# PACKAGING SYSTEM

## TECHNICAL FIELD

**[0001]** The present invention relates to packaging of articles, particularly to a packaging machine for packaging articles.

## BACKGROUND

**[0002]** Packaging of the various articles, such as soap units in containers, such as cartons may involve various operations. In an example, the operations may include aligning more than one soap units in a predetermine orientation, and stacking the soap units in the containers. The packaging process may also involve banding the soap units, i.e., tying the soap units together to form a banded unit, in cases where banded soap units are to be packaged. Generally, packaging systems are used for packaging of soap units, in stacks, in the cartons.

**[0003]** For example, a packaging system may comprise an in-feed conveyor belt to feed the soap units into the packaging system. The packaging system may further comprise various components that perform the aligning and stacking operations.

## BRIEF DESCRIPTION OF DRAWING

**[0001]** Fig. 1 illustrates a schematic representation of a packaging system in accordance with one implementation of the present subject matter.

**[0002]** Fig. 2 illustrates another schematic representation of the packaging system in accordance with one implementation of the present subject matter.

**[0003]** Fig. 3 illustrates another schematic representation of the packaging system in accordance with one implementation of the present subject matter.

**[0004]** Fig. 4 illustrates another schematic representation of the packaging system in accordance with one implementation of the present subject matter.

**[0005]** Fig. 5 illustrates another schematic representation of the packaging system in accordance with one implementation of the present subject matter.

**[0006]** Fig. 6 illustrates another schematic representation of the packaging system in accordance with one implementation of the present subject matter.

**[0007]** Fig. 7 illustrates another schematic representation of the packaging system in accordance with one implementation of the present subject matter.

## DETAILED DESCRIPTION

**[0008]** Packaging system are used for packaging various articles, collectively called as stock keeping units (SKUs) in packaging container, such as corrugated fluted cartons or CFCs. The SKUs can be soap units, or eatables or medicines or the like.

**[0009]** Conventional packaging systems are designed for packaging soap units in a predefined configuration. Such predefined configuration may be based on dimensions of soap units to be packaged and predefined dimension of a CFC in which the soap units are to be packaged. The conventional packaging system comprises an in-feed conveyor belt to feed the soap units in the packaging system. The conventional packaging system further includes a soap platform to receive the soap units that are delivered by the in-feed conveyor belt. In addition, the conventional packaging system includes a CFC platform placed parallel and sideways with the soap platform to receive a CFC for stacking soap units in the CFC and discharge the filled CFCs out of the packaging system. In conventional packaging system, the CFC platform is placed at a lower level than the soap platform. The conventional packaging system also includes a pusher to push the soap unit, received by the platform, into the CFC.

**[0010]** In operation, the in-feed conveyor belt feeds predefined number of soap units to the soap packaging system, in a predefined orientation, where the soap units are received at the soap platform. Meanwhile, the CFC platform also receives the CFC where the CFC is placed in proximity with the soap platform. After that, the pusher pushes the predefined number of soap units sideways towards the CFC such that the soap units fall into the CFC thereby forming a stack of soap unit. This process is repeated till the CFC is completely filled with soap unit. Finally, CFC filled with soap

unit is discharged out of the packaging system for sealing the CFC and subsequently shipping the CFC.

**[0011]** Although the conventional packaging systems are effective in packaging soap units in the CFC in one predefined configuration, where the soap units are aligned in a predefined orientation, the packaging systems are less effective in packaging soap units in CFCs in other configurations. For example, the other predefined configuration may be packaging banded soap units or packaging soap units in CFCs of different dimensions. Accordingly, the conventional packaging systems are not designed to be modified to pack soap units in the CFCs based on different configurations.

**[0012]** Few conventional packaging systems are capable of packaging packages soap units in the CFCs. However, such packaging systems are complex in design and operation. Accordingly, these type of packaging systems are relatively expensive that adds to the investment cost and its cost of operation. Moreover, long changeover time from the first predefined configuration to second predefined configuration in the conventional packaging systems also results in large downtime thereby reducing the throughput of the packaging systems. Thus, conventional packaging systems are incapable of packaging soap units in the CFCs based on multiple configurations in a cost effective and time effective manner.

