Feb. 8, 1966 F. A. DAVIS, JR., ETAL 3,233,639

METHOD OF PACKAGING MATERIALS

Original Filed Sept. 19, 1961 4 Sheets-Sheet 1

FIG. 1

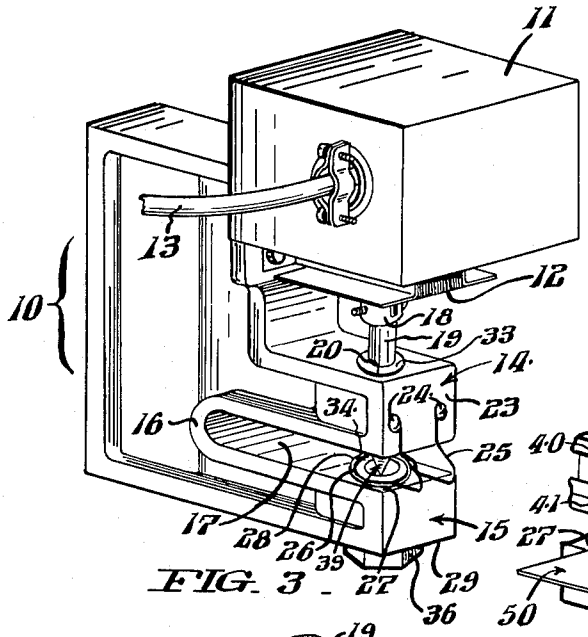


FIG. 2

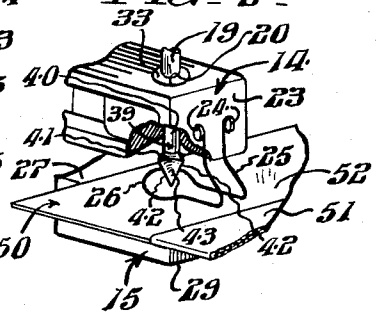


FIG. 3

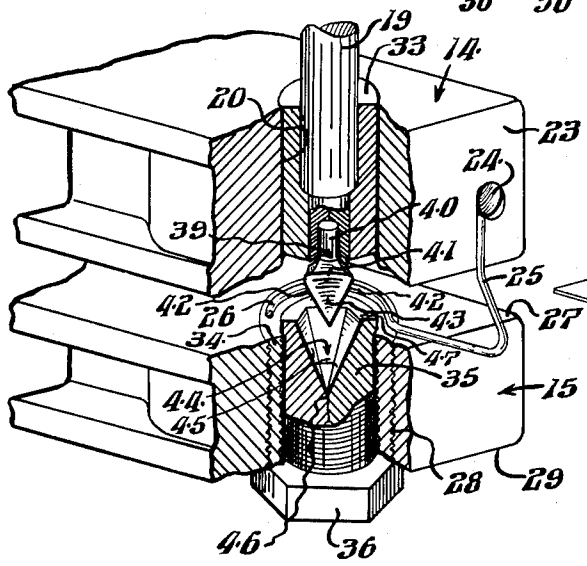
