

# **Design and Development of Safety-enriched Innovative Tools for Pouch/ Sachet Cutting in FMCG Re-work Activities**

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The current project titled ‘Design and development of safety-enriched pouch/ sachet cutting apparatus for safe re-working of liquid- filled pouches/ sachets in Fast Moving Consumer Goods (FMCG) manufacturing industries in India’ aims at designing safety- enriched tools for re-work activity of FMCG industries. It provides a cost-effective, innovative design intervention thoroughly based on ergonomic principles to address the prevailing safety issues.

Several Indian FMCGs are involved in the production of liquid-filled (hair oil, shampoo, detergent, jams, pickles, etc.) pouches/ sachets. These often become defective due to non- printing of proper batch numbers, label graphic details, inadequately filled quantity, shrinkage of pouches/sachets (due to overheating/ vibrating machines), improper cutting (as per standards), etc. As such, only the outer plastic covering of the pouch/ sachet is defective, and the inner content (liquid) remains re-usable for fresh filling. It needs to be recovered efficiently for re-filling in the new pouch/ sachet. This entire process becomes the FMCG re-work activity.

Since the FMCGs are low-cost – high-volume products, the re-work activity within FMCG manufacturing units becomes a voluminous and prominent activity. Nearly 1 lakh pouches/ sachets are produced in a single small-scale FMCG manufacturing unit per day, and 25-30 percent wastage occurs, i.e., 25,000 pouches/ sachets need to be re-worked daily within a single small-scale FMCG manufacturing unit. The re-work activity becomes a tedious job due to its large volume of work. Besides India, it is a prominent FMCG activity prevailing among FMCG industries located in developing nations across the globe. It needs immediate innovative solutions to reduce drudgery and safety-related issues. The pouch/ sachet cutting activities are presently carried out using sharp-edged blades/ cutters, scissors used with bare slippery hands. It causes cuts and injuries and becomes a safety concern for factory management. No standard or context-specific tool exists to carry out this essential activity on the FMCG shop-floor with

ergonomic and safety considerations. Considering the importance and severity of the safety concerns in FMCG re-work activities, there lies an immediate need to design and develop some context-specific safety tools. These tools could help address the existing safety issues and promote well-being.

Mr. Gurdeep Singh had proactively developed two different variants of innovative safety tools using a systematic product design methodology. The adopted methodology encompassed the steps viz. field observations, understanding the essential functions/ subfunction needed, developing the product prototype, and finally conducting the field trials to determine its effectiveness. The developed product has been well-received by the concerned workers and factory management. These tools proved to be a successful context- specific design intervention. The tool’s success was attributed to its cost-effectiveness & safety improvement, and drudgery reduction features.

A sitting-based cutter is a hand-held cutter comprising a roller press assembly and the roller glider cum collection bin. The roller press assembly constitutes a detachable frame having a roller attached at one

end. The roller is used for squeezing the cut/ pierced pouches to drain out the liquid content filled inside defective pouches completely. A C-clamp is provided on the one side of the detachable frame, upon which the industrial cutter/ blade can be mounted. This blade cuts the pouches which are fed beneath it from the right side. A roller press assembly is dragged from left to right against the pouch feed in the opposite direction. The squeezed liquid is collected in the container provided under this roller press assembly. This roller glider cum collection bin includes a plurality of holes and a guide rail for providing a channel for the cutter. This collection bin can be opened up for cleaning using the hinge provided. This collection bin is made up of Stainless Steel to avoid contamination of the liquid. This apparatus allows the worker to work safely as it eliminates the necessity of holding a sharp cutter/ blade in bare slippery hands. Besides, manual squeezing (which is a prominent source of contamination) of the pouches to recover liquid from cut pouches is evaded as the roller squeezes the inner content (liquid).

A Standing-based cutter is a mechanized apparatus comprising an upper assembly, a top solid circular heavy plate with sharp-edged spikes provided at the bottom surface capable of piercing the un-usable pouches/ sachets. In this cutter, the middle fine knitted plate is capable of removing out entangled pierced pouches/sachets. The top solid circular heavy plate of the apparatus presses the filled liquid from the pierced (cut) pouches/ sachets by effectively pressing upon such pouches, and sachets kept at the upper base of the collection drum. It is driven using a hydraulic/ pneumatic/pulley-based system attached to the upper assembly. The top solid circular heavy plate of the assembly is moved up and down to press the pierced pouches to drain out the liquid, which is collected in the collection drum provided below it. It is made up of Stainless Steel parts.

FMCG re-work is prevalent in several developing countries as a result of similar existing scenarios. Therefore, the developed tools have a broad market value among these FMCG units, and the product is commercially viable. The developed tools can eliminate drudgery and other safety issues prevailing in pouch/ sachet cutting re-work activities. It leads to reduced man-day losses and worker compensation incurred due to accidents and injuries. These tools are easy to operate, maintain and handle and this ease of operation makes these tools well suited to the FMCG shop-floor needs among untrained workers.

Considering wide acceptability and demand among various developed nations, mass production of these tools is required. These tools will be very cost-effective during mass production and may cost as low as 70 USD for a hand-held cutter and 275 USD for the mechanized cutter. These tools can save huge money for the FMCG industries by making the re-work activities safe and comfortable. Besides, using these tools makes the re-work process non-contaminated and hygienic, and the chances of wastage due to contamination are also reduced.

Intellectual Property Rights (IPR) Initiatives: Innovative Tool

IPR Filing Details

Category

Hand-held Cutter (sitting position) Mechanized Cutter (standing position)

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Patent Number: 355504

Patent Number: 364959

Granted Design Patent (India)

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