**[0013]** The present subject matter relates to a soap packaging system for packaging article in the containers based on a first defined configuration. Various examples in the following description have been provided in context of a packaging system used for packaging soap units in the CFCs. It would be appreciated that such examples have been provided for the ease of understanding and are not to be construed as a limitation in any way. The concepts explained in context of the packaging soap units in CFCs may be extended to any other packaging container wherein any other items may be packaged.

**[0014]** The manner in which the soap packaging system operates shall be explained in details with respect to the Fig. 1, 2, 3, 3, 4, 5, 6, and, 7. While aspects of the described

packaging system can be implemented in any number of packaging processes, the embodiments are described in the context of the following exemplary system(s) that relate to a packaging process implemented for packaging soap units.

**[0015]** It should be noted that the description merely illustrates the principles of the present subject matter. It will thus be appreciated that those skilled in the art will be able to devise various arrangements that, although not explicitly described herein, embody the principles of the present subject matter and are included within its spirit and scope. Furthermore, all examples recited herein are principally intended expressly to be only for pedagogical purposes to aid the reader in understanding the principles of the present subject matter and the concepts contributed by the inventor(s) to furthering the art, and are to be construed as being without limitation to such specifically recited examples and conditions. Moreover, all statements herein reciting principles, aspects, and embodiments of the present subject matter, as well as specific examples thereof, are intended to encompass equivalents thereof.

**[0016]** Fig. 1 illustrates a schematic representation of a packaging system 100 in accordance with one implementation of the present subject matter. The packaging system 100 may comprise a base plate 102. The base plate 102 has a first surface 102-1 and a second surface 102-2 and an aperture 104 extending between the first surface 102-1 and the second surface 201-2. The packaging system 100 may also comprises a plurality of adjustable guides 106-1, 106-2, 106-3, and 106-4, collectively number as 106. The plurality of adjustable guides 106 are slidably installed above with the first surface 106 such that the plurality of adjustable guides 106 covers the aperture 104. In the illustrated implementation, the number of adjustable guides 106 is four, although any number of adjustable guides 106 can be incorporated depending upon the requirement.

**[0017]** In an example, the adjustable guides 106 are collectively coupled to an actuator (not shown in fig.), herein referred to as the first actuator, that displaces the plurality of adjustable guides 106. Moreover, each of the plurality of adjustable guides

106 have a first end (not shown in Fig.) and a second end (not shown in Fig.) wherein the soap units enter the first gap 110 from the first end. The constructional and operational features of the adjustable guides 106 will be described in details in subsequent embodiments. The packaging system 100 may also comprise a plurality of stopper guides 108-1, 108-2, and 108-3 collectively referred to 108, slidably installed above the first surface 102-1 and in proximity to the second end of the plurality of adjustable guides 106. In the illustrated implementation, the stopper guide 108-1 can slide in the first gap 110 formed between the adjustable guides 106-1 and 106-2. Similarly, other stopper guides 108-2 and 108-3 can slide in their respective gaps formed between the respective consecutive adjustable guides 106.

**[0018]** The slidable motion of the plurality of stopper guides 108 are governed by an actuator, herein named as the second actuator (not shown in fig.). Further, the position of the plurality of stopper guides 108 inside their respective gaps defines a queue length of the queue of the soap units. The queue length of soap unit is the number of the soap units that are inside the first gap 110.

**[0019]** The packaging system 100 may further comprise a top plate 126 installed on the first surface 102-1 and above the plurality of adjustable guides 106. In the illustrated implementation, the top plate 126 is coupled to a third actuator 128 such that the third actuator 128 moves the top plate up and down. The top plate 126, in operation, checks the number of soap units entering the first gap 110 between the consecutive adjustable guides and prevents the soap unit from toppling inside the gap.

**[0020]** In accordance with one example implementation, the packaging system 100 may further comprise a pair of slidable platform 112 slidably installed below the second surface 102-2 and below the aperture 104. The pair of slidable platform 112, in operation, alternatively closes and opens the aperture 104 to receive and deliver the soap units downstream in the soap packaging system 100. In the illustrated implementation, the opening and closing of the aperture 104 by the pair of slidable platform 112 is governed by a fourth actuator 132 and a fifth actuator 134.The opening

and closing of the aperture 104 by the pair of slidable platform 112 is explained, in details in subsequent embodiments.

