May 20, 1969 G. A. SARANDOS 3,444,666

AUTOMATIC WRAPPING APPARATUS

Filed Oct. 5, 1966 Sheet 1 of 4

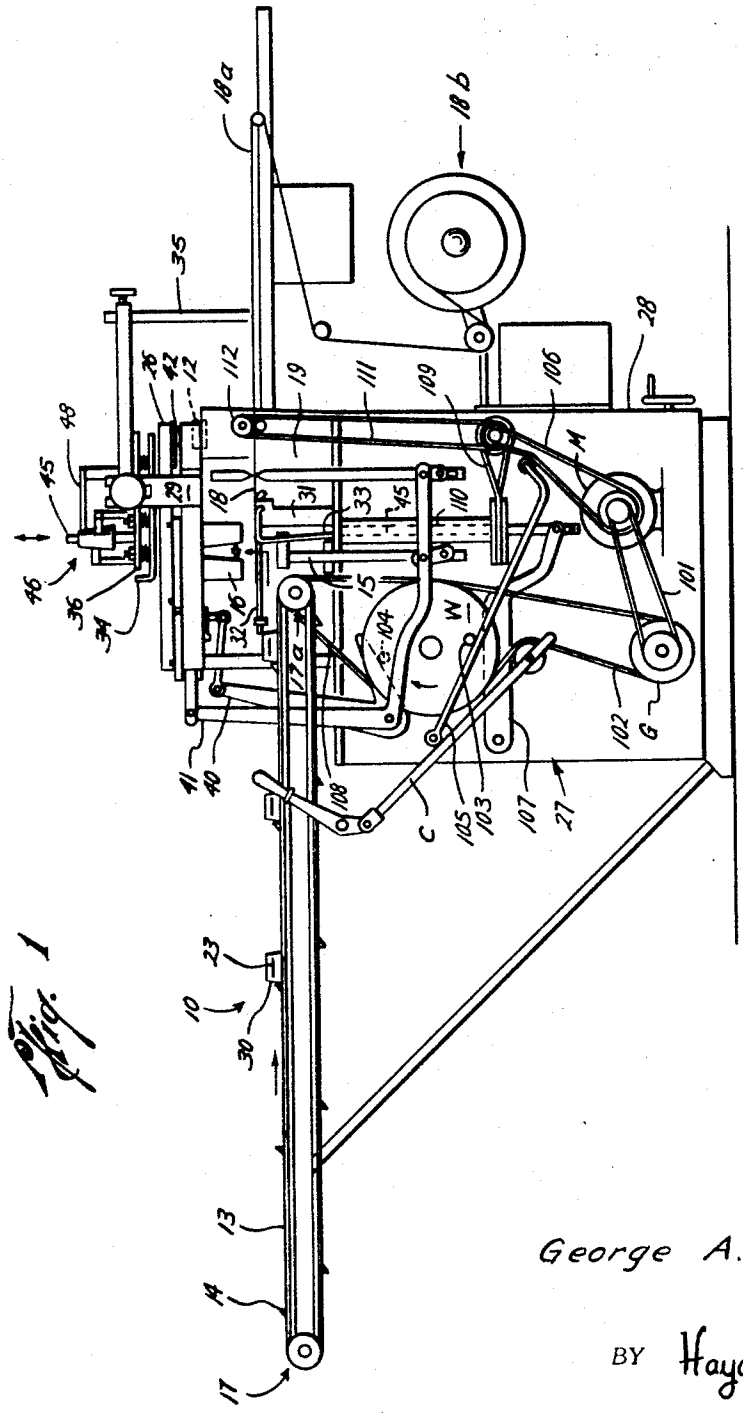

