

White Paper

# The FlowTransfer Roll Concept

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Patent Pending

March 4, 2014

## Summary

An innovative material handling system was previously created by Pack Flow Concepts LLC (PFC). A novel improvement to this system has been created by PFC that creates a large capacity compact storage system that is documented herein. The key market driver is the need to package 2 or more products that are produced in different locations or at different times. There are 3 embodiments presented.

### 1.0 Reusable Self Contained Flow Transfer Roll Embodiment

The packaging system shown in Figure 1 is one of many embodiments of the full patent filed August 9, 2011 by Pack Flow Concepts LLC. The stream of cookies (3 cookies long and 2 cookies high) have been packaged in protective film, and unlike most existing packaging systems, these pack of cookies (called slugs) have not been cut at the seal common to 2 consecutive packs. The stream of slugs is carried by the flexible conveyor found between the 2 rows of empty cases shown in upper left of Figure 1.

When the stream of slugs is indexed to the lower right across the yellow table top, the stream of slugs are paused so as to cut into a row of 6 slugs and slide the row to either the right or left side. The incoming stream of slugs on the drooping conveyor creates the needed pause for cutting and sliding the row of slugs. These rows of 6 slugs are then grouped so as to index the group towards the case or carton and the row of slugs are cut as a sub-grouping that get loaded into the case (The loading head that transfers the single row sub-grouping is not shown in Figure 1).



**Figure 1 Exiting Embodiment of Case Packer Using Flex Conveyor for Timing Benefits**

But if the case is to be loaded with a mix of products (say 3 flavors of cookies in each case) then the system shown in Figure 1 is limited. One viable solution would be to only load a partial row into the case, or to load

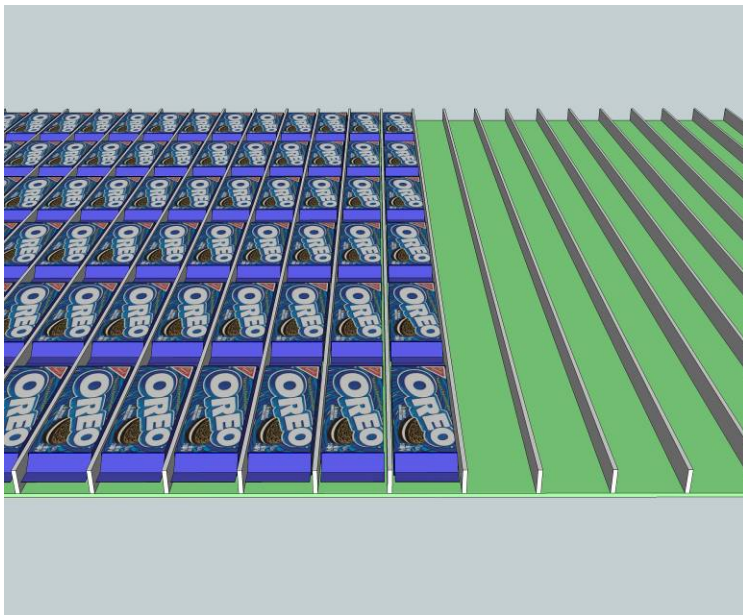
a single row into the case, while leaving space for a second system as per Figure 1 to load the partially filled cases, and a third system to load the third flavor to complete the case.

Having a 3 system configuration as described requires that the partially filled cases are moved from 1 system to the next, and the internal case contents cannot shift or the next system will likely fail. Also, if the other flavors are not currently being produced and packaged the protective film, the partially filled cases will need to be stored until the other systems are ready. This can be a difficult situation so alternatives are desired.

