April 15, 1952 G. BARDET 2,592,642

DEVICE FOR FILLING RECEPTACLES WITH CYLINDRICAL ARTICLES

Filed July 18, 1945 3 Sheets-Sheet 1

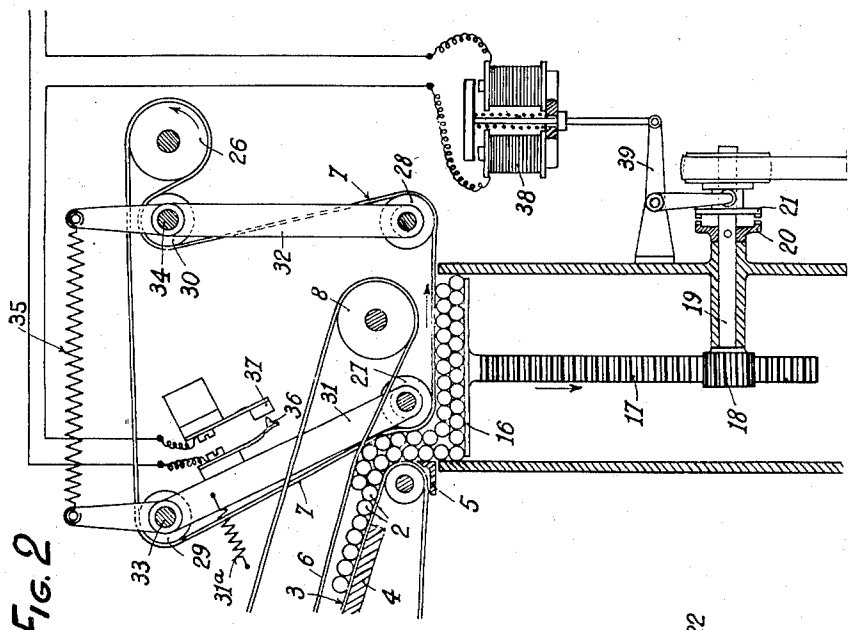


FIG. 2

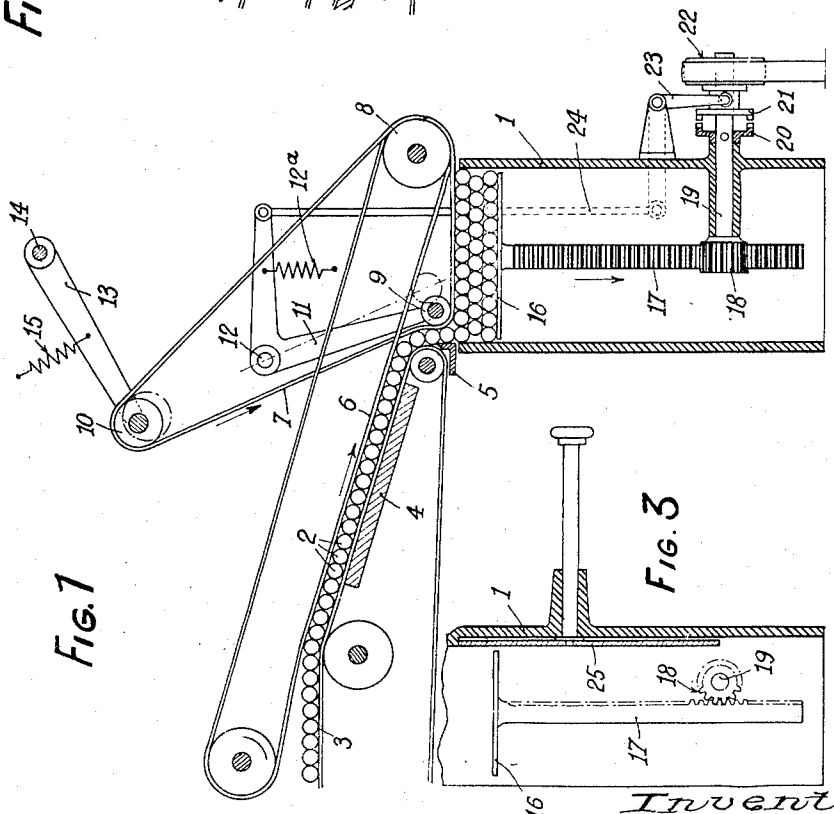


FIG. 1

FIG. 3

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DEVICE FOR FILLING RECEPTACLES WITH CYLINDRICAL ARTICLES