Fig. 1

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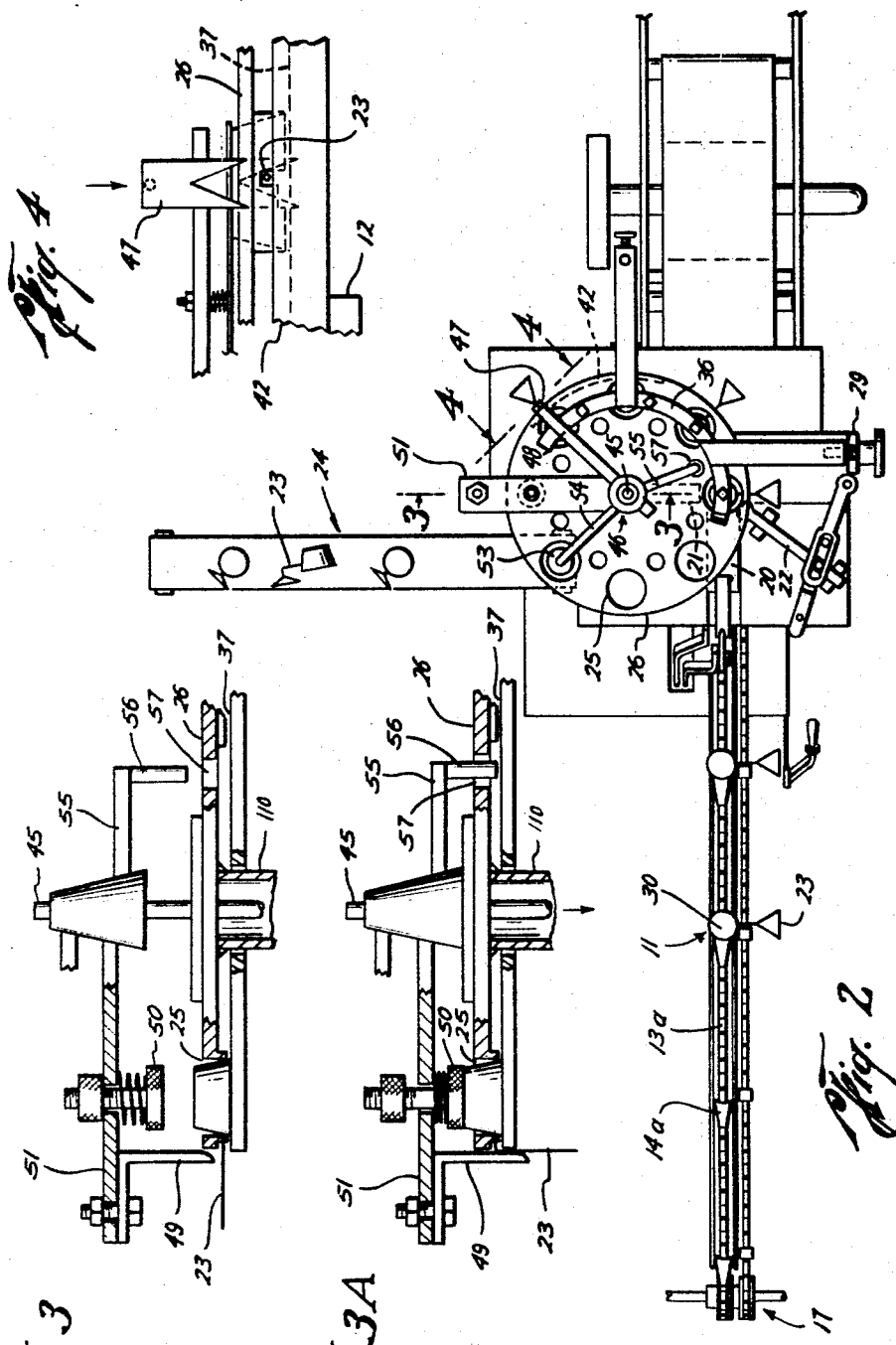

