July 19, 1955 W. E. CARMICHAEL 2,713,449

PACKAGING APPARATUS

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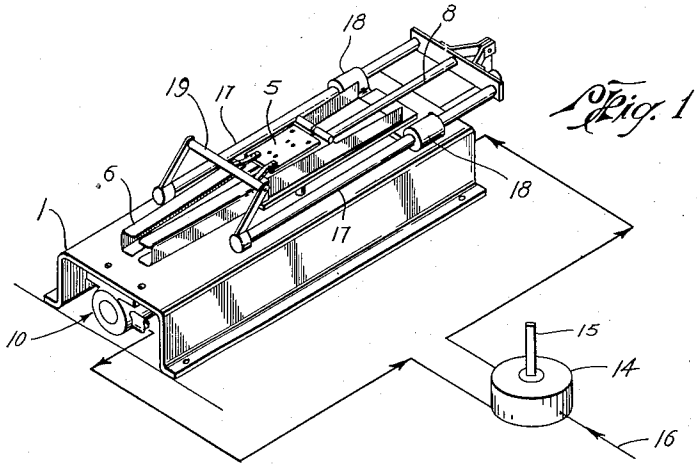


Fig. 1

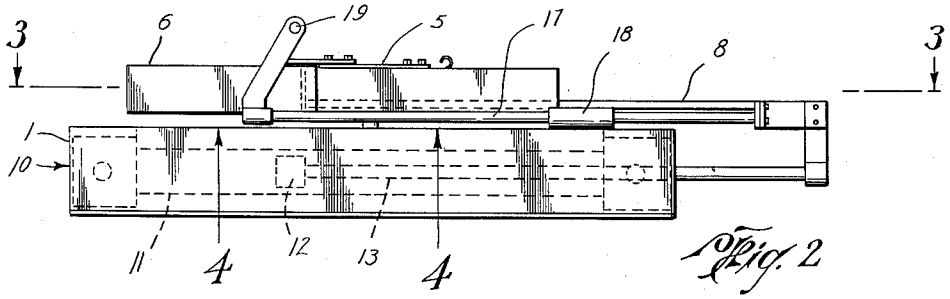


Fig. 2

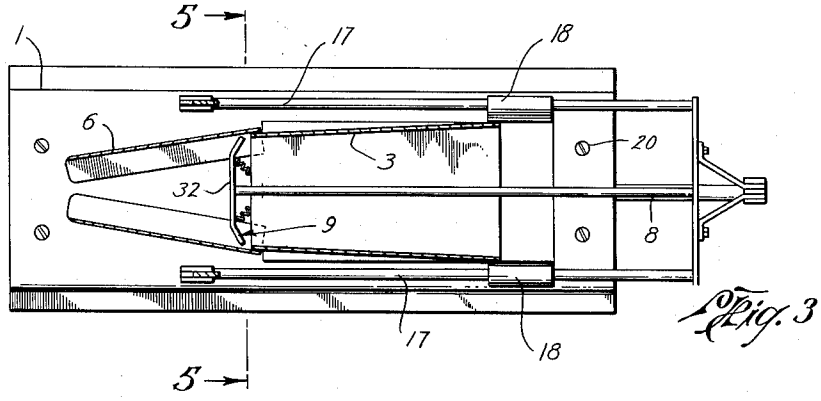


Fig. 3

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Fig. 4