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FIG. 4

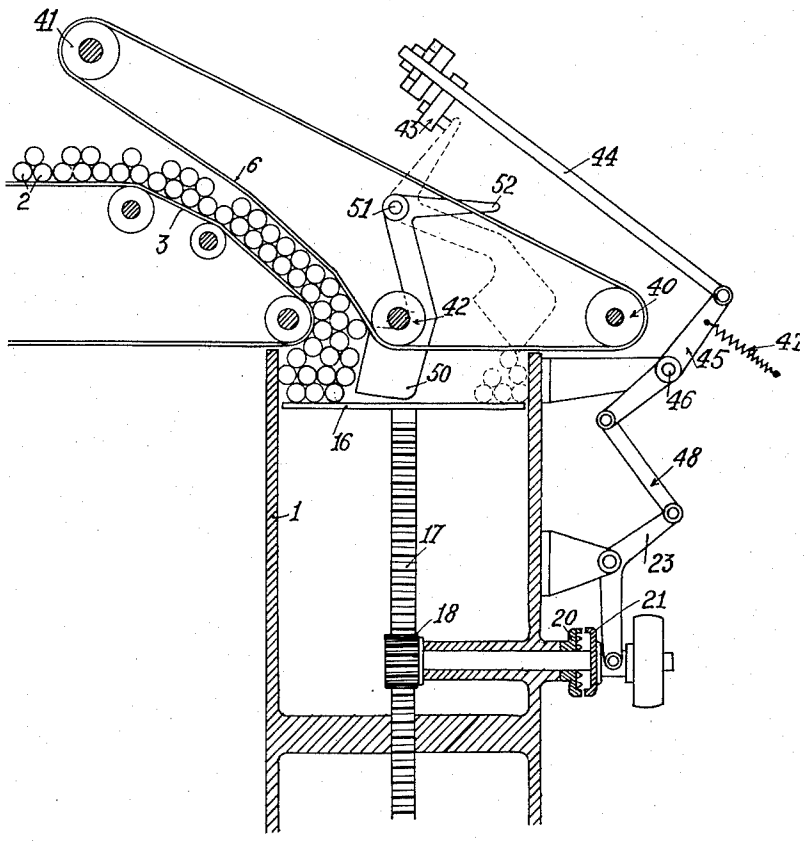
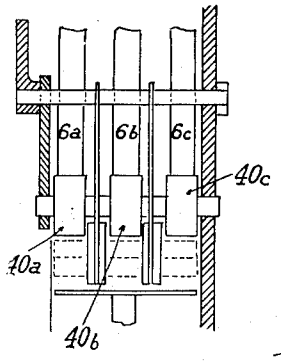


FIG. 5



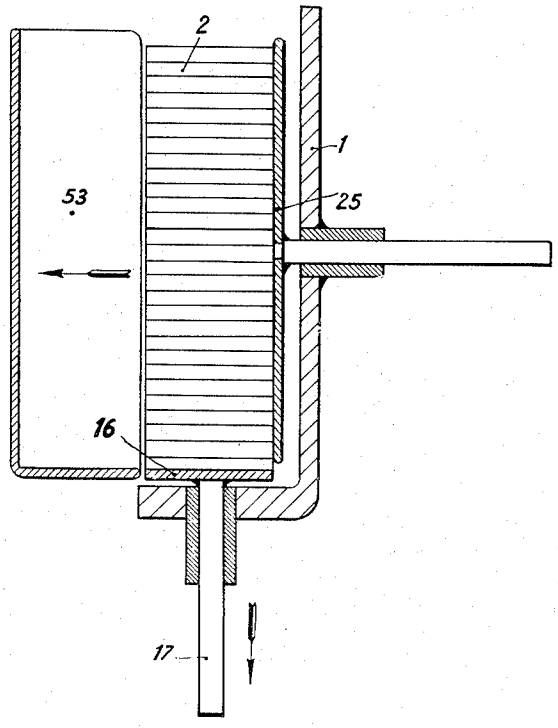
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DEVICE FOR FILLING RECEPTACLES WITH CYLINDRICAL ARTICLES