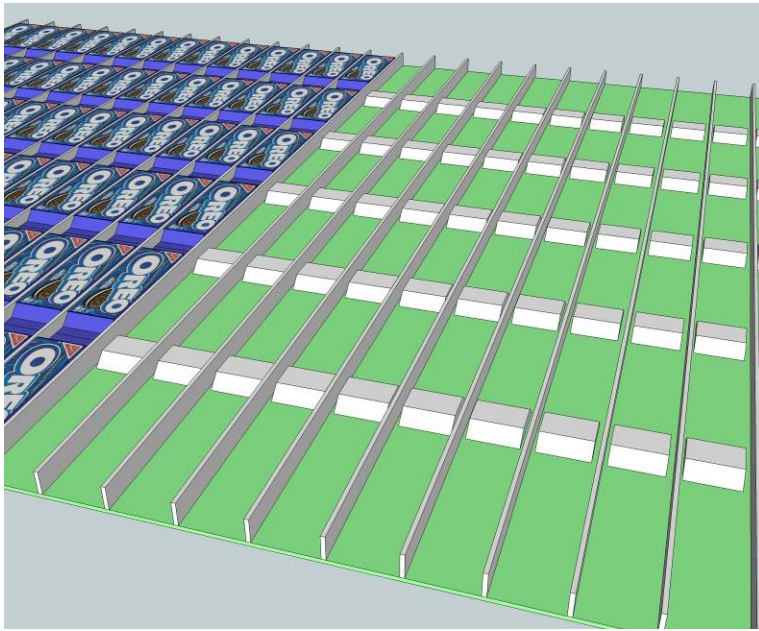
So a second solution is to slide the rows of 6 slugs onto an additional device (the FlowTransfer Roll) instead of moving into the staging area on the table followed by the cut station concluding with insertion into the case. The FlowTransfer Roll accumulates the rows of slugs for use at a later time and possibly different facility location. Then the FlowTransfer Roll will be again be moved adjacent to the table so that the row of slugs can be transferred back to the table (yellow in Figure 1) at a later time so as to combine with other flavors to fill the entire case at one operational step.

The FlowTransfer Roll flexible surface will have short side walls (Figure 2) similar to flights found on many conveyors (used when the conveyed product needs superior constraints to move product up a steeper incline or to keep product segregated from one to the next). These side walls or flights keep the rows constrained and the side walls can be used to keep the next layer of wrapped flexible surface from crushing the contents (in this case slugs).

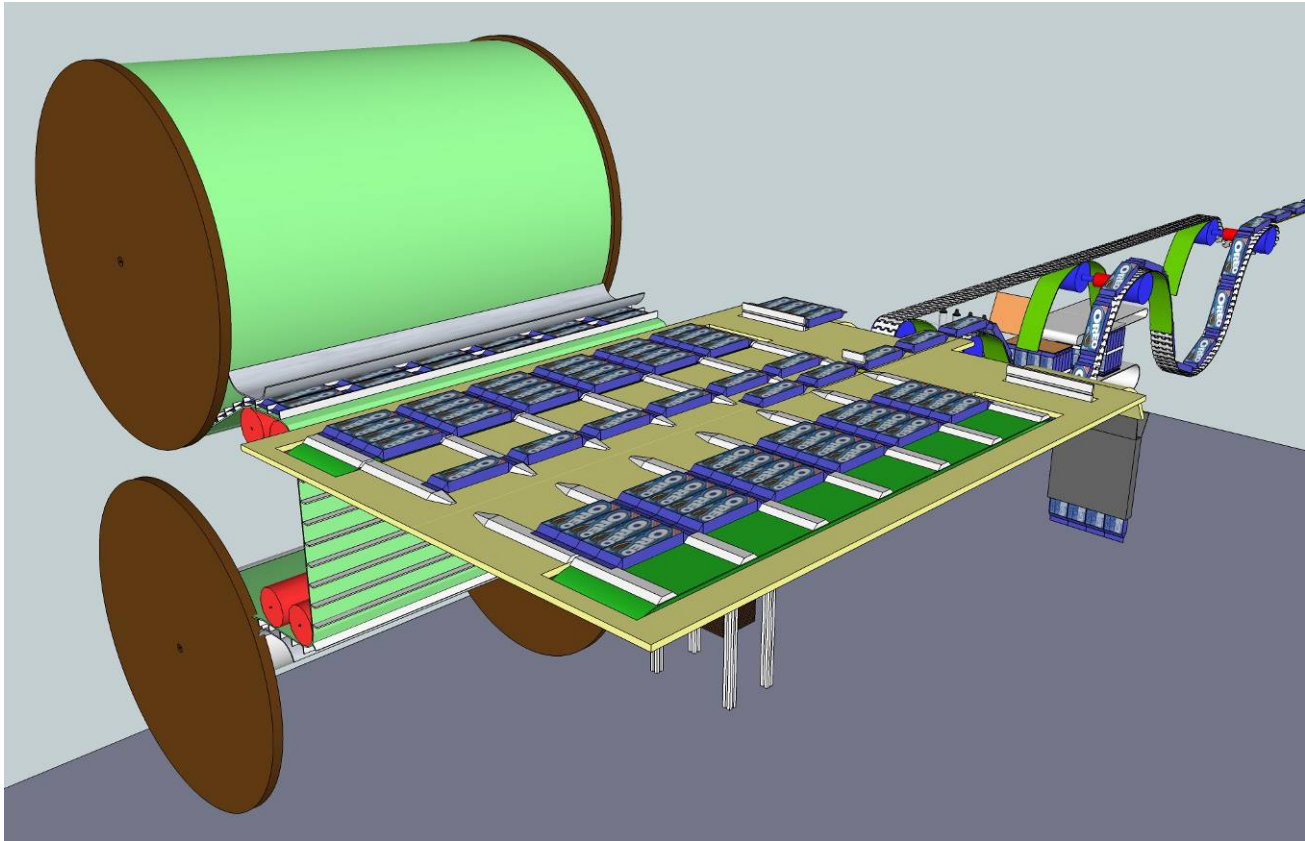
The FlowTransfer Roll flexible surface may have ridges (Figure 3) that match the rails (white in Figure 1) so that the row of slugs will not shift along the roll wind axis direction. These ridges, looking something like a speed bump, mean that the row of slugs can be slid off of the flexible surface back onto the table if the FlowTransfer Roll is placed next to the staging area (Figure 4) as opposed to opposite the slug stream entry location. These ridges also mean that if the FlowTransfer Roll is located opposite the slug stream entry location (Figure 5), the row of slugs needs to be moved onto or off of the FlowTransfer Roll along the direction of the roll wind axis. In this case a lifting device (perhaps a vacuum head) needs to move the row over these obstacles.