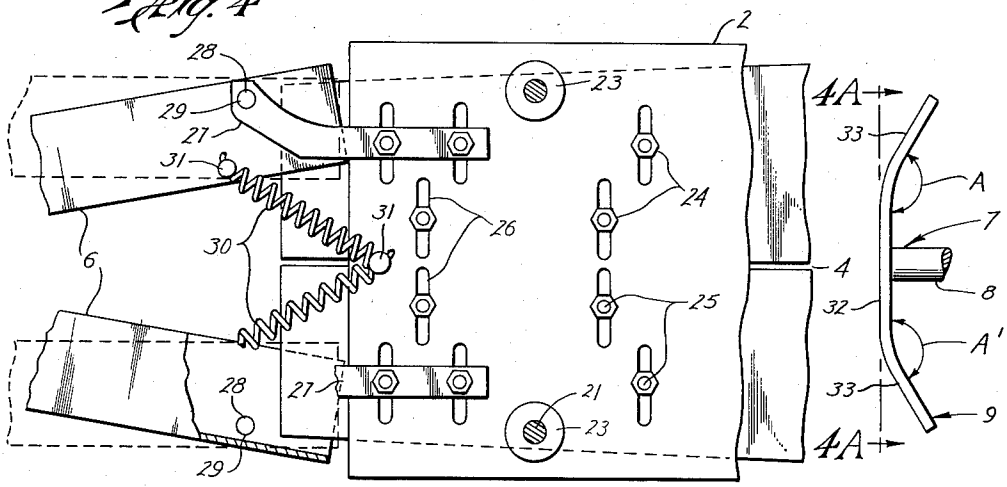


Fig. 4A

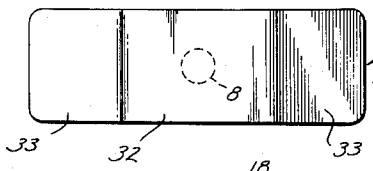


Fig. 6

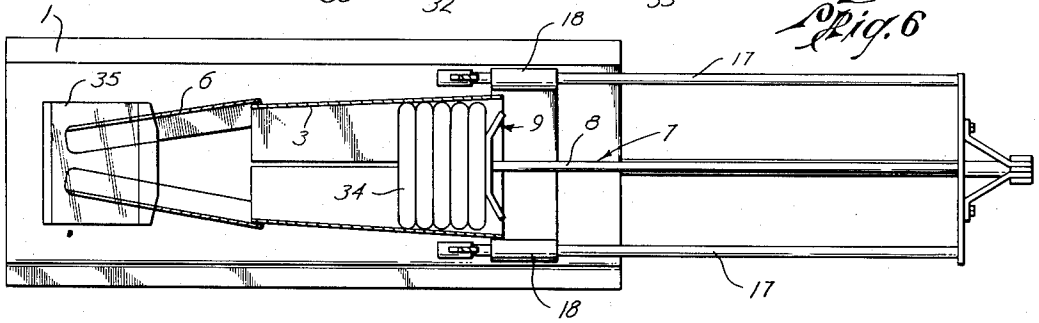
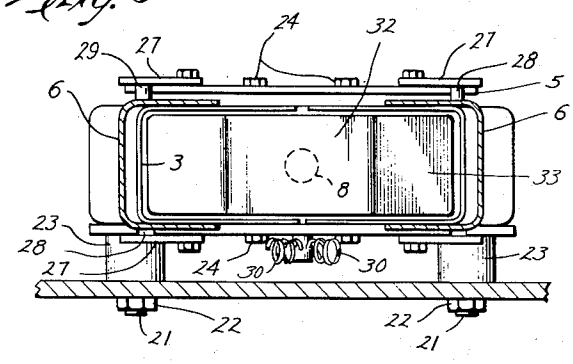


Fig. 5



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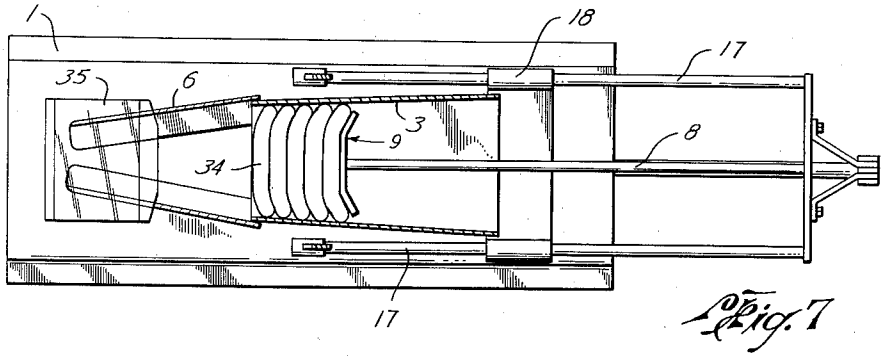