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Fig. 6



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DEVICE FOR FILLING RECEPTACLES WITH CYLINDRICAL ARTICLES

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5 Claims. (Cl. 214—6)

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The present invention has for its object a device for filling receptacles with articles identical to each other, for instance spherical, cylindrical or tubular articles, without leaving empty spaces, and whilst avoiding damaging said articles in any way whatever.

Numerous filling up devices already exist suitable for all kinds of articles or products to be stored in receptacles. Many give satisfaction; but when fragile products are contemplated, as for instance small glass flasks, cigarettes, etc., a difficulty is encountered owing to the fact that it is impossible to allow said articles to fall, even from a small height, into the receptacle. Moreover, in particular if cylindrical products are under consideration, and for certain relative dimensions of the articles and receptacle, during a falling operation, the articles would risk becoming placed crosswise and, consequently, the filling would be incorrect.

The present invention is intended to obtain a distribution and filling without dropping the articles.

For that purpose the device according to the invention in which the articles are admitted through a channel in the receptacle to be filled, is characterised in particular by the fact that said receptacle comprises a movable bottom, having an automatic movement, and that suitable means determine the displacement of said bottom and space it away from the zone in which the articles issuing from the channel, are admitted, under the thrust of said articles, as soon as they accumulate at the outlet of said channel.

Said channel is preferably constituted by one or more endless bands drawing along the articles, with a uniform movement of translation, towards the receptacle to be filled.

According to a particular embodiment of the invention, the excessive rush of the articles produces the displacement of a movable guide which controls the mechanical engagement or the electric circuit determining the forward movement of the movable bottom.

According to another embodiment of the invention the endless band constituting the upper wall of the channel admitting the articles is extended above the receptacle to be filled; it is formed of several parallel strips between which pass the teeth of a plate pivoting about a fixed axis and provided with a tail-piece which can come in contact with a catch carried by a rod capable of actuating the clutch setting the movable bottom in motion.

The invention is more particularly applicable

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to the case in which the receptacle has the form of a magazine or of a recess having a rectangular cross section, but it can also be applied to receptacles of various other arrangements.

In order that the invention may be more clearly understood, three embodiments of the new device have been illustrated in the accompanying diagrammatic drawing.

Fig. 1 shows a device the control of which is purely mechanical.

Fig. 2 shows a modified device with an electromechanical control.

Fig. 3 illustrates a device for laterally ejecting the articles from the receptacle after filling.

Figs. 4 and 5 are respectively an elevation and a side view showing another embodiment.

Fig. 6 is a vertical cross-section through the axis of the pusher member. Referring to Fig. 1, it will be seen that 1 denotes the receptacle to be filled. Said receptable is open on the side which, in the position illustrated in the drawing, is located at the upper part. It is also open on the rear side, that is to say on the side located in rear of the plane of the drawing.

The articles 2, which are to be housed in said receptacle, are admitted on an endless band 3, passing on bearing members 4, 5 suitably profiled so that in the vicinity of the receptacle, the endless band 3 has a certain inclination. In the inclined part, opposite the endless band 3, an auxiliary endless band 6 is provided, having the same linear speed as the endless band 3. The articles 2 are therefore, in their final path tightly pressed between the endless band 3, on the one hand, and the endless band 6 and a guide 7, on the other hand.

Said guide 7 is constituted by an endless belt, the linear speed of which is the same as that of the endless bands 3 and 6; it is so arranged as to be moved under the thrust produced by the articles entering the channel between the endless bands 3 and 6. For that purpose, said belt is carried by three pulleys 8, 9, 10, pulley 8 being a driving pulley and also actuating endless band 6. Pulley 9 which supports the belt at the inlet of receptacle 1, is carried by a bent lever 11, pivotally mounted on a fixed spindle 12 and subjected to the action of a returning spring 12a. Pulley 10, which supports the belt at its upper part, is carried by an arm 13, pivotally mounted about a fixed spindle 14 and constantly urged by a spring 15.