**[0021]** In one example, the slidable platform 112 is positioned at about 0.5 mm below the base plate 102. In addition to the slidable platform 112, the soap packaging system 100 may comprise a plurality of fins 130 that are slidably attached to the second surface 102-2 of the base plate 102. The plurality of fins 130 guides the soap units when the soap units are delivered downstream in the soap packaging system 100 into the CFCs through the aperture 104. Moreover, any number of fins 130 can be installed depending upon the plurality of adjustable guides 106. In addition, a second gap 138 is defined between the two consecutive fins 130. Similarly, the position of the each of the fins would be in accordance with the first predefined configuration whereby the second gap 138 can be varied based on the configuration.

**[0022]** In an example, the packaging system 100 may comprise a container platform 114 to receive and hold a CFC in which soap units are stacks. In the illustrated implementation, the container platform 114 is coupled to a sixth actuator 116 and a seventh actuator 118 at either corner of the container platform 114 such that the sixth actuator 116 and the seventh actuator 118 displace the container platform 114 between a lower position 120 and an upper position 122. The packaging system 100 may further include a pusher 124 for displacing the CFC, placed on the container platform 114, out of the packaging system 100. In an example, the pusher 124 is coupled to an eighth actuator 136 that actuates the pusher 124 to push the CFC out of the packaging system 100.

**[0023]** In operation, the plurality of adjustable guides 106 is adjusted in accordance with a first predefined configuration. The adjustments are done by the first actuator so that the first gap 110 and similarly all the other gaps are in accordance with the first predefined configuration. Accordingly, the plurality of stopper guides 108 is adjusted and the plurality of fins 130 is adjusted in accordance with the first predefined configuration. After that, the plurality of stopper guides 108 is adjusted to define the

queue length of the soap units that are to fed into the soap packaging system 100. The container platform 114 of the soap packaging system 100 then receives the CFC that is to be filled with the stacks of the soap units.

**[0024]** Initially, the container platform 114 is placed at the lower position 120. After receiving the CFC, the sixth actuator 116 and the seventh actuator 118 raise the container platform 114 along with the CFC to the upper position 122. Now, as the CFC is raised, the soap units are fed into the first gap 110 by an in-feed conveyor belt (not shown in fig.). At this point, the pair of slidable platforms 112 keeps the aperture closed. As the plurality of soap units moves into the gaps, they are placed on a slidable platform 112. Finally, when the soap units completely fill the gap, the top plate 126 is lowered by the third actuator 128. In one example, the top plate 126 is lowered in range of about 5mm to 10 mm. The top plate 126, when lowered, restricts further entry of the soap units in the gap and relieves the queue pressure on the soap units in the gap. The queue pressure is developed by the successive soap units on their respective preceding soap units. As the queue pressure is relieved and further entry of the soap units is checked, the fourth actuator 132 and the fifth actuator 134 displaces the pair of slidable platform 112 to open the aperture. As the aperture 104 opens, the soap units in the gaps experience a free fall and starts falling towards the CFC placed underneath the second surface 102-2 (shown in Fig. 1) of the base plate 102 (shown in Fig. 1).

**[0025]** In some case, soap units may change their orientation during the free fall. Such change in orientation would result in poor stacking of the soap units in the CFC thereby leading to poor quality of packaged CFCs. To curb this issue, the plurality of fins 130 guides the soap units during their free fall. The plurality of fins 130 prevents unwanted change in orientation of the falling soap units. Hence, soap units are dropped into the CFC in the desired orientation. Post dropping the soap units, the fourth actuator 132 and the fifth actuator 134 slides the pair of slidable platform 112 is close the aperture 104. Then the third actuator 128 moves the top plate 126 to its initial position thereby allowing next batch soap units to enter the gaps.