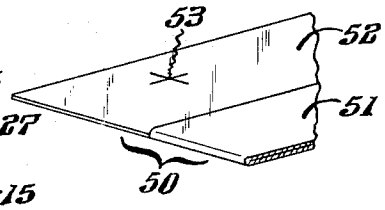
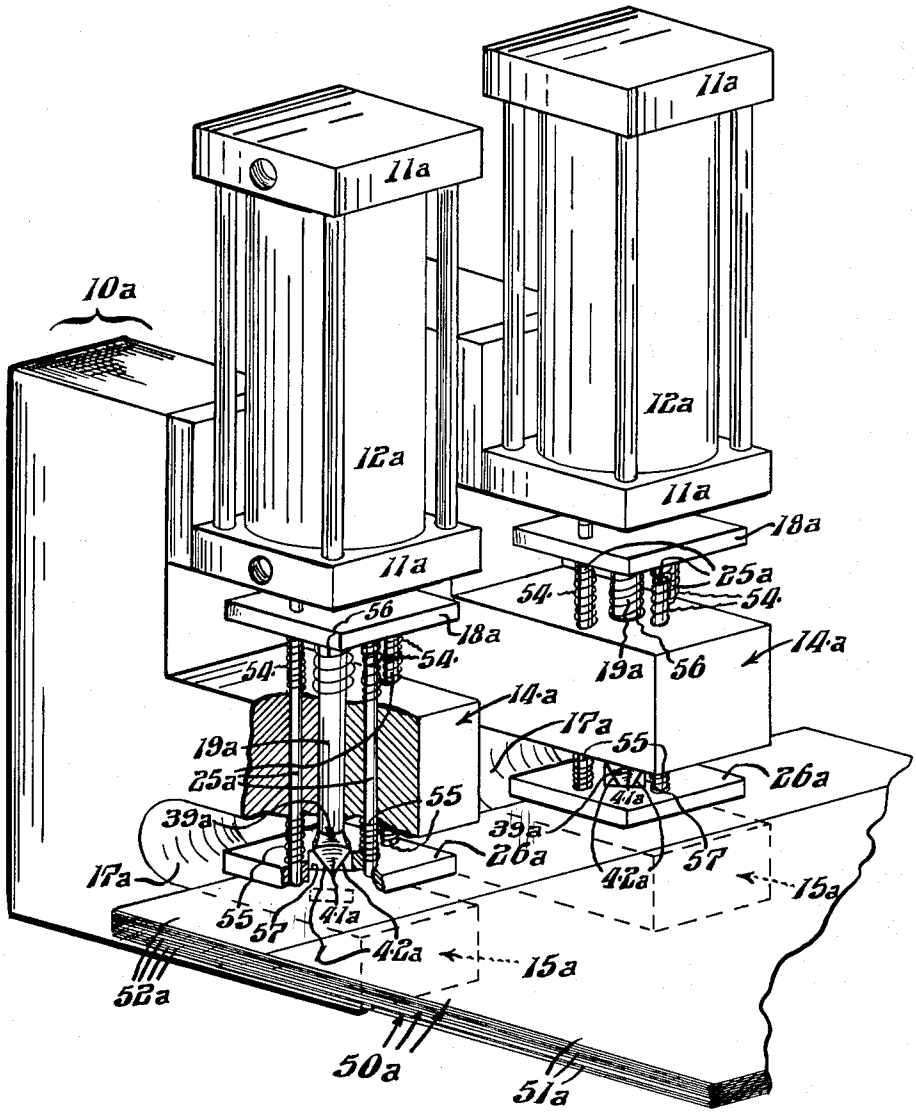


FIG. 4



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FIG. 5



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METHOD OF PACKAGING MATERIALS