**Figure 2 Flexible Material with Short Side Walls (Flights)**

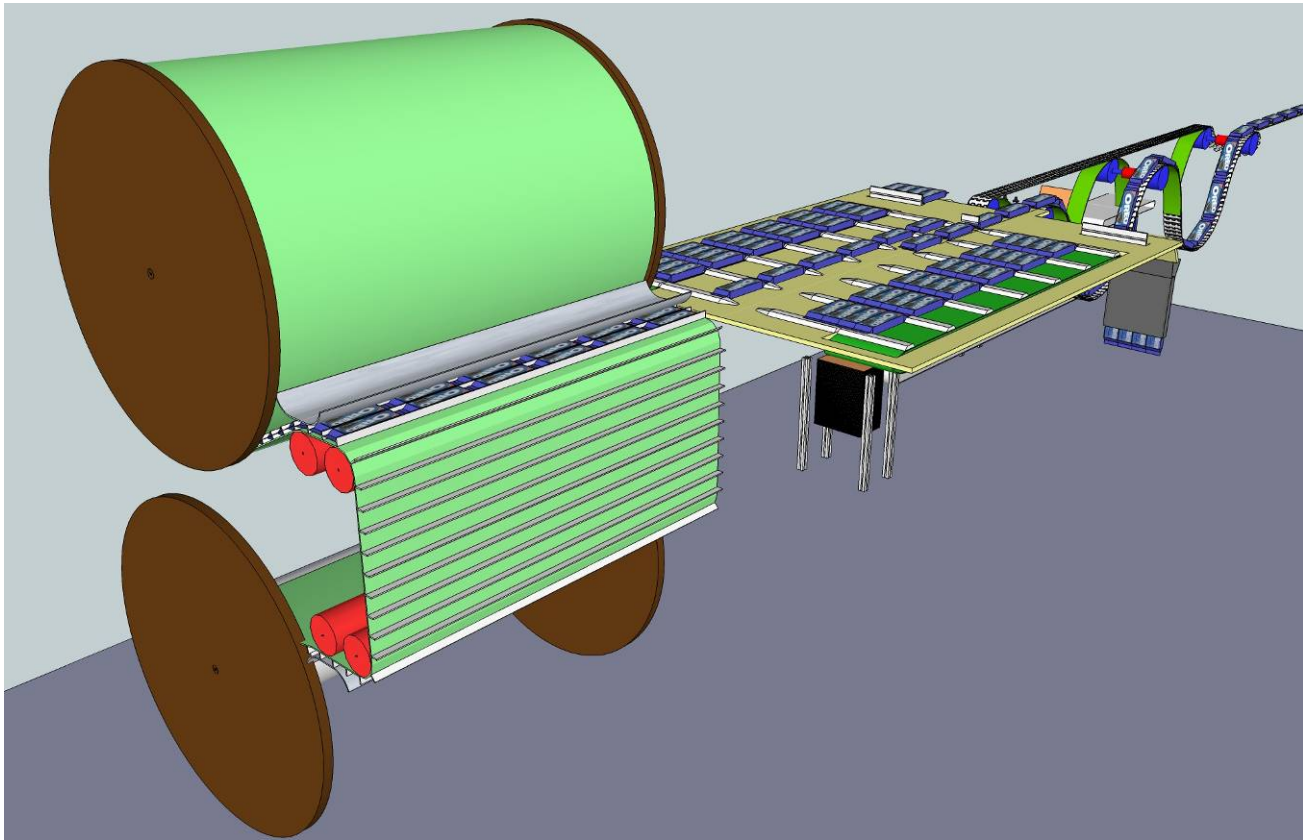


**Figure 3 Flexible Material with Ridges (Speed Bumps)**



**Figure 4 FlowTransfer Roll