**[0026]** The cycle of filling the soap units in the CFC repeats till the CFC is completely filled with soap units. After the CFC is completely filled, the sixth actuator 116 and the seventh actuator 117 lowers the container platform 114 to the lower position 120. The completely filled CFC also moves to the lower position 120 as the completely filled CFC is placed on the container platform 114. After the container platform 114 along with the completely filled CFC is lowered to the lower position 120, the eighth actuator 136 actuates the pusher 124 and the pusher 124 pushes the completely filled CFC out of the packaging system 100.

**[0027]** As the completely filled CFC is discharged from the packaging system 100, one complete cycle of filling and packaging CFC is accomplished and post the accomplishment, next cycle starts. Depending upon various factors such as the size of the soap units, banding of soap units, dimensions of the CFCs, or stacking arrangement of soap units in the CFC, the packaging system 100 can be reconfigured in various other predefined configurations to accommodate the aforementioned factors. Moreover, since the movement of various components in packaging system 100 is done by the actuators, the complete packaging system 100 can reconfigured for other configuration in lesser time, requiring lesser manual adjustments and with better precision.

**[0028]** Fig. 2 illustrates a soap packaging system 100 in accordance with one implementation of the present subject matter. As shown, the packaging system 100 may comprise a frame 212 to provide support to the various components of the packaging system 100. As illustrated, the plurality of adjustable guides 106 is slidably installed on the frame 212.

**[0029]** As mentioned previously, the arrangement of plurality of adjustable guides 106 has a first end 208 and a second end 210. Further the plurality of adjustable guides 106 are installed sideways so that a plurality of first gaps is formed between the consecutive adjustable guides 102. The plurality of adjustable guides 106 slide with respect to one another to vary the plurality of first gap 110 in accordance with first

predefined configuration. As evident, the width of the plurality of first gap 110 can be varied to other predefined configurations.

**[0030]** In the illustrated implementation, the second adjustable guide 106-2 can be fixed and rest of adjustable guides 106-1, 106-3, and 106-4 can slide to vary the plurality of first gap 110. The second adjustable guide 106-2 acts a reference for the slidable of the others adjustable guides 106. Such reference ensures proper width of the plurality of the first gap 110. In addition to the adjustable guides 106, the packaging system 100 may comprise a plurality of stopper guides 108. The plurality of stopper guides 108 are slidably installed on the frame 212 and in proximity with the second end 210 such that the plurality of stopper guides 108 can slide in their respective first gap 110. For example, the first stopper guide 108-1 can slide in the first gap 110. Similarly, other stopper guides 108 can slide in their respective gaps first gap 110. The plurality of stopper guides 108 governs the number of soap units that would enter the plurality of first gap 110, i.e. the plurality of stopper guide 108 defines the queue length of the soap units in the plurality of first gap 110.

**[0031]** In operation, the adjustments that are to be made for a first predefined configuration are identified and the adjustments are carried out on the plurality of adjustable guides 106. For example, based on the width of the soap units, the width of the plurality of the first gap is adjusted. Similarly, depending upon the dimensions of the CFC, the plurality of stopper guides 108 are adjusted to define the number of soap units that would enter inside the plurality of first gap 110. For example, the stopper guide 108 can be adjusted to allow 3 or 4 soap units at a time. Alternatively, the adjustments can be made of banded soap units as well.

**[0032]** After all adjustments are made and the packaging system 100 is configured in accordance with the first predefined configuration, the soap units are then fed into the packaging system 100 by an in-feed conveyor belt (not shown in fig.). The soap units then enter into the first gap 110 from the first end 208. Since, the plurality of the adjustable guides 106 are adjusted in accordance with the first predefined

configuration, the plurality of adjustable guides 106 prevent any lateral movement of the soap units that have entered into the plurality of first gap 110. As the soap units enter the plurality of first gap 110, the number of soap units is checked by the plurality of stopper guides 108. The plurality of stopper guide 108 prevents further movement of the soap units in the plurality of first gap 110 resulting in accumulation of the soap units in the plurality of first gap 110. The accumulation continues till the plurality of first gap 110 is completely filled. After that, further processes are executed as explained with respect to fig. 1. Based upon the requirement, the plurality of adjustable guides 106 and plurality of stopper guides 108 can be adjusted in accordance with a second predefined configuration thereby making the packaging system 100 flexible in operation.