Fig. 4

Fig. 2

Fig. 3

Fig. 3A

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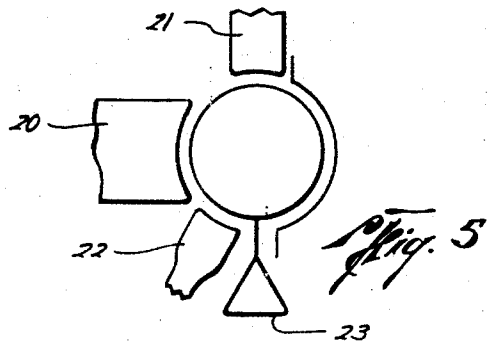

Fig. 5

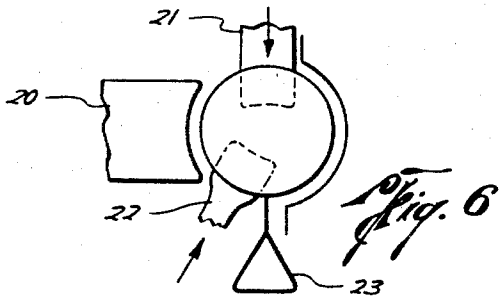

Fig. 6

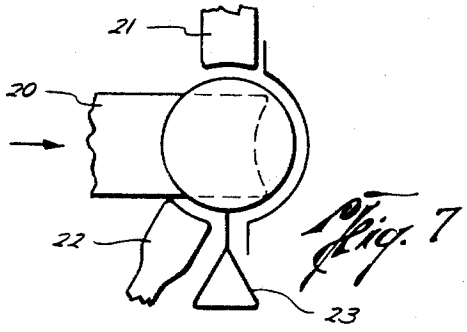

Fig. 7

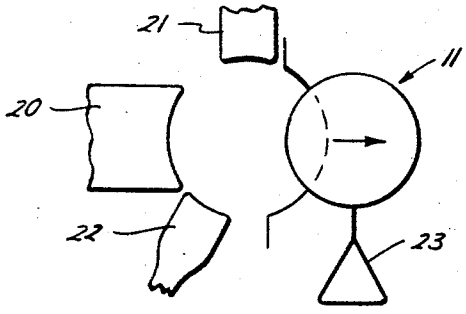

Fig. 8

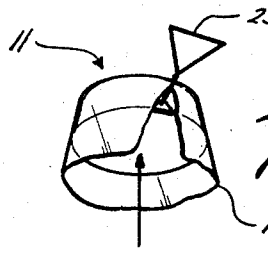

Fig. 5A

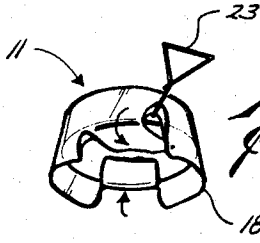

Fig. 6A

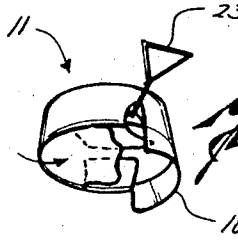

Fig. 7A

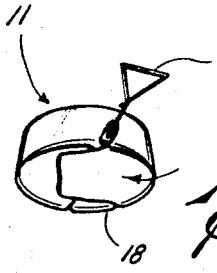

Fig. 8A

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Fig. 9