Fig. 7

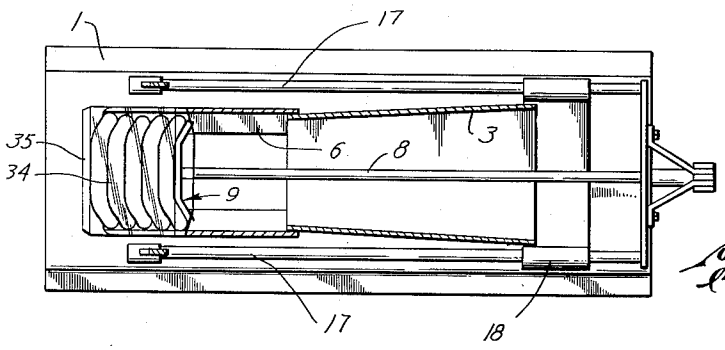
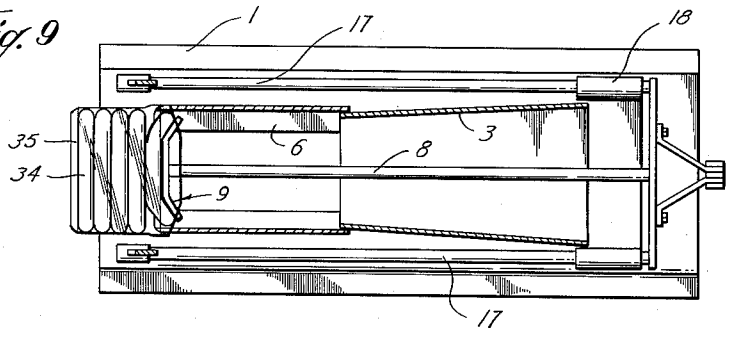


Fig. 8

Fig. 9



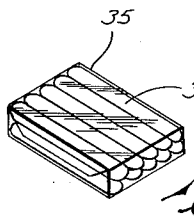


Fig. 10

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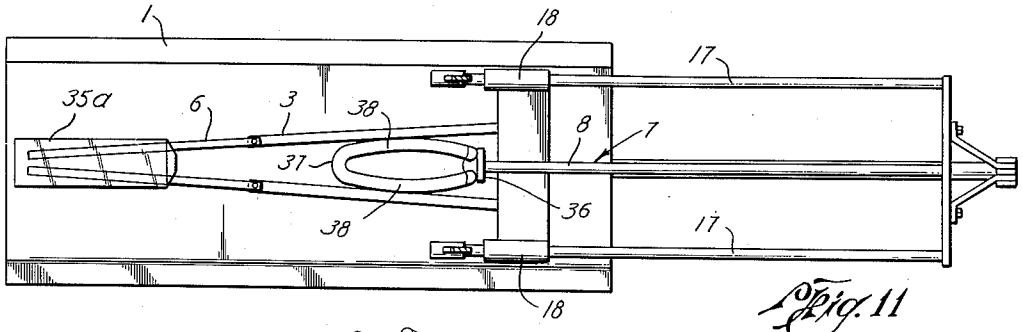