**[0033]** Fig. 3 illustrates a packaging system 100 in accordance with one implementation of the present subject matter. As discussed above, the packaging system 100 may comprise the support frame 212 to support various components installed in the packaging system 100. In an example, the top plate 126 is installed on the support frame 212 and above the plurality of adjustable guides 106 (shown in fig. 2). In the illustrated implementation, the top plate 126 is L-shaped plate having a flat portion 126-1 and L portion 126-2. As evident, top plate 126 of other shapes and designs can be adopted without deviating from the scope of the present subject matter. The top plate 126 is further coupled to a third actuator 128 that lower and raises the top plate 126 when required to check the further entry of the soap units inside the first gap 110.

**[0034]** In operation, the soap units enter in the first gap 110 (shown in fig. 2) from the first end 208 (shown in fig. 2). After the required number of soap units has accumulated in the first gap 110 and queue length of the soap units inside the first gap 110 is achieved, the third actuator 128 lowers the top plate 126 to limit a stack height of the soap units in each of the first gaps 110.

**[0035]** During high speed operation, there may be a case that a soap unit may topple inside the first gap 110 due to their high speed movement inside the first gap 110. This would result in poor stacking of the soap units inside first gap 110 and subsequently in the CFC where they are finally accumulated. In addition, the in-feed conveyor belt (not shown in fig.) continuously feed the soap units in the packaging system 100. Further, the stopper guides 108 (shown in fig. 2) checks the further entry of the soap units inside the first gap 110 after predefined number soap units have entered. In some cases, incoming soap units may push the soap units that have entered into the first gap 110. This may result in a pressure development on the soap units, known as queue pressure. If not relieved, the queue pressure may damage the casing in which the soap units are wrapped thereby resulting in poor quality of the soap units that are to be packed in the CFC.

**[0036]** In order to relieve the queue pressure, the top plate 126 is lowered by the third actuator 128. The top plate 126 performs two operations. First, the flat portion 126-1 restricts the upward movement of the soap units inside the first gap 110 thereby preventing the toppling of the soap units. Second, the L portion 126-2 lowers down and cuts the feed of the soap units inside the first gap 110 thereby relieving queue pressure from the soap units inside the first gap 110. Hence, the damages caused to the soap units due to the queue pressure are prevented. After the queue pressure is relieved, further processes are executed as explained in previous embodiments. In one implementation, the third actuator 128 lower and raises the top plate 126 in range of about 5-10 mm. Since, the third actuator 128 can displace the top plate at various heights, the packaging system 100 can be easily configured for soap units in accordance with other predefined configurations.

**[0037]** Fig. 4 illustrates the packaging system 100 in accordance with another exampel implementation of the present subject matter. As illustrated in the example implementation of Fig.4, near to the second surface 102-2, a pair of slidable platform 112 having a first slidable platform 112-1, and a second slidable platform 112-2 is

installed that covers the aperture 104 (shown in fig. 1). In the illustrated implementation, the first slidable platform 112-1 may cover the region of the aperture 104 that receive the soap unit through a first gap 110-1. Similarly, the second slidable platform 112-2 may cover the region of the aperture that receives soap units through the first gaps 430-2, 430-3. Further, the pair of slidable platform 112 is placed 0.5 mm below the second surface 102-2 of the base plate 102. Moreover, the first slidable platform 112-1 is coupled to a fourth actuator 132 and the second slidable platform 112-2 is coupled to a fifth actuator 134. The fourth actuator 132 and the fifth actuator 134 can independently displace the first slidable platform 112-1 and the second platform 112-2 in one example.

**[0038]** In operation, the soap units enter the first gaps 130. After the predefined number of soap units has entered, the top plate 126 (shown in fig. 3) is lowered to cut off further entry of the soap units and relieve the queue pressure. As further entry of soap units is stopped and queue pressure relieved, the fourth actuator 132 and the fifth actuator 134 displaces their respective slidable platform 126112-1 and 112-2 to open the aperture 104. Since, the slidable platform 112 opens the aperture 104, the soap units resting of the slidable platform 112 between the first gap 430 experiences a free fall. The soap units, thus fall downstream in the packaging system 100 in stacks and in desired orientation into the CFC. Further, the mechanism by which the soap units are guided by the fins 130 will be explained with respect to Fig. 5.