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FIG. 6

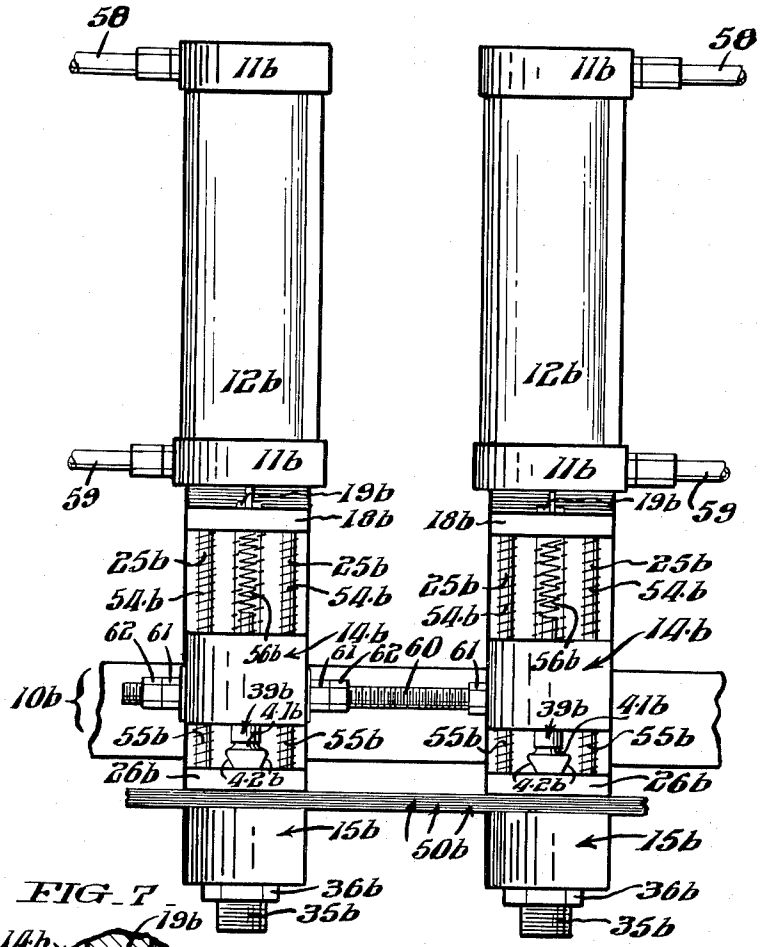


FIG. 7

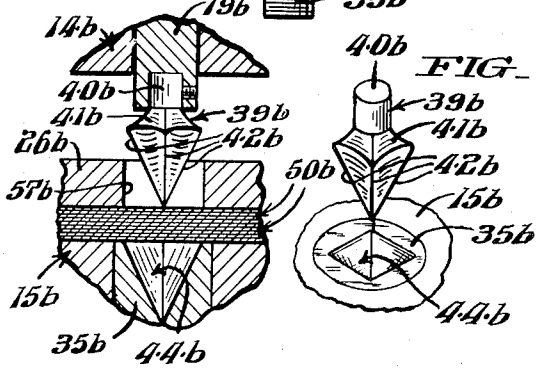


FIG. 8

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FIG. 9

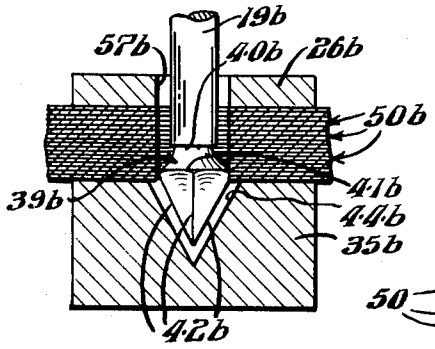


FIG. 16

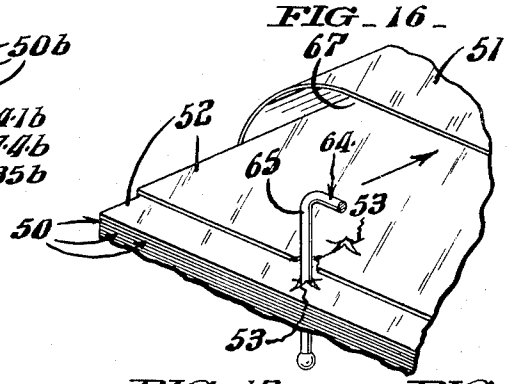


FIG. 13

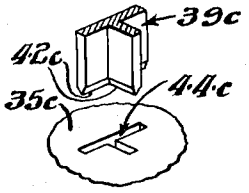


FIG. 14

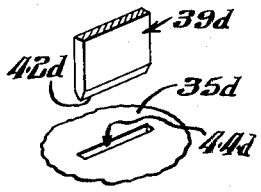


FIG. 10

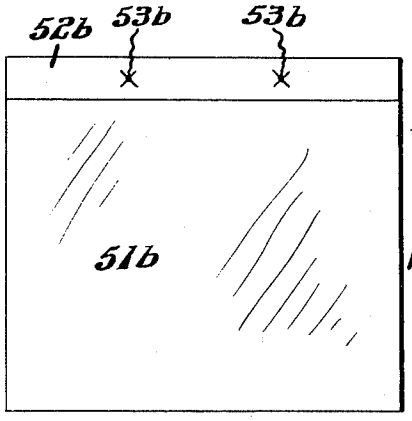


FIG. 15

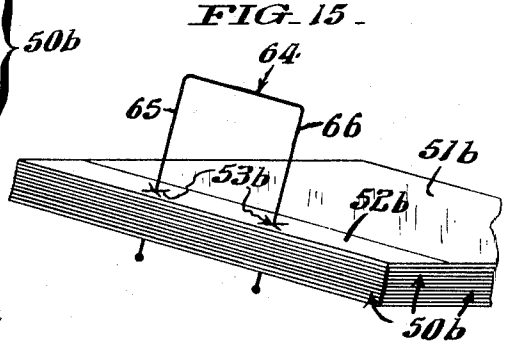


FIG. 11

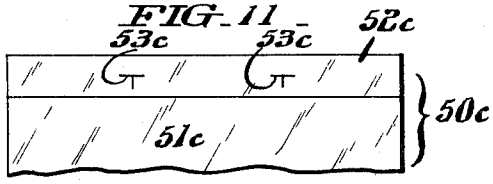
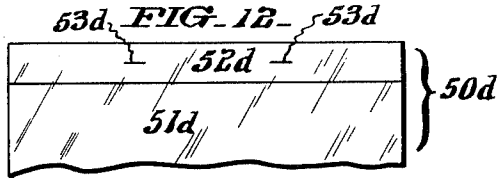


FIG. 12



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3,233,639

METHOD OF PACKAGING MATERIALS

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Original application Sept. 19, 1961, Ser. No. 139,234, now Patent No. 3,183,750, dated May 18, 1965. Divided and this application Jan. 9, 1963, Ser. No. 250,279

5 Claims. (Cl. 141—10)

This application is a division of our copending application Serial No. 139,234 filed on September 19, 1961, now U.S. Patent No. 3,183,750 and entitled "Plastic Bag Cutter."

This invention relates to a method of packaging materials in plastic containers and the like.

One of the objects of the present invention is to provide a novel method for incising sheet materials, such as plastic bags and the like, and taking advantage of the incision during a filling operation.

It is another object of this invention to provide a method of packaging articles which includes filling a bag with sufficient force so that the bag is torn from its wicket support.

It is another object of this invention to provide a novel and efficient method for packaging materials in plastic bags and similar containers.

Other objects and attendant advantages of the invention will appear hereinafter and in the drawings wherein:

FIGURE 1 is a view in perspective of a material incising apparatus as provided in accordance with this invention.

FIGURE 2 is a partial view in perspective, partly broken away, of a part of the apparatus shown in FIGURE 1.

FIGURE 3 is an enlarged view, partly in perspective and partly in section, of a part of the apparatus shown in FIGURE 1.

FIGURE 4 is a perspective view of plastic sheet material and an incision formed therein.

FIGURE 5 is a view in perspective of a modified form of material incising apparatus as provided in accordance with this invention.

FIGURE 6 is a view in front elevation of another modified form of incising apparatus as provided in accordance with this invention.

FIGURE 7 is a view, partly in elevation and partly in section, of a part of the apparatus shown in FIGURE 6.

FIGURE 8 is a view in perspective of an incisor blade and die as provided in accordance with this invention.

FIGURE 9 is a view partly in elevation and partly in section illustrating a specific arrangement of a part of the apparatus shown in FIGURE 6.

FIGURE 10 is a plan view of plastic material showing a modified incision as provided in accordance with this invention.