Fig. 11

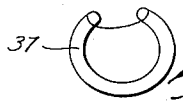


Fig. 11A

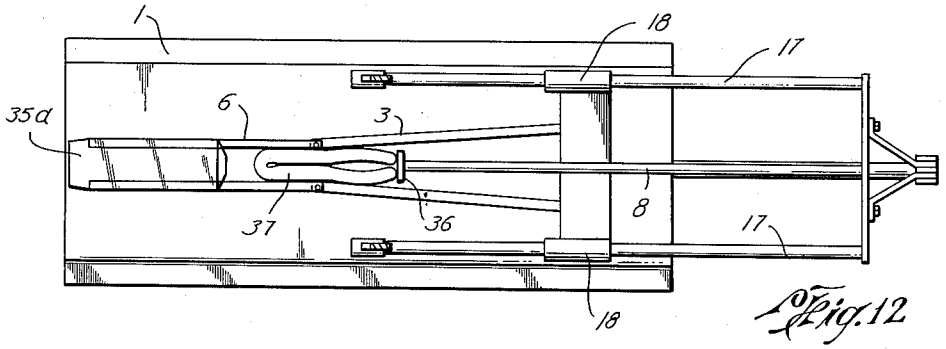


Fig. 12

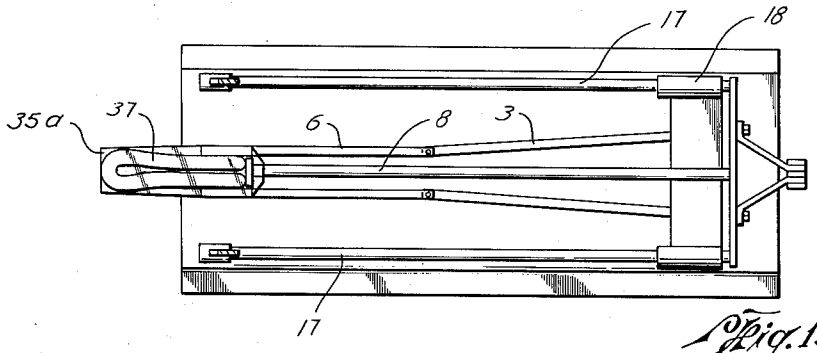


Fig. 13

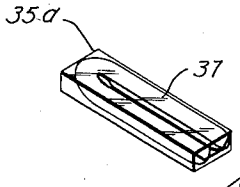


Fig. 14

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PACKAGING APPARATUS

William E. Carmichael, Houston, Tex.

Application April 13, 1951, Serial No. 220,950

4 Claims. (Cl. 226—18)

This invention relates to the packaging of articles and apparatus therefor, and more particularly to apparatus for packaging flexible articles. The invention specifically relates to apparatus for packaging such articles which have been previously stuffed in bulk in a protective covering.

This invention is applicable to packaging many types of articles; however, for the sake of clarity, simplicity and convenience, a preferred embodiment thereof will be described with reference to packaging meat products, such as e. g. frankfurters, link sausages and the like products. A second embodiment will be described with reference to packaging ring meat products, e. g. ring sausages and the like.

With the advent, popularity and convenience of self-service and other modern merchandising features, the advantages and practical necessity of proper display of mechandise became apparent. One of the essential features, and perhaps the most important feature, in proper display of merchandise is a neatly wrapped package in which the product fits snugly and through which a major portion of the product is visible.

One major difficulty encountered, and heretofore unsolved, in packaging these meat products is due to the flexibilty and non-uniform contour thereof, which properties inherently cause the products to resist being properly packaged.

Heretofore such meat products have been packaged by wrapping both by hand and by machines, although mostly by hand. While the machines are very complicated and practically prohibitive in cost, they still fail to adequately solve the problem. Likewise hand wrapping is extremely expensive because of amount of labor and materials required. Hand wrapping also fails to produce the desired results. Additional unsatisfactory elements in prior art techniques include the use of an excessive amount of wrapping material, and often the use of material to reinforce the package is found necessary, thereby adding to the inconvenience and cost of the techniques and restricting the visibility of the product in the package.