**[0039]** In an example, depending upon the dimensions of the CFC, soap units are feed into the first gap 110-1 only or other first gaps 110-2, 110-3 as well. In such cases, only the respective slidable platform 112 is operated whereas the other slidable platform 112 is kept idle. For example, if the soap units are fed into the first gap 110-1, then the first slidable platform 112-1 alone is operated whereas if the soap units are fed into the either of the first gap 110-2 or 110-3 or both, then the second slidable platform 112-2 is operated keeping the first slidable platform 112-1 idle. Hence, independent operation of the both the slidable platforms 112 makes the packaging

system 100 flexible and energy efficient. The packaging system 100 explained herein is with respect to two slidable platform 112-1, and 112-2, although more slidable platforms 112 can be installed without deviating from the scope of the present subject matter.

**[0040]** Fig. 5 illustrates a packaging system 100 in accordance with one implementation of the present subject matter. In an implementation, as illustrated, the packaging system 100 comprises a plurality of fins 504-1 to 504-4, collectively referred as 130 installed downstream with respect to the slidable platform 112 (shown in fig. 1). In the illustrated implementation, the number of fins 130 is four. As evident, more numbers of fins 130 can be employed depending upon the requirement. In addition, a second gap 138 would be formed between the consecutive fins 130. Moreover, the fins 130 can slide with respect the lower surface 102-2 on a sliding rail 506 thereby varying the width of the second gap 138. The arrangement of the plurality of fins 130 may be done manually, in one example implementation, thereby reducing the complexity in design of the packaging system 100 although, in various other implementations, such adjustments can be done automatically using actuators as well. In one example, the position of each of the fins 130 can depend upon the dimensions of the CFCs.

**[0041]** In operation, the slidable platform 112 (shown in Fig.1) is displaced and opens the aperture 104 (shown in Fig. 1) causing the soap unit to fall due to gravity. During the free fall, the soap units may change their orientation. If, in any case, the soap units change their orientations during the free fall, then the soap units would be delivered in the undesired orientation and this would lead to poor stacking of the soap units in the CFC. In order to curb the issues, the plurality fins 130 are adjusted o guide the soap units during their free fall. Prior to the starting the operation cycle of the packaging system 100, the plurality of fins 130 are adjusted in accordance with a first predefined configuration by moving them across the sliding rail 506. After each of the plurality of fins 130 are positioned at their respective position, in one example, the fins are secured to their position by tightening means such as fasteners. Thereupon, the

operation is executed and the plurality of fins 130 guides the soap units during their free fall and thereby maintaining the desired orientation of the soap units.

**[0042]** Fig. 6 illustrates a schematic representation of a packaging system 100 in accordance with one implementation of the present subject matter. As mentioned previously, the packaging system 100 comprises a container platform 114 installed downstream with respect to the plurality of fins 130 (shown in fig. 5). The container platform 114 may receive a container that may a CFC, from a direction depicted by the arrow 616 and discharge the container in a direction depicted by the arrow 618. The container platform 114 may further couple to a sixth actuator 116 and a seventh actuator 118. The sixth actuator 116 and the seventh actuator 118 displace the container platform 114 from a lower position 120 and an upper position 122, the upper position 122 being at a higher level than the lower position 120.

**[0043]** In the illustrated implementation, the container platform 114 receives the CFC, where the CFC is placed on the platform surface 114-4. In addition, a plurality of brackets 114-1, and 114-2 are installed on the platform surface 114-2 to restrict the movement CFC when the CFC is placed on the platform surface 114-4. In an example, one or more brackets 114-5 may be hinged to the platform surface 114-4 to deflect downwards when the CFC is pushed out of the packaging system 100 in the direction 618. In order to facilitate the smooth discharge of the CFC from the container platform 114, a plurality of rollers 114-3 is installed in the container platform 100. The packaging system 100 may further comprise a pusher 124 installed in proximity with the brackets 114-1 and 114-2. Further, the pusher 124 is coupled to an eighth actuator 136 that displaces the pusher 124 in the direction 618.

