

## **RESEARCH RELATED TO THE FLEXIBILITY OF THE DEVICES USED FOR PACKING CANNED FOOD IN CARDBOARD BOXES**

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### ***Abstract***

*In this work we have proposed to realize a system that leads to an easy loading of canned food in cardboard boxes, boxes that have got standard dimensions, the loading system having an increased flexibility being able to load uni-layer or multi-layer different types of canned food, of different sizes, in order to obtain an easy way of transporting them to the point of sale.*

**Key words:** Packing device, wrapping/packing, cardboard boxes, hydraulic elevator, pneumatic updating device, rodless pneumatic updating device, pushing updating device assembly.

### **INTRODUCTION**

Whatever would be the estate of the food, be it natural or processed, it is to be transported from the production unit to the point of sale and then finally it would reach the human consumer, maintaining its quality and integrity.

Thus, the packing operation shall be seen as an integrated part in the production and preservation of food (Banu C. și colab., 1999).

The packing operation is realized with the help of some devices that use packing materials having as an aim to protect the food from deterioration (Bureau, G. și Multon, J.L., 1989). The packing operation protects the food against the toxic factor, which in this case is the environment, and it also protects the food (Botea T., 1998) against quality and quantity losses, so that the features and its value as a commodity stay intact. (Iancu C. 2010, Ioancea L., 1986, Renert M., 1971)

The packing itself has the material role to satisfy ideal handling, transport and storage conditions as well as the role to stimulate the policy of food unloading and sale (Paine, F. A. et Paine, Y., 1983, Robertson G.L., 1993). The current tendencies and the perspectives in what the food products' packing is concerned must take into consideration to adopt new solutions in choosing the packing material which should ensure the marketing, trade, technical quality, and it is also a must to ensure the modernization of the packing devices as new different kind of products appear and to also have in view the requests and the demands of the

consumer (Merticaru V., și colab., 1997, Scadovschi S., 1976, Turtoi Maria, 2000).

#### MATERIAL AND METHOD

Having in view that technology keeps performing through new constructive solutions, it is normal that those technologies from the food engineering be subject to last hour transformation in order to perfectionate the already existant solutions. Thus, last but not least, the devices destined to food processing must be of the latest generation in order to ensure the quality of the food product. This is why the food packing devices are positively influenced by the development of the technology.

The automatic packing lines can somehow but not entirely compensate the lack of industrial robots but we must find solutions to flexibilize them.

To help small and middle businesses from the food industry and not only, that face a fund shortage and that cannot afford financially to buy automated packing devices we came up with a constructive solution of a device that packs the canned food in cardboard boxes.

In order to achieve this aim we suggested the realization of an easy way of loading canned food in cardboard boxes, that have standard dimensions, the loading system having an increased flexibility being able to load different kind of uni-layer or multi-layer canned food of different sizes.

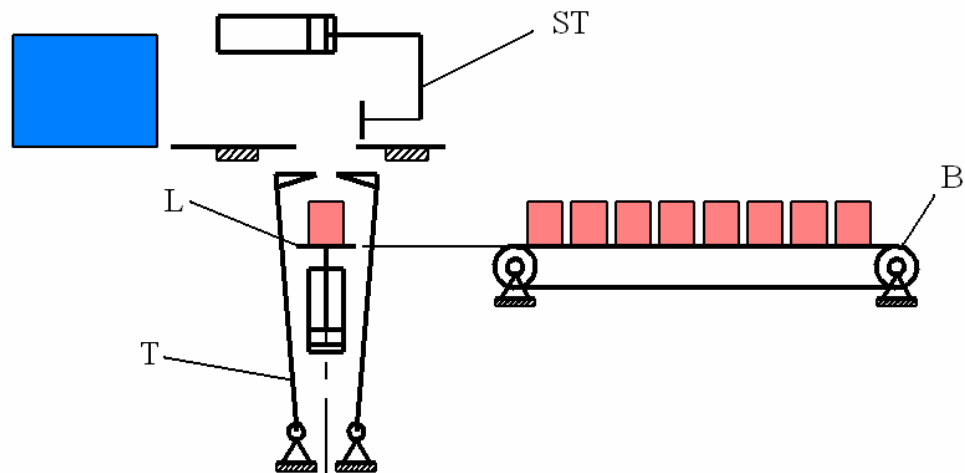


Fig. 1. kinematic scheme of the machine

In figure 1 we present the scheme of the suggested cardboard box packing device's loading system. On the basis of this scheme we had issued the 3D drawing of the device using the Solid Works program.