An object of this invention is to provide apparatus for packaging articles. A further object is to provide apparatus for packaging flexible integral products in such manner and by such means whereby a packaged product results characterized by pleasing neat appearance, snug fit, and maximum visibility of product in package. A still further object is to overcome the disadvantages of the prior art techniques. Other objects will be apparent from the description of this invention given hereinafter.

This invention will be more fully illustrated by reference to the accompanying drawings, wherein identical reference numerals are used to indicate similar parts in the figures.

Referring to the drawings generally:

Figure 1 is a perspective view of one embodiment of the packaging device of this invention.

Figure 2 is a side elevation of the packaging device.

Figure 3 is a plan view of the packaging device.

Figure 4 is a bottom view taken along line 4—4 of Figure 2 showing certain details.

Figure 4–A is a view along the line 4A—4A of Figure 4.

Figure 5 is a view partly in section along the line 5—5 of Figure 3.

Figures 6, 7, 8 and 9 are plan views partly in section showing the packaging device at progressively advanced stages during its use in packaging products.

Figure 10 shows the finished article.

Figures 11, 12 and 13 are similar to Figures 6, 7 and 9, but show the packaging of a different product, which is illustrated in Fig. 11A.

Figure 14 shows the finished article of this latter product.

The major elements of the packaging device according to the embodiment of this invention shown in the drawings comprise a frame or housing **1** attached to any suitable support (not shown); a plate **2** mounted upon and spaced away from the frame; a trough **3** mounted on the plate **2** and tapered throughout its length, the trough being split **4** from end to end to render it adjustable in width; a plate **5** mounted on top of the tapered trough at its narrow end; a pair of jaw-like guides **6** pivoted and spring-attached at the narrow end of the tapered trough; a plunger **7** having a plunger rod **8** and a shaped plate **9**. The plunger is reciprocated along in the tapered trough and jaw-like guides by means of a pneumatic piston assembly **10** including a cylinder **11**, a piston **12**, piston rod **13**. The piston assembly is provided with a pneumatic valve **14**, actuated by means of hand lever **15**, and a compressed air source **16**. Of course, the plunger **7** could be actuated hydraulically, by steam, electricity or other suitable source of power. The stroke of the plunger **7** is guided by the guide rods **17** and guide sleeves **18**. The piston assembly is secured to the plunger as indicated in Figures 1, 2 and 3. The handle **19** retains guide rods **17** in alignment with guide sleeves **18** and aids in manually operating the packaging device in the event of power failure.

In addition to the herein described embodiment of this packaging device wherein provision is made for both power and manual operation, it is contemplated that the packaging device will also be made with the means for power operation omitted and only means for manual operation provided. In this event, e. g., the piston assembly **10** would not be included, but the housing **1** would be included. Thus small operators, who may prefer the manually operated units, could buy them, and when their volume of business increased they could readily convert the units for power operation simply by installing the piston assembly.

Plate **2** is attached to the frame **1** with screws **20**, bolts **21** and nuts **22**. This plate is spaced away from the frame by the collar spacers **23** in order that the nuts **24** will be accessible for adjusting the width of the trough **3** to accommodate various size products being packaged.

The two halves of the split tapered trough **3** are held in the desired position by means of headless bolts **25** and nuts **24**. One set of the bolts **25** pass through the transverse slots **26** and the bottom plate **2** and are tack-welded to the bottom outside of the tapered trough **3**. Similarly, another set of the bolts **25** pass through transverse slots **26** in the top plate **5** and are tack-welded to the top outside of the trough **3**.

The pair of jaw-like guides **6** are pivotally attached near the narrow end of the tapered trough by means of arms **27** attached on the bottom of the plate **2** and on top of the plate **5** by some of the bolts **25** and nuts **24**. The jaw-like guides are pivoted to the opposite end of the arms **27** by means of pins **28** tack-welded to the outside surface of the jaw-like guides and passing through the holes **29** in the arms **27**. The jaw-like guides **6** are

held in the normal out-of-use closed position (Fig. 1) by springs **30** secured to pins **31** tack-welded to the outside surface of the bottom of the jaw-like guides and plate **2**. Instead of the above, it is obvious that securing the jaw-like guides to the tapered trough by means of spring hinges (not shown) would serve the same purpose.