**[0044]** In operation, the CFC that needs to be filled with the soap units is fed into the packaging system 100, wherein the container platform 114 receives the CFC. The CFC can be fed into the packaging system 100 from a case erector (not shown in fig.) through a conveyor belt (not shown in fig.). Initially, the container platform 114 is at the lower position 120 when the container platform 114 receives the CFC. The CFC is

placed on the platform surface 114-4 and the brackets 114-1, 114-2 and 114-5 are deployed to restrict the movement of the CFC on the platform surface 114-4. After that, the sixth actuator 116 and the seventh actuator 118 raise the container platform 114 from the lower position 120 to the upper position 122. Following the placement of the container platform 114 at the upper position 122, subsequent processes such as admission of the soap units in the first gaps 110 (shown in fig. 1), opening of the sliding platform 112 (shown in fig. 1) are executed. The description of each of the process is explained in previous embodiments and hence is not repeated here for the sake of brevity of the description.

**[0045]** After the CFC is completely filled with the soap units, the aforementioned processes are halted. The sixth actuator 116 and the seventh actuator 118 then lower the container platform 114 and the CFC to the lower position 120. Once the container platform 114 reaches the lower position 120, the eighth actuator 136 actuates the pusher 124 and the pushes the CFC out of the packaging system 100 in the direction 618. The mechanism by which the pusher 124 pushes the CFC to discharge the filled CFC will be explained in details with reference to Fig. 7.

**[0046]** Fig. 7 illustrates the packaging system 100 in accordance with one implementation of the present subject matter. The soap packaging system 100 illustrated herein depicts the pusher 124 to push the CFC out of the container platform 114. The pusher 124 is further coupled to an eighth actuator 136 through a coupling member 710. The container platform may further comprise the hinged bracket 114-5 as explained previously. The hinged bracket 114-5 deflects in the direction depicted by the arrow 712 when the CFC is pushed by the pusher 124. In an example, the hinged bracket 114-5 can be spring loaded and may return to its initial position after the CFC is discharged.

**[0047]** In operation, the CFC filled with the soap units is lowered to the lower position 120 (shown in fig. 6). Then the eighth actuator 136 actuates the pusher 124 through the coupling member 710 and the pusher 124 then pushes the CFC in the

direction 618. As the CFC is pushed, the CFC further pushes the hinged bracket 114-5. The hinged bracket 114-5, under the pressure exerted by the CFC, deflects in the direction 712 thereby clearing the path for the CFC to move out of the packaging system 100. The CFC then moves over the deflected hinged bracket 114-5 and is finally discharged from the packaging system 100. Finally, once the CFC has passed over, the deflected hinged bracket 114-5 returns to its initial position as the hinged bracket 114-5 is spring loaded. Simultaneously, the eighth actuator 136 pulls the pusher 124 through the coupling member 710 and the pusher 124 also returns to its initial position. The above mentioned process is repeated when the next filled CFC is lowered to the lower position 120 (shown in fig. 6).

**[0048]** In one implementation, the aforementioned actuators described in previous embodiments can be pneumatic cylinders or hydraulic cylinders or electromagnetic actuator known in the art. Further, each of the components of the packaging system 100 can be fabricated from industrial grade material used in manufacturing such systems. Moreover, the number of adjustable guides 106, stopper guides 108 and fins 130 can vary depending upon the requirement of the soap units to be packed. In another implementation, the packaging system 100 can be synchronized with other components installed upstream with respect to the packaging system 100 such that the packaging system 100 can be adjusted automatically with change in the production line thereby reducing the supervision of the system and increase in the production of the filled CFCs.

**[0049]** Although implementations for a packaging system have been described in language specific to structural features and/or methods, it would be understood that the appended claims are not necessarily limited to the specific features or methods described. Rather, the specific features and methods are disclosed as example implementations for the packaging system.