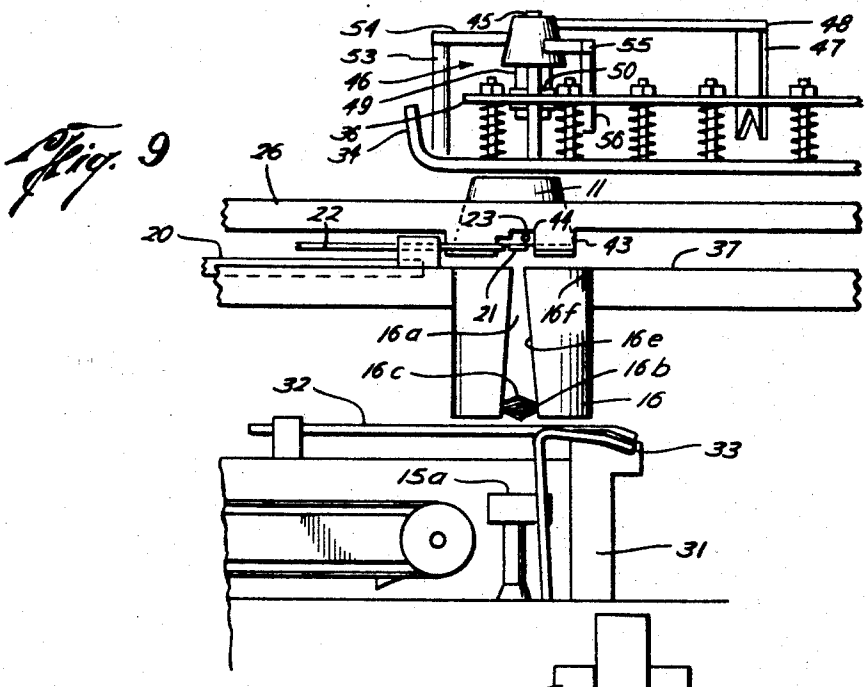
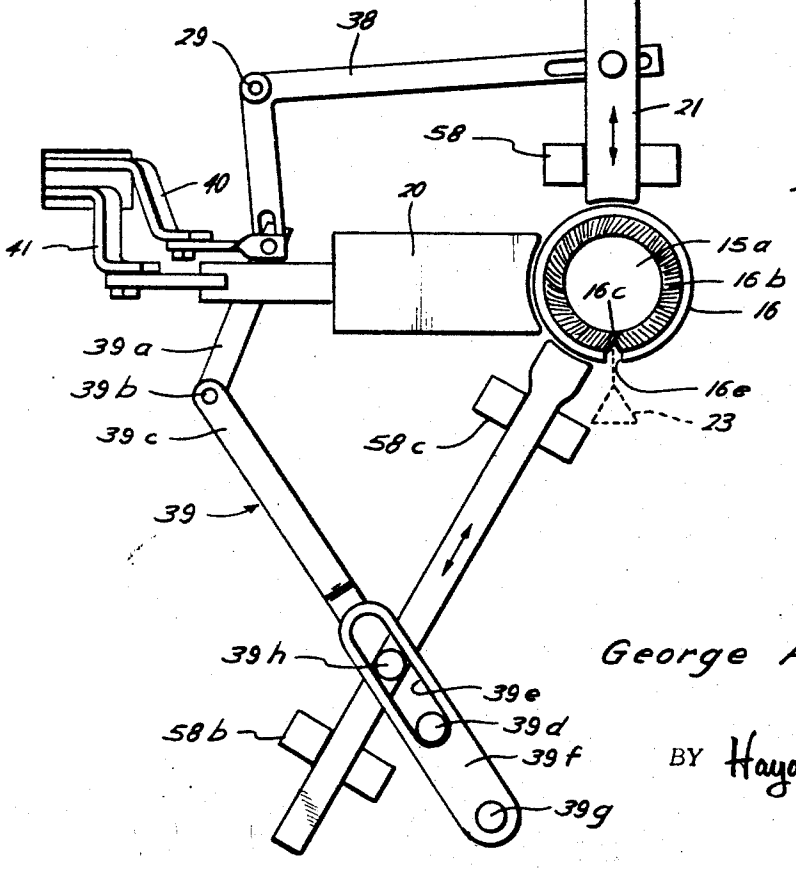


Fig. 10



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Patented May 20, 1969

3,444,666

AUTOMATIC WRAPPING APPARATUS

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Int. Cl. B65b 17/00, 55/00, 61/00, 65/08, 13/00, 27/00, 11/06, 49/00
U.S. Cl. 53—167 8 Claims

ABSTRACT OF THE DISCLOSURE

An automatic wrapping apparatus for automatically wrapping a product having a handle or other projection extending from its body.