In the receptacle 1 to be filled is arranged a movable bottom 16. The latter can be raised and lowered by a suitable mechanism. For in-

stance, the bottom is rigid with a rack 17, meshing with a pinion 18, fast on a shaft 19, carrying a clutch member 20 with which can come in engagement a member 21, forming the counterpart of the clutch, rigid with a pulley 22, continuously rotating. The unit formed by the pulley 22 and the clutch member 21 can slide on shaft 19, under the action of a bent lever 23 to which is attached a rod 24 pivoted, on the other hand, on the end of one of the arms of bent lever 11.

The operation is as follows:

The bottom 16 is first of all placed in its uppermost position. At this moment it is located against the orifice admitting the articles and at the level of the upper part of the receptacle.

The endless bands 3, 6 and 7 are set in motion and the articles 2 rush towards the filling orifice. As they cannot issue forth owing to the obstacle created by the movable bottom 16, the guide 7 moves away until the lever 23 engages together members 20 and 21. The bottom 16 then lowers and allows the articles to enter the receptacle.

If the respective speeds of the endless bands and bottom 16 are exactly adjusted, the filling up orifice is rapidly cleared. Guide 7, restored by spring 12*a*, then resumes its starting position. The two members 20 and 21 of the clutch separate and the bottom 16 ceases to lower. Then the cycle begins over again without there ever being a "miss" in the filling, nor, consequently, any appreciable space between the articles becoming packed above the bottom 16.

When bottom 16 has reached its lower position, which is adjusted in accordance with the lower part of receptacle 1, the latter is completely full and its charge can be transferred, for instance by lateral pushing or ramming, into a box, tank, or any suitable chamber. In Fig. 3 has been shown by way of example a ramming device 25 which can be actuated by hand or mechanically.

In the modification of Fig. 2, the control of the clutch 20—21 is an electromagnetical control. The endless belt 7 constituting the movable guide passes over a set of pulleys 26, 27, 28, 29, 30. Pulley 26 is the driving pulley which actuates the belt 7 at the same speed as endless bands 3 and 6, as previously stated. The lower pulleys 27 and 28 are carried by two arms 31, 32 completing a kind of parallel motion. Said arms pivot on fixed pivot pins 33, 34 and are subjected to the action of a spring 35 maintaining the belt under tension. The reversing pulleys 29 and 30 are mounted concentrically with the axes of rotation of arms 31, 32. The movable unit 31, 32 is restored by a spring 31*a*. Arm 31 carries a contact 36 which can come in contact with a fixed contact 37 establishing the circuit of an electromagnet 38 the armature of which controls, by means of a bent lever 39, the clutching of the two members 20, 21, similar to those shown in Fig. 1.

The operation of this device is as follows:

When the guide 7 moves away under the rush of the articles, contact 36, 37 is closed; the electromagnet 38 operates and causes the bottom 16 to lower, until guide 7 resumes its initial position and so on.

As will be seen, the filling takes place automatically, without leaving empty spaces in the receptacle, and while avoiding any shock or pressure liable to damage the articles stored.

In the device shown in Figs. 4 and 5, the articles 2 which are to be housed in said receptacle 1 are led, as previously, through a passage formed

by the two endless bands 3 and 6 which advance at the same speed. The upper endless band 6 is extended beyond the receptacle by passing over pulleys 40, 41, 42, the first being a driving pulley and the others acting as reversing pulleys. The endless band 6 is formed of several parallel strips 6*a*, 6*b*, 6*c*, passing over as many pulleys 40*a*, 40*b*, 40*c*, as seen in Fig. 5. Between said strips pass the teeth or branches of a plate 50, constituting a kind of rake or fork, against which press the articles 2 which advance in the passage formed by the two endless bands 3 and 6; said plate rotates at 51 and is extended by a tail-piece 52 which can come in engagement with a catch 43 carried by a rod 44, pivoted with a lever 45, pivotally mounted about the spindle 46. Said lever, which is subjected to the action of a returning spring 47, is connected by a connecting-rod 48 to the lever 23 controlling the clutch.