FIGURE 11 is a partial view in top plan showing still another modification of incision as provided in accordance with this invention.

FIGURE 12 is a partial view in top plan of plastic bag material showing still another modification of incision as provided in accordance with this invention.

FIGURE 13 is a view in perspective of a modified incisor blade and die as provided in accordance with this invention.

FIGURE 14 is a view in perspective of another modified form of incisor blade and die as provided in accordance with this invention.

FIGURE 15 is a partial view in perspective of one arrangement of stacked plastic bags as provided in accordance with tihs invention.

FIGURE 16 is a partial view in perspective of one stage of the method of packaging materials as provided in accordance with this invention.

The following description is directed to a specific form of the apparatus illustrated in the drawings with which the present invention may be practiced and is not intended to be addressed to the scope of the invention itself which may be practiced with a wide variety of forms and arrangements.

Adverting herewith to the specific form of the invention illustrated in the drawings, a material incising apparatus as shown in FIGURE 1, for example, comprises a frame **10** to which is affixed a housing **11** for a solenoid **12** to which there leads an electric current carrying wire **13** for the energization thereof from a source of power not shown. Forward of the frame **10** are formed guide blocks **14** and **15** between which there is provided a U-shaped casting **16** formed integrally with the frame **10** which provides a space **17** between the guide blocks **14** and **15** for the passage of material therebetween. Attached to the plunger **18** of the solenoid **12** is a shaft **19** arranged for reciprocal movement upward and downward through a circular opening **20** in the guide block **14** provided for that purpose. Secured to the front end **23** of the guide block **14** by means of screws **24** is a wire stripper or hold-down **25** which is arranged to form a loop **26** which lies flat against the top surface **27** of the guide block **15** and substantially surrounds a circular opening **28** which extends completely through the guide block **15** to the bottom side **29** thereof.

As may be seen in FIGURE 3, a sleeve **33** is immovably set into the cylindrical opening **20** extending through the guide block **14**, which sleeve carries the reciprocating shaft **19**. As may also be seen in FIGURE 3, the cylindrical opening **28** provided in the guide block **15** is threaded for engagement with a sleeve **34**, which sleeve is threaded on both the inside and outside cylindrical walls thereof and is in turn adapted to engage a substantially cylindrical die **35** having corresponding threads formed on the outer wall thereof and an adjusting lock nut **36** mounted to the bottom end thereof.

As may be seen in FIGURES 2 and 3, an incisor blade **39** having a shank **40** and an inverted pyramidal head **41** is affixed to the shaft **19** and accordingly arranged for reciprocal movement therewith. The inverted pyramidal head **41** is formed generally in the shape of a four-sided pyramid and has cutting edges **42** at the junctures of the sides **43** thereof.

The die **35** has formed therein an inverted pyramidal space **44** having side walls **45** with the vertex **46** of the pyramidal space positioned centrally of the die **35** and the base of the pyramidal space opening into the top surface **47** thereof. It will be clear that the volumetric dimension of the inverted pyramidal space **44** in the die **35** is of approximately the same dimension as the inverted pyramidal head **41** of the incisor blade **39**.

As may be seen in FIGURE 2, a plastic bag **50** to be incised is positioned in the space **17** between the guide blocks **14** and **15** and is held flat against the top surface **27** of the guide block **15** and the top surface **47** of the die **35** by the loop **26** of the stripper **25**. The plastic bag **50** comprises a body portion **51** and a flap portion **52**, which latter portion is held for incision between the guide blocks **14** and **15** by the stripper **25**.

In FIGURE 4 is illustrated a portion of an incised plastic bag which may be a part of a long continuous strip of material out of which may be fashioned a plurality of plastic bags. In one flap **52**, perpendicular slits or cuts have been incised to form an incision **53** in the

form of a cross, the purpose of which will become more fully apparent hereinafter.