Briefly, the present invention provides means for automatically wrapping a deodorant product or the like which has a handle or other projection extending from its body. While the following description relates specifically to deodorant products, it should be understood that the range of products which may be wrapped by the apparatus of the present invention is not so limited. Also, as will be described, the apparatus of the present invention may be readily modified to automatically wrap a wide range of differently shaped bodies.

Certain deodorant products must be wrapped to prevent their chemical content, usually paradichlorobenzene, from decomposing upon being exposed to the atmosphere. The deodorant product wrapped by the apparatus of the present invention is a unit in the form of a solid body with a handle, usually wire or the like, extending from one point of the body. Such unit is generaly employed as a deodorant aid in conjunction with bathroom fixtures such as urinals and toilets. The handle is provided for the purpose of attaching the unit to the bathroom fixture to prevent it from being flushed into the sewer line or from being rapidly decomposed by constant washing over or submersion in the water contained within the fixture. Generally, the handle is bent by hand into the form of a hook which is then placed over the upper rim of the bathroom fixture to suspend the chemical body of the unit in the desired location within the fixture.

Because the chemical body of the deodorant unit decomposes upon exposure to the atmosphere, it is necessary to wrap the body immediately after its manufacture to protect it until it is ready to be used. While prior art machinery has heretofore been available for the automatic wrapping of deodorant blocks which do not have handles or other projections, no such machinery has been available for automatically wrapping deodorant blocks or units which have a handle or other projection. As a consequence, such blocks or units with handles or other projections have required the more expensive and time consuming procedure of hand wrapping.

It is therefore an object of the present invention to provide a new and improved apparatus which automatically wraps deodorant blocks or units having a handle or projection, or any simliar product.

It is also an object of the present invention to provide a single apparatus for automatically wrapping products having projections as well as products lacking such projections.

A further object of the present invention is to provide a single apparatus for automatically wrapping products having projections as well as products lacking such projections wherein the body of the product may assume a wide range of shapes.

Still another object of the present invention is to provide an apparatus for automatically wrapping a product having a handle or other projection extending from its body in a protective covering wherein the protective covering closely adheres to the base of the handle or projection to form a substantially air-tight seal about the body of the product and the base of the handle or projection.

It is an object of the present invention to provide means for automatically placing a protective covering about a product having a body portion with a projection or handle extending from the body portion whereby the body portion of the product is completely wrapped in the protective covering with the covering being tightly drawn about and enclosing the base of the projection to provide a substantially air-tight package about the product.

Another object of the present invention is to provide means for eliminating costly and time consuming hand wrapping procedures.

Other objects and advantages of the present invention will become readily apparent from a consideration of the following description and drawings, wherein:

FIG. 1 is an elevation of one form of the apparatus of the present invention;

FIG. 2 is a plan view of the apparatus of FIG. 1;

FIG. 3 is a partial elevation, partly in section, taken along the line 3—3 of FIG. 2, illustrating one operating position of certain moving components of the invention;

FIG. 3A illustrates the components of FIG. 3 in a second operating position;

FIG. 4 is a partial elevation taken along the line 4—4 of FIG. 2 illustrating, by solid and dotted line convention, two operating positions of a component of the present invention;

FIGS. 5–8A illustrate progressive steps in the folding operation of the apparatus of the present invention;

FIG. 9 is a partial elevation illustrating in greater detail several important operative components of the apparatus of the present invention;

FIG. 10 is a partial enlarged plan view illustrating one form of operation of the folding blades of the present invention.