The operation is as follows: Owing to its weight, plate 50 tends to occupy the position illustrated in full lines in the drawing. When the articles admitted by the passage 3, 6 have filled the space comprised between the walls of the receptacle, the movable bottom 16 and plate 50, they push back the plate by causing it to pivot about spindle 51 until it assumes the position indicated in dot and dash lines. At this moment, tail-piece 52 encounters catch 43, which sets the clutch in action, so that the movable bottom lowers. The articles cease pressing against the inlet of the receptacle, and the plate tends to bear against the catch, the clutch is uncoupled and the bottom stops. The articles again accumulate, the clutch is recoupled, the bottom lowers and so on until the receptacle is completely full. At this moment the ram or pusher member 25 (Fig. 6) is actuated by hand or mechanically as in the case already described with reference to Fig. 1 whereby the cigarettes or the like objects are urged laterally out of the stationary receiver 1 as a bulk and enter a removable container 53 which is then carried away. The lateral displacement of the ram 25 is preferably ensured mechanically through an arrangement which is not and need not be illustrated.

It is to be understood that the above arrangements have been given only by way of examples and that numerous modifications can be made therein without departing from the scope of the invention.

What I claim as my invention and desire to secure by Letters Patent is:

1. An arrangement for the filling of containers with a large number of similar articles in superposed layers, comprising a packing chamber assuming throughout its height an unvarying cross-sectional shape, a horizontal platform slidingly fitted inside said chamber and forming a vertically adjustable bottom for the latter, means for controlling the lowering movement of the platform, means for feeding the articles independently of one another into the chamber to allow said articles to drop in succession with their axes lying horizontally over the inlet end of the platform, to roll over the latter and to form a horizontal layer thereon, said feeding means including a conveyor belt carrying the articles and feeding them to the corresponding end of the chamber, an endless belt covering the articles lying over a section of the first belt leading to the inlet of the packing chamber and extending beyond same over the upper end of the packing chamber, and means for constraining the two belts to advance at a uniform speed, the speed of the two

belts being always equal and of same direction, a feeler adapted to pivot around a horizontal stationary axis parallel to the direction of the axes of the articles lying on the platform and engaging the foremost article of a layer moving under the pressure of the succeeding articles and submitted to the horizontal thrust of said foremost article, and means whereby said feeler controls the platform-lowering means to lower said platform each time the feeler has receded to the end of its allowed path corresponding to the arrival of said foremost article at the end of the chamber opposed to the inlet point of the platform thereof.

2. An arrangement for the filling of containers with a large number of similar articles in superposed layers, comprising a packing chamber assuming throughout its height an unvarying cross-sectional shape, a horizontal platform slidingly fitted inside said chamber and forming a vertically adjustable bottom for the latter, means for controlling the lowering movement of the platform, means for feeding the articles independently of one another into the chamber to allow said articles to drop in succession with their axes lying horizontally over the inlet end of the platform, to roll over the latter and to form a horizontal layer thereon, said feeding means including a conveyor belt carrying the articles and feeding them to the corresponding end of the chamber, an endless belt covering the articles lying over a section of the first belt leading to the inlet of the packing chamber and extending beyond same over the upper end of the packing chamber and means for constraining the two belts to advance at a uniform speed, the speed of the two belts being always equal and of same direction, a feeler adapted to pivot round a horizontal stationary axis parallel to the direction of the axes of the articles lying on the platform, said feeler engaging the foremost article of a layer moving under the pressure of the succeeding articles and submitted to the horizontal thrust of said foremost article, and means whereby said feeler controls the platform-lowering means to lower said platform each time the feeler has receded to the end of its allowed path corresponding to the arrival of said foremost article at the end of the chamber opposed to the inlet point of the platform thereof.