Located Next to the Staging Area**

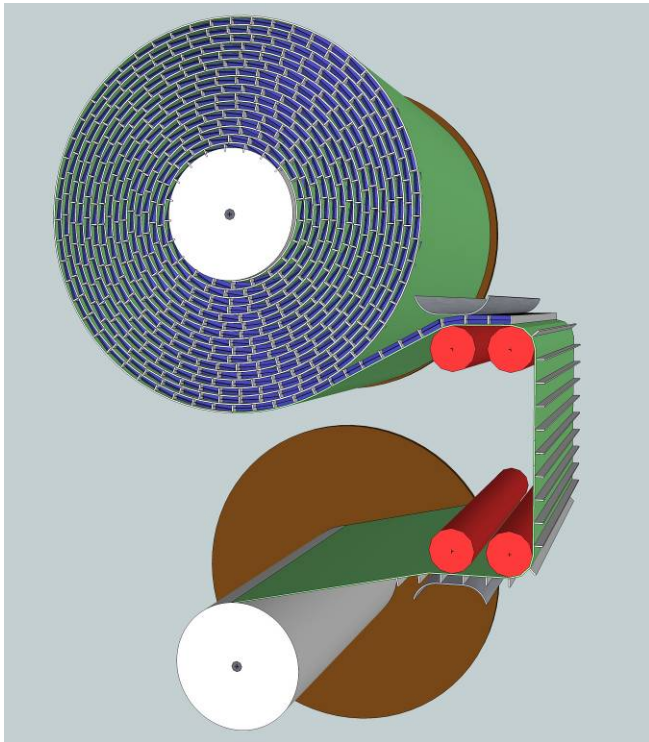




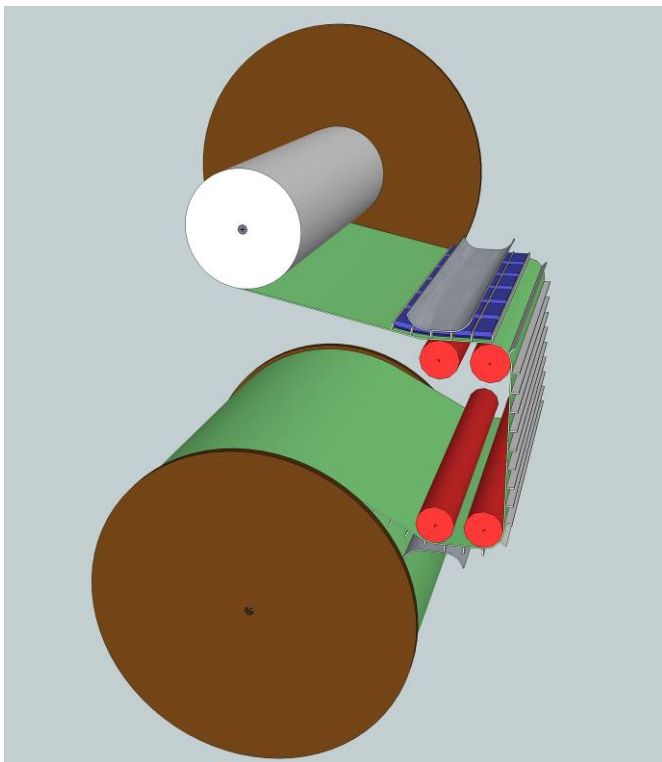
**Figure 5 FlowTransfer Roll Located Opposite Slug Stream Entry Location**