It will be noted that the width of the tapered trough may be varied to accommodate the size of the product being packaged. This is done by loosening the nuts **24**, pulling the halves of the trough apart or pushing them together to the desired extent and then tightening the nuts **24**. In making this adjustment the bolts **25** slide along the transverse slots **26** in the plates **2** and **5**. It will be seen that since the bolts **25** are not slotted through the arms **27**, adjustment of the trough width automatically adjusts the width of the jaw-like guides the same amount.

While this invention includes a packaging device not having the adjustment means, adjustment means is very important in that it increases the utility of said device and thereby simplifies the job of packaging products of various size. If the processor has only one product to package, the packaging device with set specifications would be provided.

In the fully-open position (Fig. 8), the jaw-like guides stop against the sides of the trough at its narrow end. Preferably, in this position the walls of the jaw-like guides are parallel (i. e., untapered) and the passageway formed thereby is substantially of the same width as the tapered trough **3** at its narrow end.

As relates to packaging elongated substantially straight products, e. g., frankfurters and link sausages, an essential and very important feature of the present invention is the plunger plate **9** of the shape which will now be described.

The plunger plate **9** is attached to the free end of the plunger rod **8** (Figures 4 and 4A). The plate can be conveniently formed by bending a flat plate to the contour shown, whereby a symmetrically-shaped plate is formed having its face in three vertical planes. The plate is attached at its middle portion **32** to the plunger rod 8. It has been found that, in order to function properly, angles A and A^1 (Fig. 4), formed by the middle portion **32** of the plunger plate and the end portions **33** thereof, must be greater than 90 degrees but less than 180 degrees. Unless these conditions are met, proper packaging of the product has not been obtained. An angle of 110°–140° is preferred. An angle of 125° has given very good results.

It will be understood that the present invention is not to be limited to the above illustrative embodiment thereof described in terms of the accompanying drawings and that many modifications may be made in said embodiment within the scope of this invention.

In practicing this invention according to a preferred embodiment thereof, the product to be packaged, e. g., frankfurters **34** in units of 10 with a row of five superimposed upon another row of five, is placed transversely in the wider end of the tapered trough **3** and a cellophane bag **35** is placed over the jaw-like guides (Fig. 6). While not a part of this invention, the device well known in the food-packaging art (e. g., in the packaging of ice cream products such as popsickles) as the "Anderson Bagger" is very useful in opening the cellophane bags prior to placing them on the jaw-like guides **6**. Next (Fig. 7) the plunger is caused to travel toward the bag end of the machine by actuating the pneumatic valve **14** by means of the hand lever **15** or other suitable means, e. g., a foot pedal (not shown). The width of the trough being progressively less in dimension than the length of the frankfurters, the frankfurters are uniformly and gradually flexed to the contour of the plunger plate **9**. The plunger pushes the frankfurters along the trough to the end thereof and then into and through the jaw-like guides **6** (Fig. 8). This forces these guides open and places the springs **30** (Figs. 3 and 4) under tension. In this open position the bag fits tightly around the jaw-like guides. The sharp edges and corners of these guides are rounded

off so that the bag is properly shaped open without danger of tearing or otherwise damaging the bag.

It will be noted that in the normal out-of-use position the jaw-like guides **6** are fully closed, and that in this closed position it is very easy to place the cellophane bags over them; whereas in the in-use position these guides are fully open, and that in this open position they serve to retain the cellophane bags and to shape the bags to the desired contour for loading the products therein.

The width of the passageway formed by these guides when open being substantially the same as that of the narrow end of the trough, the frankfurters remain in substantially the same flexed state in passing from the trough into and through the guides.