In order to determine the optimum loading solution we had in view the possibility to realize a multi layer or a mono layer assortment of the articles that are to be packed.

The assortment is realized with the help of a fixed race elevator (L) that functions with the help of a pneumatic cylinder presented in figure 3.

Through the hatches (T) we can realize the intermediary stop of the articles that are going to be packed in cardboard boxes in order to obtain the wanted mono layer or multi layer assortment. The number of layers is according to the number of the elevator's double cylinder races until the moment the articles are transferred into the cardboard boxes.

The packing device being assisted by a programmable automated device called (PLC) from which we can select the wanted loading programmer according to the number of layers, to the dimension of the articles and to the weight of the articles that are to be packed in the cardboard boxes.

The conveying belt (B) supplies and directs the articles to the elevator (L) and in order to be able to do this the belt has got guides and gutters.

The pneumatic updating device that is presented in figure 2 is actually a rodless pneumatic cylinder that has the role to push into the cardboard boxes the articles that are to be packed, grouped in a mono layer or in a multi layer, according to their dimension.

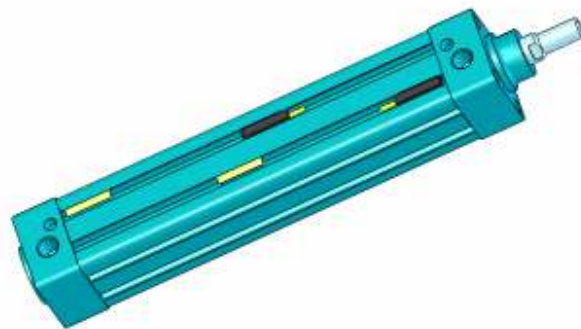


Fig. 2. The pneumatic updating device

We have chosen a rodless pushing device so that the pushing device have a reduced weight and so that the latter have a big enough race without exceeding the weight of the device.