FIGURE 5 illustrates a modification of the apparatus adapted to incise a plurality of sheets of plastic material and comprises a frame 10*a* to which are affixed mountings 11*a* arranged for the support of a pair of pneumatic cylinders 12*a* having piston rods (not shown) connected to support plates 18*a* and shafts 19*a*. Formed integrally with the frame 10*a* are a pair of upper guide blocks 14*a* and lower guide blocks 15*a* having therebetween generally U-shaped spaces 17*a* for the reception of a plurality of sheets of plastic bag material 50*a* having flap portions 52*a* and body portions 51*a*.

Mounted to the support plates 18*a* are rods 25*a* which pass through guide blocks 14*a* and have mounted thereto at the lower extremities thereof hold-down plates 26*a*, which plates function in a manner to be explained more fully hereinafter. As may be clearly seen in FIGURE 5, springs 54 are mounted on the rods 25*a* between support plates 18*a* and top the surfaces of guide blocks 14*a* and springs 55 are mounted to the rods 25*a* between the bottom surfaces of guide blocks 14*a* and the hold-down plates 26*a*. As may also be seen in FIGURE 5, springs 56 are also mounted on the reciprocating shafts 19*a* between the support plates 18*a* and the top surface of guide blocks 14*a*.

Affixed to the distal end of shafts 19*a* are incisor blades 39*a* having inverted pyramidal heads 41*a* and cutting edges 42*a*. Set in the lower guide blocks 15*a* are adjustable dies in all respects similar to those shown in FIGURE 3 of the previously described modification of the invention and adapted to receive the pyramidal cutting heads 41*a* which are likewise in all respects similar to the cutting head of the previously described modification of the invention. As may be seen in FIGURE 5, the hold-down plates 26*a* are provided centrally thereof with a square opening 57 of dimension to permit the cutting head 41*a* and shaft 19*a* to pass therethrough.

In FIGURE 6, there is illustrated still another modification of the apparatus adapted to incise a plurality of sheets of plastic material in which there are mounted to a rigid frame 10*b* a pair of hydraulic cylinders 12*b* having hydraulic fluid carrying lines 58 and 59 leading thereinto respectively at the tops and bottoms 11*b* thereof. To the piston rods of the cylinders 12*b* are secured support plates 18*b* in which are set the top ends of rods 25*b*, which rods pass through guide blocks 14*b* and are mounted at their bottom ends in hold-down plates 26*b*. Springs 54*b* are mounted on rods 25*b* between support plates 18*b* and guide blocks 14*b* and springs 55*b* are mounted on rods 25*b* between guide blocks 14*b* and hold-down plates 26*b*.

Shafts 19*b*, to which are mounted springs 56*b* extending to the central portions of support plates 18*b*, extends through the guide blocks 14*b* centrally thereof and to the distal end thereof there is mounted an incisor blade 39*b* having a shank 40*b* and a head 41*b* with cutting edges 42*b*. As may be seen in FIGURE 7, the head 41*b* has the shape of an inverted four-sided pyramid.

Below the hold-down plates 26*b* are mounted guide blocks 15*b* which also serve as die holders for dies 35*b* which may be adjusted therein by means of lock nuts 36*b*. Between the hold-down plates 26*b* and the guide blocks 15*b* are positioned a plurality of plastic bags 50*b* or similar sheet material for incision in a manner to be described hereinafter. As may be seen in FIGURES 7 and 8, dies 35*b* are provided with spaces 44*b* having the shape of an inverted pyramid and of dimension to receive the incising head 29*b*. FIGURE 9 illustrates one position of the incising head 39*b* relative to the plastic bags 50*b* and the die 35*b* during the incising operation.

Cylinders 12*b* are mounted for translational motion across the frame 10*b* and extending between the aforesaid cylinders is an adjusting bolt 60 which passes through bolt retaining members 61 adjacent to which are positioned lock nuts 62, all for a purpose to be explained more fully hereinafter.