Before entering into a detailed description of individual components of the apparatus of the present invention, a general functional description of some of the operations performed by the invention will be useful. Referring to FIGS. 1 and 2 of the drawings, the illustrated form of the apparatus of the present invention includes a first conveyor indicated generally at **10**. The conveyor **10** transfers the deodorant units **11**, comprising a handle **23** and a body portion **30**, from left to right in the direction of the arrow as the endless chains **13** and **13***a* move in a clockwise direction about the sprockets indicated generally at **17** and **17***a*.

The units **11** are held in place and are properly spaced from each other as they move along the conveyor **10** by the small projections **14** and **14***a* on the chains **13** and **13***a* respectively. As the projections **14** and **14***a* reach the sprockets **17***b*, the unit **11** is transferred to the pad **15***a* of an elevator mechanism indicated generally at **15**. While a deordorant unit **11** is thus being placed on the pad **15***a*, a measured sheet **18** of a thermoplastic wrapping material **18***a*, such as cellophane or the like, is simultaneously positioned over the top of the unit **11**. When a proper amount of the wrapping materials has been fed out over the unit **11**, the knives or cutters **19** are activated to sever a sheet **18** from the wrapping material supply roll **18***b*. The pad **15***a* and the unit **11** are then driven up into the cylindrical cavity **16***a* of a die **16** to draw the wrapping sheet **18** down around the sides of the unit **11**. As may best be understood by referring to FIG. 9, the unit **11** is elevated through the die cavity **16***a* and positioned in an opening **25** formed in a circular plate **26**. When the unit **11** is properly positioned in the opening **25**, the undersurface

of the unit **11** is above the blades **20**, **21** and **22** used in folding the sheet **18** about the unit **11**. As the pad **15***a* withdraws through the die cavity **16***a*, the folding blades **21** and **22** close in below the unit **11** taking it from the pad **15***a* and, subsequently, in cooperation with the blade **20**, folding and closing the wrapping **18** about the under side of the unit **11**.

When the blades **20**, **21** and **22** have folded the wrapping **18**, they withdraw to their initial positions, the plate **26** rotates in a counter-clockwise direction, as viewed in FIG. 2, carrying the unit **11** over a heated surface **37** to a new position. The heat conductive surface **37** is heated by a heating unit **12** to a temperature high enough to render the wrapping **18** self-adhesive to bond overlapping folds. As the unit **11** continues its movement with the opening or slot **25** of the moving plate **26**, the folds at the bottom of the unit **11** in the wrapping **18** are automatically heat sealed and the wrapping **18** is crimped tightly about the base of the handle **23**. The handle **23** is then bent by a reciprocating multiple purpose element **46**, and the completely wrapped unit **11** is ejected onto a second conveyor indicated generally at **24**.

Considering the invention now in greater detail, attention is first directed to FIG. 1 of the drawings wherein the exterior case **28** is illustrated as containing representative means indicated generally at **27** for imparting a desired reciprocating or rotating movement to various components of the apparatus.

It should be understood that the mechanism **27** to be described herein does not contribute to the novel aspects of the present invention and is illustrated merely as a schematic representation of means capable of providing the desired movements for certain operative components of the invention. Appropriate means are well known to those having ordinary skill in the art and any of such means which are capable of effecting the desired movements in properly timed sequence may be substituted for the exemplary means to be described.

The representative mechanism **27** comprises an electric motor M which drives the belts **101** and **106**. The belt **101** drives a reduction gear G which in turn drives a belt **102**. The belt **102** drives the power wheel W. A clucth C takes up the slack in the belt **102** to activate the power wheel W. The wheel W has two projections **103** and **104** extending respectively from its two sides. The projection **103** engages a power arm **41** and drives it upwardly during the upper portion of the movement of the projection **103**. The power arm **41**, when thus driven by projection **103**, raises the elevator **15** and closes the cutters **19** while it simultaneously opens or withdraws the blade **20** from its position over the cavity **16***a*. At the lower portions of its revolving movement, the projection **103** drives the arm **105** which acts as a clutch to tighten the belt **106** for a purpose to be described. The projection **104**, disposed on the power wheel W at the side opposite the projection **103**, drives the power arm **40** during the upper positions of its revolving movement with the wheel W and drives the arm **107** during the lower positions of its revolution. The arm **40** closes the blades **21** and **22** when it is engaged and activated by the projection **104**. The arm **107** draws a reciprocating multipurpose element indicated generally at **46** downwardly when activated by the projection **104** by drawing a central shaft **45** through a hollow shaft **110**. The wheel W drives a belt **108** which in turn drives the conveyor **10**.