Desirably, the operator will have his hand on the closed end of the bag while the frankfurters are being charged into the bag. The frankfurters are flexed to such an extent that when they enter the bag they will spring back to substantially their normal straight position and will not only snugly fill the bag but also place the cellophane under slight tension (Figs. 8 and 9). At the end of the loading operation the plunger pushes the loaded bag off the guides, and the open end of the bag is then secured together, e. g., by heat sealing or by use of bag toppers.

The finished article (Fig. 10) is characterized by a snug fit of the frankfurters in the bag, uniformity in shape of the "squared-up" package, neat and pleasing appearance, increased strength and stability of package, relatively high rigidity, and substantially complete visibility of the frankfurters from all six sides of the package.

The advantages of this invention are that it provides a tighter fit of product in the package than heretofore found possible by hand or machine packaging, effects a saving of about 40% of cellophane used per unit weight of product (in addition to the elimination of a cardboard backing in the package) and increases production per man-hour more than two-fold as compared with hand packaging, hand packaging being the only technique in general use at present. A further important advantage is that the packaging device is simple in construction and operation and comparatively inexpensive.

It should be noted that this invention is based essentially on my discovery of the very useful application that can be made of the inherent property of flexibility of the products involved herein. In connection with this invention, the property of flexibility should not be confused with the property of compressibility. They are far different, especially as applied to this invention. For instance, in working out this invention, all efforts to obtain the desired packaged article through compression of the product (both across and along the longitudinal axis thereof) resulted in comparative failures. While some compression of the product probably takes place in practicing this invention and may aid somewhat in the solution of the problem, it is insignificant as compared to flexing, and the invention is not applicable to compression per se.

There are only practical and obvious limitations as to the number of integral products, e. g. frankfurters, that can be packaged per stroke of the plunger; either one or a plurality of them may be so packaged. If a plurality are involved, they may be either in the same horizontal plane (i. e., in a single row) or in different and substantially parallel horizontal planes (i. e., one row superimposed upon another). The number in a row can be varied as desired. If more than one row deep, it is necessary that they be held together in some manner while being packaged.

It is general practice in the art to "cartridge" the frankfurters together with a narrow strip of material or to "band" them together with a "collar," on which advertising usually appears. The terms "cartridge," "band" and "collar" are well understood in this art. Such means of

holding the frankfurters together have been found entirely satisfactory for the purposes of this invention.

In packaging the meat products mentioned herein, if the portions of the packaging device which contact the meat products are made of material (e. g. metal) lacking the desired lubricating properties, it is preferred, but not necessary, to lubricate said portions as a safety factor to prevent the possibility of the meat products being torn. A packaging device having said portions of polished stainless steel has been operated successfully with and without such lubrication. Lubrication could be provided, e. g. by applying an edible oil onto said portions of the device. Spraying a fine mist of edible oil onto said portions of the device has been found very satisfactory.

It is common practice in preparing the meat products mentioned herein to stuff the meat either in an animal casing or a sythetic casing. If an animal casing is used, it is not removed. However, if a synthetic casing is used, the casing normally is removed after smoking, and the product sold as "skinless." The present invention is applicable to packaging both of these products, i. e., it is applicable to packaging meat products enclosed in animal or other casings, meat products enclosed in synthetic casings and said "skinless" meat products.

Hereinabove this invention has been described with reference to packaging substantially straight, elongated, flexible products, e. g. frankfurters, and in connection therewith it has been pointed out that the contour of the plunger plate is critical.

Another substantially related application of the packaging device of this invention is in packaging meat products known in the trade as ring products, such as e. g. ring sausages. When ready for packaging, the ends of these products are still tied together as they were during smoking. While the shaped plunger plate described hereinbefore serves well for packaging this product, a shaped plunger plate is not essential and a flat plunger plate may be used. For this reason and to avoid confusion, in Figures 11–14, illustrating the packaging of such ring products, the packaging device is shown with a flat plunger plate **36**. Other than this, the packaging device is substantially the same as that described above for packaging frankfurters. Of course, the tapered trough **3** is adjusted in width according to the product, and the same applies to the size of the cellophane bag **35**–*a*. Likewise, the process involves the same important principle of flexing the product.