3. An arrangement for the filling of containers with a large number of similar articles in superposed layers, comprising a packing chamber assuming throughout its height an unvarying cross-sectional shape, a horizontal platform slidingly fitted inside said chamber and forming a vertically adjustable bottom for the latter, means for controlling the lowering movement of the platform, means for feeding the articles independently of one another into the chamber to allow said articles to drop in succession with their axes lying horizontally over the inlet end of the platform, to roll over the latter and to form a horizontal layer thereon, said feeding means including a conveyor belt carrying the articles and feeding them to the corresponding end of the chamber, a series of parallel endless strands covering the articles, lying over a section of the first belt leading to the inlet of the packing chamber and extending beyond same over the upper end of the packing chamber and means for constraining said belt and strands to advance at a uniform speed, the speed of the belt and strands being always equal and of same direction, a plurality of parallel blades rigid with one another, adapted to pivot round an axis parallel with the axis of the articles on the platform and to engage the intervals between the endless strands and projecting into engagement with the foremost articles of a layer moving under the pressure of the succeeding articles and submitted to the horizontal thrust of said foremost article and means whereby said blades control the platform-lowering means to lower said platform each time the blades have receded to the end of their allowed path corresponding to the arrival of said foremost article at the end of the chamber opposed to the feeding means.

4. A device designed to fill receptacles with articles, including a loading chamber, a travelling band driven by a uniform movement supporting the articles and bringing them toward the loading chamber along a slight slope, said travelling band offering upon arrival above the loading chamber a region vertically inflected toward the lower part to permit the articles to leave said travelling band and to align themselves by gravity in the loading chamber, an endless belt driven by a uniform movement of the same speed and in the same direction as the movement of the travelling band, said endless belt being placed above the travelling band and parallel to the travelling band in the region in which the travelling band has a slight slope in order to cover these articles placed side by side in a single layer on the travelling band, up to the region vertically inflected toward the lower part of the travelling band, a platform mounted in a sliding fashion vertically to the bottom of the loading chamber to support the articles which are aligned by gravity in the loading chamber, an arm mounted to pivot about a horizontal axis above the loading chamber, a pulley mounted at the lower end of this arm with respect to the region vertically inflected toward the lower part of the travelling band, a belt passing over the pulley to form with the region inflected toward the lower part of the travelling band a vertical corridor by which the articles are aligned by gravity in the loading chamber, and means driven by said arm to control the descending movement of the platform when the articles which arrive in the vertical corridor delimited by the region vertically inflected toward the lower part of the travelling band and the region of the second mentioned belt which passes around the pulley find the loading chamber filled, and occur in several layers in this vertical corridor, pushing back the second mentioned belt and the pulley and causing the arm to pivot about its horizontal axis.

5. A device designed to fill receptacles with articles, including a loading chamber, a travelling band driven by a uniform movement supporting the articles and bringing them toward the loading chamber along a slight slope, said travelling band having, upon arrival above the loading chamber, a region vertically inflected toward the lower part to permit the articles to leave the travelling band and to align themselves by gravity in the loading chamber, an endless belt driven by a uniform movement of the same speed and in the same direction as the movement of the travelling band, the endless belt being placed above the travelling band and parallel to the travelling band in the region in which the travelling band has a slight slope to cover these articles placed side by side in a single layer on the travelling band, up to the region vertically inflected toward the lower part of the travelling band, a platform mounted so as to slide vertically to the bottom of the loading chamber to support the articles

which are aligned by gravity in the loading chamber, an arm mounted to pivot about a horizontal axis above the loading chamber, a pulley mounted at the lower end of this arm with respect to the region vertically inflected toward the lower part of the travelling band, a belt passing over this pulley to form with the region inflected toward the lower part of the travelling band a vertical corridor by which the articles are aligned by gravity in the loading chamber, and electromagnetic means driven by this arm to control the descending movement of the platform when the articles which arrive in the vertical corridor delimited by the region vertically inflected toward the lower part of the travelling band and the region of the second mentioned belt which passes around the pulley find the loading chamber filled and occur in several layers in this vertical corridor, pushing back the second mentioned belt and the pulley and causing the arm to pivot about its horizontal axis.

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