As before mentioned, the belt **106** is tightened by the action of arm **105** to act as a clutch. The belt **106** is connected to the motor M and when the belt **106** is tightened, it drives the twisted belt **109** which in turn rotates the hollow shaft **110** at its lower end. The hollow shaft **110** is connected at its upper end to the plate **26**.

A belt **111** drives the rollers **112** to feed the wrapping material **18***a* between the die cavity **16***a* and the elevator pad **15***a*.

As best understood from reference to FIG. 2 of the drawings, the two moving drive chains **13** and **13***a* of the conveyor **10** receive the handle **23** and body **30**, respectively, of the unit **11**. The projections **14***a* and **14** are designed to accommodate the body **30** and handle **23** of the unit **11** as shown. While a specific conveyor means **10** has been described, it will be understood that any means which performs the functions of positioning, spacing and transporting the units **11** in the desired manner may be substituted for the conveyor **10** as illustrated herein. Thus, merely by way of example, the conveyor **10** may be a flexible belt mounted on rollers corresponding to the sprockets **17** and **17***b*, with appropriately placed projections, corresponding to projections **14** and **14***a*, being attached to the belt.

Referring now to FIG. 1 of the drawings, when the unit **11** reaches the sprocket **17**, its momentum and direction cooperate with the projections **14** and **14***a* to place the unit **11** on the pad **15***a* of the elevator **15**. The projections **14** and **14***a* also insue proper alignment of the unit handle **23** with a slot **16***e* of the die **16** as the unit **11** is placed on the pad **15***a*.

Concurrently with the positioning of the unit **11** on the pad **15***a*, the wrapping material **18***a*, supplied from the roll **18***b*, is fed out as illustrated in FIG. 1 of the drawings so that the sheet **18** is positioned between the unit **11** and the die **16**. When a sufficient amount of material has been provided, the knives **19** sever the sheet **18** from the supply **18***a*. A rod **32** mounted as illustrated, assists in keeping the wrapping sheet **18** elevated in the proper position above the unit **11**. A second bent rod **33** also assists in positioning the sheet **18** as well as serving to guide the handle **23** into the slot **16***e* of the die **16**.

As best shown in FIGS. 9 and 10, the die cavity **16***a* is provided at its lower end with a brush **16***b*. The base of the brush **16***b* is secured to the inner cylindrical surface of the die cavity **16***a* and the bristles of the brush **16***b* extend into the interior of the cavity **16***a*. As the unit **11** is driven up into the die cavity **16***a*, the brush **16***b* acts to resiliently draw the wrapping **18** down against the sides of the body of the unit **11**. The bristles of the brush **16***b* overlap or cross at the point **16***c* causing the wrapping **18** to be pulled against the top portion of the base of the handle **23** as it spreads the bristles at **16***c* in its upward movement through the cavity **16***a*.

Referring to FIGS. 5A and 9, when the pad **15***a* reaches the highest point in its movement through the cavity **16***a*, the wrapping **18** is pulled down over the unit **11** in the manner illustrated. In this latter position, the top of the unit **11** engages a spring loaded press **34** which is mounted on a rigid support element **36**. The support element **36** is adjustably mounted on the vertical members **29** and **35**, which are spaced from the plate **26** to provide adequate clearance from the moving handles **23** extending from the plate **26**. As the elevator pad **15***a* begins to retreat down the cavity **16***a*, the blades **21** and **22** are activated by the drive arm **40** illustrated in FIGS. 1 and 10, and begin to close over the cavity **16***a* and under the bottom of the unit **11**. When the blades **21** and **22** have closed partially over the cavity **16***a* but before they strike the pad **15***a*, the elevator **15** retracts to remove the pad **15***a* from the path of the closing blades **21** and **22**. The unit **11** is thus prevented from falling back toward the cavity **16***a* as the pad **15***a* retracts by the presence of blades **21** and **22** as they move into the position illustrated in FIG. 6 of the drawings.