FIGURE 10 illustrates a plastic bag 50*b* having a body portion 51*b* and a flap portion 52*b* containing incisions 53*b* which are cut into the flap portion 52*b* by rotating the incising heads 39*b* and dies 35*b* through an angle of 45°.

In FIGURE 11, there is illustrated a plastic bag 50*c* having a body portion 51*c* and a flap portion 52*c* in which are formed incisions 53*c* which may be cut into the flap portion 52*c* by a modified incising head and die illustrated in FIGURE 13.

In FIGURE 13 is shown a T-shaped cutting head 39*c* having an arm and leg at the bottom of which are formed cutting edges 42*c* and a die 35*c* having a correspondingly T-shaped space 44*c* formed therein of dimension to receive the incising head 39*c*.

FIGURE 12 illustrates a plastic bag 50*d* having a body portion 51*d* and a flap portion 52*d* in which are formed incisions 53*d* produced by a modified incising head and die shown in FIGURE 14.

In FIGURE 14, there is shown a generally wedge-shaped incising head 39*a* having a cutting edge 42*d* and a die 35*d* having a wedge-shaped space 44*a* formed therein of dimension to receive the incising head 39*a*.

FIGURE 15 illustrates one arrangement of stacking a plurality of bags 50*b* which are secured to a wicket 64 having posts 65 and 66 which extend through the incision 53*b* in flaps 52*b*. FIGURE 16 is an enlarged view of the post 65 of the wicket 64 shown in FIGURE 15 and illustrates one stage in the process of packaging materials in accordance with this invention. In FIGURE 16, the top bag of the stack of plastic bags 50 having an open mouth 67 is shown torn from the post 65 as the bag moves forward in the filling process.

Although in FIGURES 1, 2 and 3 only one solenoid and incising head have been shown attached to frame 10, ordinarily in the practice of this invention two incising heads operated by a pair of solenoids are used. In forming the incision 53 in the flap 52 shown in FIGURE 4, a plastic bag is inserted into the space 17 beneath the stripper loop 26 so that flap 52 lies flat against the top 27 of the guide block 15 and against the top 47 of the die 35. Energization of the solenoid causes the plunger thereof to fall, driving the shaft 19 downward and driving the cutting head 41 through the plastic flap 52 into the space 44 in the die 35. In passing through the plastic flap 52, the cutting edges 42 of the incising head 41 cut the incision 53 into the flap 52 without punching any of the plastic material out of the flap. As a consequence, only neat slits or cuts are formed in the flap 52. After the incision 53 has been made in the flap 52 of the plastic bag 50, the solenoid is de-energized by controls not shown and the plunger thereof rises, thereby lifting the shaft 19 and the incising head 41 so that the incising head 41 again rises above the flap 52. Thereafter, the plastic bag 50 is removed and the operation may be repeated as desired. It will be understood that the plastic bag 50 may be part of a continuous strip of plastic bag material which may be continuously run through the incising apparatus by appropriate drive means.

In the practice of this invention in accordance with the modifications illustrated in FIGURES 5 and 6, a stack of plastic bags are neatly incised in the same manner in which a single bag was described as incised in the first-mentioned modification of the invention.

In the modification illustrated in FIGURE 5, the flaps 52*a* of the plastic bag 50*a* enter the spaces 17*a* and, when in the desired position, are maintained flat against the guide blocks or die holders 15*a* by means of the hold-down plates 26*a* which are pressed downwardly by the force of the pneumatic cylinders 12*a*. The pneumatic cylinders similarly drive downward the shafts 19*a* so that the incising heads 41*a* pass through the holes 57 in the

hold-down plates 26*a* and penetrate the stack of plastic bags 50*a*. In penetrating the plastic bags, the cutting edges 42*a* of the incising heads 41*a* cut neat incisions in the plastic bag in the same manner as described in the previous modification of the invention.