There can be two FlowTransfer Roll systems used for either loading or unloading purposes by adding a mirror image system on the right hand side of the table (not shown in Figure 4) or a mirror image FlowTransfer Roll system at the near side of the table (not shown in Figure 5) so as to allow no lost time when the rolls are changed when they are either completely filled or completely empty.

The reusable self contained FlowTransfer Roll will both have a spool that will hold the flexible surface when it is holding the product (slugs) and a take up spool to wind the empty flexible surface (Figures 6 and 7). A single device holding both spools can be moved using a fork truck or have casters and towed or pushed into place. This device will also have a platform where the rows on the flexible surface can be loaded or unloaded in a constrained fashion.



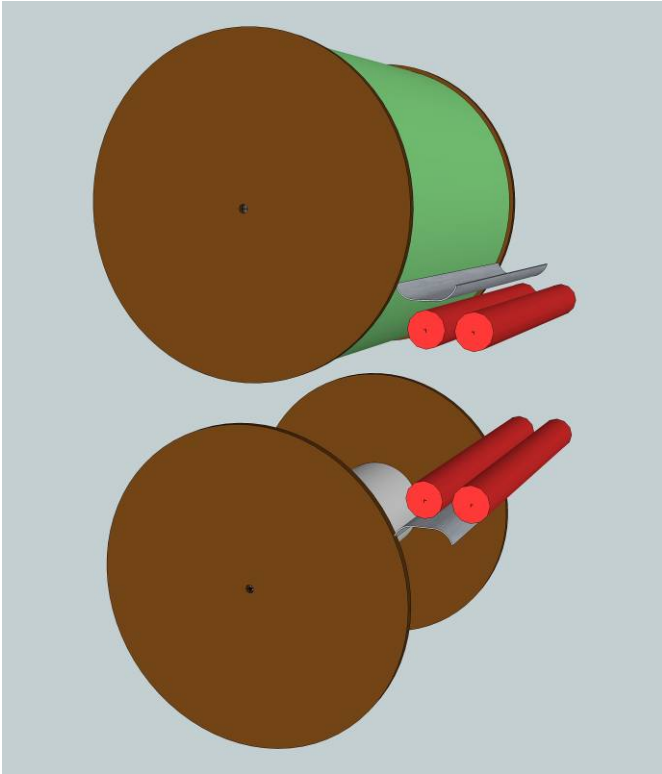
**Figure 6 Full Supply Roll (Spool ends removed for clarity)**



**Figure 7 Nearly Empty Supply Roll (Top spool end removed for clarity)**

## 2.0 Single Spool Shipped FlowTransfer Roll Embodiment

This embodiment would more likely use a 2 spool system where only the FlowTransfer Roll containing stored product is wound at one location and it is shipped to a second location. Here, the volume and weight shipped is of great concern. So the second location would have a base unit with a platform for the rows on the flexible surface can be loaded or unloaded in a constrained fashion. Then filled spool FlowTransfer Rolls can be placed onto the base unit for operation (Figure 8). When empty of slugs, the single spool FlowTransfer Roll would be rewound and moved or shipped back to the loading location.



**Figure 8 Single Spool Shipped FlowTransfer Roll Lifted Over Base Unit**

## 3.0 One Time Use Single Spool Shipped FlowTransfer Roll Embodiment

Another option is to use a compostable flexible surface that has formed paper flights that are low in costs to be used in cases where shipping the reusable flexible surface based FlowTransfer Roll back to the loading facility is not desired.

## Conclusions

The FlowTransfer Roll can be used for a wide variety of products:

- Streamed slugs of cookies or snacks
- Filled bags of connected 4 sided or 3 sided packets
- Shingled empty Stand Up Pouches
- Any product needing to be stored and/or shipped to another location/for a later time