arrows the receptacles and the pistons coincide and the pistons may descend in the respective receptacles. During the pressing operation the links 94 of the chain are guided by rollers 101, which are journaled on lateral projections 101^x on the links and enter into groove-shaped, stationary guides 102 and 103 provided one at each side of the path of the receptacle chain. On the rod 104 of each pressure piston 93 two rollers 105 are journaled, which engage groove-shaped stationary guides 106 and 107 while the pressure pistons are in their operative position. The left part of the guides 106 and 107 is funnel-shaped, so that the entrance of the rollers 105 into the guides is facilitated and besides the pressure pistons respectively are forced downwards into the receptacles 95 and subject the two sets of little cigars 108 located in the receptacle to a pressure. The said little cigars may have been introduced into the receptacles in the same manner as in the machine shown in Figs. 1–10 inclusive. The first, left part of the guides 106 and 107 is parallel to the path of the partition chain, so that the pressure pistons remain in their lowered operative position. The top part of the chain is sustained by a bar 109 or the like extending longitudinally of the chain. The lower part of the chain is sustained by a similar bar 109^x. The distance between the right part of the guides 106 and 107 and the path of the pressure receptacles increases gradually at *a*, so that the pressure pistons are moved upwards and their pressure on the little cigars is reduced or ceases. The guides 106 and 107 may then be parallel to the path of the receptacles, so that the pistons remain in their position in the receptacles and serve as guides for the pressed little cigars while pushed out of the receptacles and into the boxes etc., which may be effected in the same manner as stated above. The receptacle chains may be moved continuously, at least at a comparatively slight rate, because the slides introducing the little cigars into the compressor receptacles and the slides removing the same may be moved at a velocity adapted thereto. The output of the machine may hereby be considerably increased.

As perceived from Fig. 11, the little cigars are subjected to pressure from the pistons 93, while the receptacles are moved through a distance substantially equal to the length of four receptacles. Through the pressing thus described the square cross-sectional shape is imparted to the little cigars. By rendering the guides 106 and 107 for instance wave shaped the pistons 93 will be lowered and raised a plurality of times and thus subject the little cigars to a repeated pressure.

In the form of the pressing machine illustrated in Figs. 13, 14, 15 and 16 each of the pressure receptacles 110 is provided with a pressure member 111 which extends into the receptacle and is guided by the same and by two pins 112 fixed to the bottom wall of the receptacle and provided with a head. A two-armed locking member or pawl 113 is pivoted at 114 to the pressure member 111 and is provided in its ends with semicircular lateral recesses 115. In the side of the said recesses 115 teeth 116, adapted to engage corresponding teeth 117 on top end of the pins 112, are provided. Springs 118, one slid on each pin 112 and bearing with its one end against the bottom wall of the receptacle 110 and with its other end against the pressure member 111 force the latter normally against the heads of the pins 112. A spring 119, fixed to the pressure member tends to swing the pawl 113, 115 into engagement with the teeth 117 of the pins 112, so that as the pressure member 111 is forced downward in the manner stated below, after the pressure receptacle has been charged with little cigars, the pressure member 111 may be locked in any desired operative position by the pawl 113, 115 engaging the teeth 117 of the pins 112, Fig. 16. The pressure receptacles are connected with each other and constitute an endless chain, which passes round the rollers or discs 120 and 121. The said discs are rotated step by step by the main shaft of the machine by a motion transmitting device, not shown.

During the travelling of the said chain in the direction indicated by the arrows, Fig. 13, the receptacles charged with cigarettes, are placed, one after the other, below a fork-shaped piston 122, which at the suitable moment is lowered and forces the pressure member 111 downwards into

the receptacle, the pressure member being then locked in its lower operative position by the pawl 113, 115 in the manner stated above.

The piston 122 is movable in a guide 123 and to the top end of the piston rod is connected the fork-shaped end of a two-armed lever 124, which is pivoted to a bracket 125. The downward movement is imparted to the piston 122, against the action of a spring 126, by a cam disc 127 on a shaft 128 which is rotated by the main shaft of the machine by means of a motion transmitting device, not shown.

The little cigars placed in the receptacle 110 are compressed by the lowered pressure member or piston 122 and are held in the compressed condition by the locked pressure member while the movement of the receptacles is continued.