In the modification shown in FIGURE 6, the hydraulic cylinders force downwardly the support plates 18*b* and consequently the hold-down plates 26*b* against the stack of plastic bags 50*b* while the incising head 41*b* passes through the hold-down plates 26*b* and plastic bags 50*b* to enter the space 44*b* in the die 35*b*.

It will be apparent that by means of the threaded die 35*b*, the die can be adjusted in the guide block or die holder 15*b* to the precise position desired and locked in the aforesaid position by means of the lock nut 36*b*.

In the modification illustrated in FIGURE 6, the hydraulic cylinders 12*b* are mounted so that the distance between the cylinders may be adjusted by moving one or the other of the cylinders translationally toward or away from the other. The adjustment may be accomplished by loosening the lock nuts 62 and moving cylinder 12*b* so that the bolt 60 slides through the bolt retaining member 61 until the incising heads 41*b* are at the correct distance apart, after which the lock nuts 62 are again tightened against the bolt retaining member 61.

In the practice of this invention, plastic bags 50 incised in the manner afore-described are mounted on the wicket 64 and arranged for filling as illustrated in FIGURE 16. The mouth 67 of the top bag is opened by a stream of air or other means and the bag filled at the same time with material which it is desired to package therein. In the filling process, the bag is pulled away from the posts 65 and 66 along one of the arms of the incision 53 so that the flap 52 of the bag neatly tears away from the aforesaid post and the bag moves away, thereby exposing the next topmost bag of the stack for filling in like manner. After the bags have been filled as afore-described, the torn flap is removed in the process of heat-sealing the mouth 67 of the bag.

It will be apparent that an important advantage of the provision of an incision in accordance with this invention resides in the manner in which incisions may be made in sheet material so that no part of the material is punched out or removed in the incising operation, thereby eliminating contamination of bags, sacks or similar containers formed therefrom by punched out pieces of sheet material. It will be appreciated that punched holes in plastic bags and similar containers result in the collection of a large number of punched out pieces of material which tend to become intermingled with the ultimate contents of the bag or container as a contaminate. However, by the incising method of this invention, this undesirable condition is entirely eliminated.

Another important feature of the invention lies in providing an incision which facilitates the easy removal of the bag from its wicket posts.

The present invention may be embodied in other specific forms without departing from the spirit or essential attributes thereof and, accordingly, reference should be made to the appended claims, rather than to the foregoing specification as indicating the scope of the invention.

It is claimed:

1. In a method of packaging materials in a plastic container having a body portion and a flap portion adjacent the mouth thereof, the steps which comprise forming a neat incision in said flap portion, passing a post through said incision to secure said container in position, and passing material into said container through the mouth thereof with sufficient force to tear said flap from said post.

2. The method defined in claim 1 wherein said flap is torn along at least one line of said incision.

3. In a method of packaging materials in a plurality of plastic containers of substantially equal dimension, each of said containers having a body portion and a flap portion adjacent the mouth thereof, the steps which comprise stacking said containers evenly so that the flap portions are superimposed over one another and the body portions are superimposed over one another, simultaneously forming at least two incisions spaced apart from each other in the flaps of said stacked containers, placing said stacked containers on the posts of a wicket by passing said posts through said spaced incisions, and successively passing material into the topmost container of said stack through the mouth thereof with sufficient force to tear said container from the posts of said wicket.

4. In a method of packaging materials in a plastic container having a body portion and a flap portion adjacent the mouth thereof, the steps which comprise simultaneously forming a neat incision in the flap portion of a plurality of superimposed containers, passing a post through said incision to secure said containers in a filling position, and sequentially passing material into each container through the mouth thereof with sufficient force to tear said flap from said post.

5. In a method in accordance with claim 4 wherein the step of forming the incision is accomplished in a manner so as to provide two intersecting lines, and said flap being torn in a direction extending along one of said lines toward the adjacent free edge of the flap.

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