The successive operations of loading are shown in figure 3. a, b, c, d, e, f

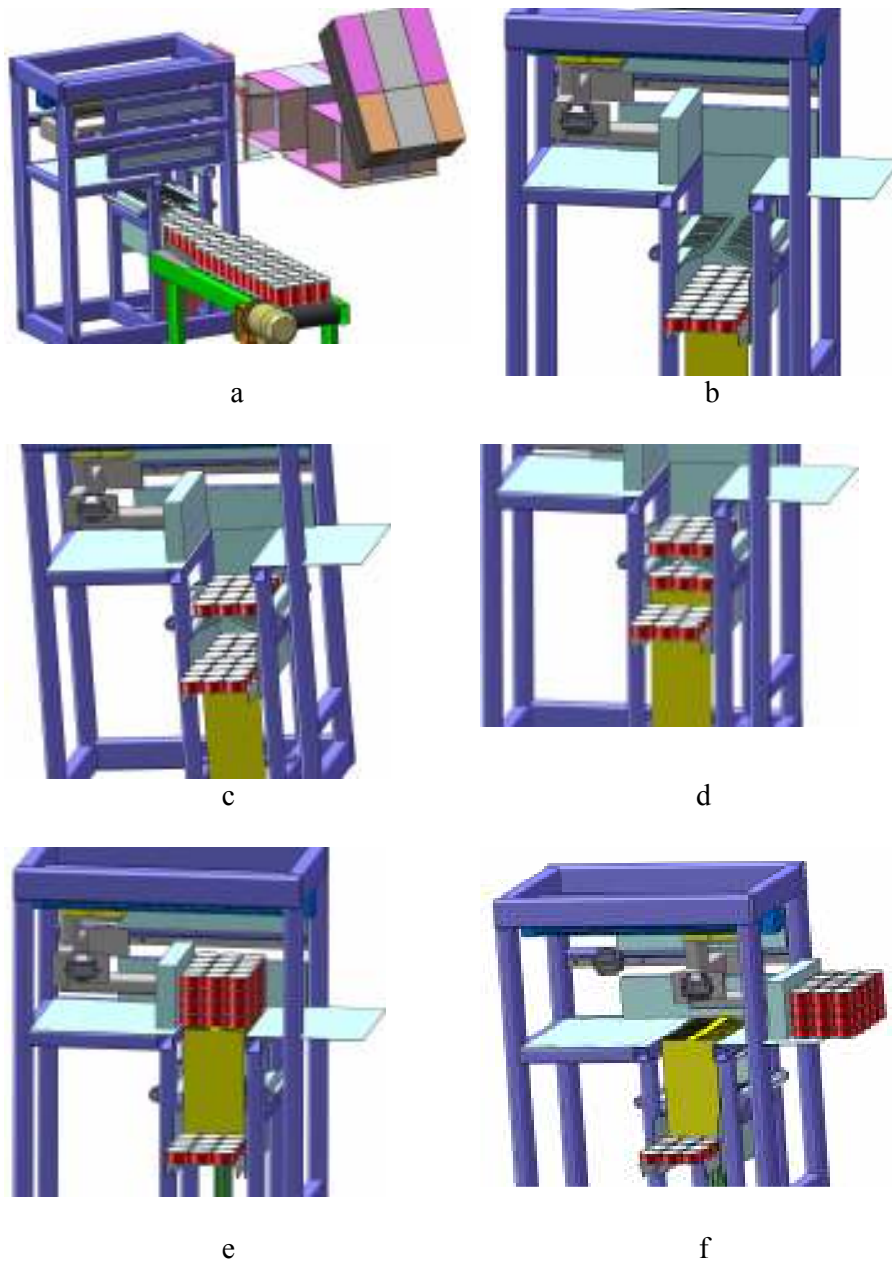


Fig. 3. a, b, c, d, e, f. Successive load operations

## RESULTS AND DISSCUSIONS

The food cardboard box packing device has got a modern and easy system of transferring and loading the food into the boxes, the chosen solution being fit for the small and middle sized businesses due to its great flexibility and to the reduced production price of the device, device that would be able to pack a great diversity of food products.

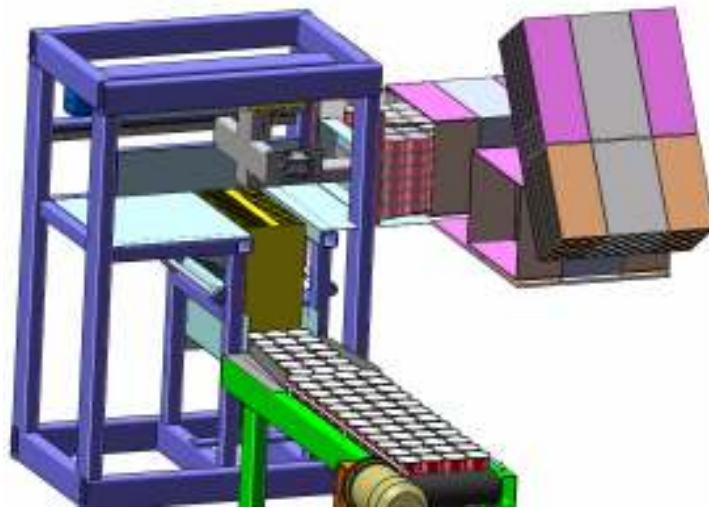


Fig. 4. The final devices used for packing canned food in cardboard boxes.

## CONCLUSIONS

In order to choose an increased rigid aspect and a reduced gauge of the device we have chosen the constructive loading variant of multi or mono layer articles using the device that transfers the articles into cardboard boxes actioned by a rodless pneumatic pushing device.

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