The receptacles with the compressed little cigars finally arrive to a station, where the pawl 113, 115 is disengaged and the pressure of the pressure piston 122 on the little cigars is reduced. 129 is a piston which is movable in a bracket 130 and may be lowered by a cam disc 131, rotated by the main shaft, and a two armed lever 132 against the tension of a spring 133. The said arm 132 is fork-shaped and connected to the piston 129. As a receptacle is located under the piston 129, the piston is lowered in the stated manner and acting upon the head of the pin 114 lowers the pressure member 111 through a short distance, so that the pressure between the teeth 116 of the pawl 113, 115 on the teeth 117 of the pins 112 is reduced or ceases. At substantially the same time a pin 134 fixed in the pawl 113, 115 has struck a roller 135, journaled on a two-armed lever 136, which is swingably mounted on the bracket 130 and acted upon by a spring 137. The normal position of the lever arm is fixed by a preferably adjustable abutment (screw) 138.

As the pin 134 strikes the roller 135 the lever arm 136 is swung through a slight angle, so that after the reducing of the pressure between the teeth 116 and 117 has been effected in the stated manner, the pawl 113, 115 is disengaged and the pressure member released. The compressed little cigars may then be pushed out from the receptacle guided by the pressure member and introduced into the box in a manner analogous to the manner described above with reference to Figs. 3 and 9.

In order that the compressing period may be as long as possible the station, at which the receptacles are charged with little cigars, which may be effected analogous to the manner stated above, is located between the pistons 129 and 122, so that the little cigars are subjected to pressure while the receptacles pass round the left disc or roller 120 and from this roller to the right roller 121 and round the roller last mentioned to the piston 129. The comparatively long period, during which the little cigars thus are subjected to pressure insures the desired square cross-sectional shape of the little cigars and besides the little cigars are subjected to a drying process during the said passage. The top and lower parts of the receptacle chain are sustained during the said travelling by guide bars 139 and 140 respectively.

The degree to which the little cigars are compressed may be controlled by the change of cam disc 127. Through the provision of two or more piston devices of for instance the same construction as the piston device 122 and the parts belonging to the same along the path of the receptacle chain the little cigars by suitably adapting the height of the cam discs (127) may be subjected to an increased compression.

We claim:

1. In a machine for imparting to cigars and similar articles a cross-sectional shape different from the ordinary circular cross-sectional shape, the combination of means forming receptacles to contain one or more rows of cigars, means for moving said receptacles in an endless path, pressure members one for each receptacle, means provided at a point of the said path for forcing each pressure member against the cigars contained by its receptacle, each receptacle having a spring-mechanism tending to move its pressure member outward from the receptacle, means for locking each pressure member in operative position, and means at a second point of the said path for disengaging the said locking means to reduce the pressure of the pressure member on the cigar.

2. A machine as claimed in claim 1 characterized by the locking means for the pressure member comprising one or more toothed pins fixed in walls of the receptacles, a spring-actuated toothed arm, swingably mounted on the pressure member, and an abutment located in the path of the toothed arm to disengage the same.

3. In a machine for converting loose cigars into covered bundles, the combination of a member comprising receptacles moved in an endless path and adapted to contain one or more superposed rows of cigars, a conveyer band on which the cigars are placed in a row, a stationary abutment located above the said band for stopping the cigars in their motion, a slide for moving a group of cigars from the said band and into one of the receptacles, pressure members cooperating with the said receptacles, means for forcing the said pressure members against the cigars contained by the receptacles, and a member transferring the compressed bundles from the said receptacles into covers moved longitudinally of the path of the receptacles.

4. In a machine for converting loose cigars into covered bundles, the combination of a member comprising receptacles moved in an endless path and adapted to contain two or more superposed rows of cigars, a conveyer band on which the cigars are placed in a row, a stationary abutment located above the said band for stopping the cigars in their motion, a slide which moves a group of cigars from the said band and into one of the receptacles, a second conveyer band located at a somewhat higher level than the conveyer band first mentioned, a second stationary abutment for stopping the cigars in their motion, a second slide which moves a second group of cigars into the receptacles from the said band and places the same on the group first introduced into the receptacles, pressure members cooperating with the said receptacles, means for forcing said pressure members against the cigars contained by the receptacles, and a member transferring the compressed bundles from the said receptacles into covers moved longitudinally of the path of the receptacles.

5. In a machine as claimed in claim 4 the provision of two members located one on either side of the path of the receptacles and movable toward and from the same, and means for forcing the said members against the end of the cigars for bringing the cigars into a flush position before the pressing of the same.

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