I/ We claim:

1. A packaging system (100) for packaging a plurality of articles in a container in a predefined configuration, the packaging system (100) comprising:

a base plate (102) having a first surface (102-1) and a second surface (102-2), wherein the base plate has an aperture (104);

a slidable platform (112) provided below the second surface (102-2), wherein the slidable platform (112) is to cover the aperture (104), and wherein the slidable platform (112) is to receive the plurality of articles to be packaged in the container;

a plurality of adjustable guides (106), each having a first end (208) and a second end (210), placed parallel to each other such that a first gap (110) is formed between two consecutive adjustable guides (106), from amongst the plurality of adjustable guides (106), the first gap (110) being in accordance with the predefined configuration to restrict a lateral movement of one or more articles, from amongst the plurality of articles, received by the slidable platform (112);

a plurality of stopper guides (108) slidably installed in proximity to the second end (210) of the plurality of adjustable guides (106), wherein a stopper guide (108), from amongst the plurality of stopper guides (108), is to slide in the first gap (110) between the two consecutive adjustable guides (106) to restrict a queue length of the one or more articles in the first gap (110) in accordance with the predefined configuration; and

a top plate (126) slidably installed on the first surface (102-1) and in proximity with the second end (210) of the adjustable guides, wherein the top plate (126) is movable to restrict an upward movement of the one or more articles in the first gap (110) in accordance with the predefined configuration.

2. The packaging system (100) as claimed in claim 1, wherein the packaging system (100) further comprising:

a plurality of fins (130) slidably installed on the second surface (102-2) and downstream with respect to the pair of slidable platforms (112), wherein a second gap (138) is formed between the consecutive fins, the second gap (138) being in accordance with the first predefined configuration to guide the article from the slidable platform (112) to the container;

a container platform (114) installed downstream with respect to the fins (130), wherein the container platform (114) displaces between a lower position (120) and an upper position (122), the container platform (114) is to receive the container to receive the article in the container at the upper position (122) in accordance with the predefined configuration; and

a pusher (124) installed downstream with respect to the container platform (114), the pusher (124) is to displaces the container out of the packaging system (100).

3. The packaging system (100) as claimed in claim 1, wherein the distance between the second surface (102-2) of the base plate (102) and the slidable platform (112) is about 5 mm.

4. The packaging system (100) as claimed in claim1, wherein one of the adjustable guides (106-2), amongst the plurality of adjustable guides (106), is fixed to the first surface (102-2) and rest of the plurality of adjustable guide slides (106-1, 106-3, 106-4) are collectively coupled to a first actuator for varying the width of the plurality of the first gap (110) in accordance a first predefined configuration.

5. The packaging system (100) as claimed in claim 1, wherein the slidable platform (112) is coupled one of a fourth actuator (132) and a fifth actuator (134).

6. The packaging system (100) as claimed in claim 1, wherein the plurality of stopper guides (108) are collectively coupled to a second actuator.

7. The packaging system (100) as claimed in claim 1, wherein the top plate (124) is coupled to a third actuator (128).

8. The packaging system (100) as claimed in claim 2, wherein the container platform (114) is coupled to one of sixth actuator (116) and a seventh actuator (118).

9. The packaging system (100) as claimed in claim 2, wherein the pusher (124) is coupled to an eighth actuator (136).

10. The packaging system (100) as claimed in claim 1, wherein the plurality of adjustable guides (106) is supported by a frame (212).

11. The packaging system as claimed in claim 1, wherein the plurality of stopper guides (108) is supported by the frame (212).

12. The packaging system (100) as claimed in claim 1, wherein the top plate (126) is supported by the frame (212).

13. The packaging system (100) as claimed in claim 5-7, wherein the actuators are one of pneumatic cylinders or hydraulic cylinders.

ABSRACT

PACKAGING SYSTEM

The present subject matter relates to a packaging system (100) for packaging articles in a container. The packaging system (100) comprises a base plate (102) having a first surface (102-1) and a second surface (102-2) and an aperture (104). The packaging system (100) further comprises a sliding platform (112) installed in proximity with the second surface (102-2) to receive the soap units. The sliding platform (112) closes and opens the aperture (104) to deliver the soap unit downstream in the packaging system (100). The packaging system (100) comprises a plurality of adjustable guides (106) such that a first gap (110) is defined between the two consecutive adjustable guides (106). The packaging system (100) further comprises stopper guides (108) to define a queue length of the soap unit and a top plate (126) to prevent upward movement of the soap unit inside the first gap (110).

Submission by

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