The ring sausage **37** is placed in the tapered trough **3** (Fig. 11), the sausage is pushed along the trough and the jaw-like guides **6** by the plunger **7** and into the narrow elongated cellophane bag **35**–*a*. During its passage along the tapered trough, the sausage is flexed to the extent that the two portions **38** thereof are in contact throughout substantially their entire length. The sausage is pushed through the jaw-like guides **6** into the cellophane bag **35**–*a*. Upon entering the bag, the sausage springs back toward its initial shape. The bag is closed, e. g. by heat-sealing or by applying a bag topper. The result is an improved package having practically the same desirable characteristics as the packaged frankfurters described hereinbefore. This enables packaging the rings in a much narrower bag than by hand packaging, thereby effecting a large saving of cellophane and producing a tight package.

Upon entering the bag, products such as frankfurters and link sausage spring back to at least substantially their normal initial straight shape. Occasionally they may not spring back completely. If not and this is desired, the spring back may be completed by light tapping. Before packaging, the ring products are almost circular with their ends tied together with the same means that held them together during the smoking process. Upon entering the bag, the ring products spring back only a small portion of the way toward their normal ring shape.

The terms "horizontal," "vertical" and the like are used herein with respect to the packaging device in its normal position of use as shown in the drawings.

As many apparently widely different embodiments of this invention may be made without departing from the spirit and scope thereof, it is to be understood that the invention is not limited to the specific embodiments thereof except as defined in the appended claims.

What is claimed is:

1. A packaging device comprising a support, a tapered trough, a pair of pivotally mounted guides at the narrow end of said trough, biasing means biasing said guides to a converging position, a plunger including a rod and a plate attached to one end thereof, said plate having its major axis substantially perpendicular to the axis of said rod and having its respective end portions bent toward said rod at an acute angle with respect to said rod, and means for reciprocating said plunger along the longitudinal axis of said trough and guides and throughout substantially the entire length of both.

2. A packaging device comprising a support, a tapered trough, a pair of guide means pivotally hinged to the narrow end of said trough and spring biased to a converging position, a plunger including a rod and a plate attached to one end thereof, said plate having its major axis substantially perpendicular to the axis of said rod the outermost portion of the face of said plate forming an acute angle with said rod, means for reciprocating said plunger along the longitudinal or major axis of said trough and guide means and throughout substantially the entire length of both, and a second pair of guide means movable parallel to the path of said rod substantially co-extensive therewith to guide said plunger.

3. A machine for inserting flexible meat products into a non-rigid container comprising a tapered trough split along its longitudinal axis, guides pivoted to said trough at its narrow end and constituting a support for said container, manually operable adjusting means operative to vary the width of said trough and the distance between said guides, a plunger reciprocable during its work and return strokes along the longitudinal axis of said trough and guides, said plunger including a rod and a plate attached to the end thereof, said plate having its maximum dimension not greater than the width of the narrow end of said trough, operating means to move said plunger and thereby to open said guides prior to the end of said work stroke, and means limiting the opening of said guides to substantially the width of the narrow end of said tapered trough.

4. A packaging device comprising a support, a tapered trough, said trough being adjustable to vary its width, a pair of guides on the narrow end of said trough, a plunger including a rod and a plate attached to one end thereof, said plate having its major axis substantially perpendicular to the axis of said rod and having its respective end portions bent toward said rod, each of said end portions and said plate making an angle of more than 110 degrees, but less than 140 degrees, and means for reciprocating said plunger along the longitudinal or major axis of said trough and guides and throughout substantially the entire length of both.

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