During operation of the machine, the momentum imparted to unit **11** by the upward driving force of the elevator **15** prevents the unit **11** from immediately changing its direction with the change in direction of the retreating pad **15***a*. As a consequence, the closing of the folding blades **21** and **22** may be timed to allow ample opportunity for the pad **15***a* to remove completely from the path of the closing blades.

The movement of the blades **21** and **22** illustrated in

FIG. 6 of the drawings effects the corresponding folds in the wrapping **18** indicated by the arrows in FIG. 6.

As the blades **21** and **22** begin to retreat to their initial positions, the blade **20**, disposed below the blades **21** and **22**, is activated by the power arm **41** and begins to close over the cavity **16***a* and under the blades **21** and **22**. The described movement of the blade **20** effects the corresponding fold in the wrapping **18** illustrated by the arrow in FIG. 7A of the drawings.

As illustrated in FIG. 8, while the blade **20** withdraws, the unit **11** is displaced in the direction of the arrow by a counter-clockwise movement of the plate **26**. This latter movement of the plate **26** and the unit **11** effects the final fold in the wrapping sequence as illustrated by the arrow in FIG. 8A of the drawings and also acts to position the succeeding opening **25** over the cavity **16***a*. Thus, with reference to FIG. 9 of the drawings, the final fold in the wrapping **18** results when the unit **11** is pulled across the top rim **16***f* of the die **16** and onto the heated surface **37**.

As the wrapped unit **11** moves with plate **26**, the wrapping **18** at the bottom surface of the unit **11** is heated sufficiently to render the wrapping material **18** plastic causing the folds in the wrapping to adhere to each other. A heat conductive lip **42** projecting slightly above the heated surface **37** serves the dual function of compressing the wrapping **18** against the under side of the base of the handle **23** and conducting the heat from the heating unit **12** and the surface **37** to the base of the handle **23** to thus fuse the wrapping **18** at that point. The net result of the compressing and heating steps is a tight seal of the wrapping **18** around the base of the handle **23**.

The central shaft **45** reciprocates upwardly and downwardly between two positions as indicated by the arrow in FIG. 1 of the drawings. The multipurpose element **46** is rigidly secured to the shaft **45** and reciprocates therewith.

As best illustrated by dotted and solid line convention in FIG. 4 of the drawings, an alignment fork **47**, secured by an arm **48** to the reciprocating element **46** aligns the unit handle **23** immediately below the fork on the downward stroke of its reciprocating movement.

As illustrated in FIGS. 3 and 3A of the drawings, the bending tool **49** and a spring loaded clamp **50** are attached by an arm **51** to the element **46**. The tool **49** bends the wire handle **23** as the shaft **45** moves downwardly. The spring loaded clamp **50** performs the dual function of stabilizing the unit **11** against the bending force imparted by the tool **49** as well as pressing the folds in the wrapping **18** at the bottom of the unit **11** firmly against the hot surface **37** thus improving the fusing of the folded material **18**.

Referring to FIG. 2 of the drawings, a punch **53** depends from the end of an arm **54** which in turn is attached to the reciprocating element **46**. As the shaft **45** moves downwardly, the punch **53** strikes the unit **11** freeing it from the opening **25** and allowing it to fall on the conveyor **24**.

A balance arm **55** extending in the direction illustrated in FIG. 2 of the drawings carries a rod **56** at its end. The rod **56** extends through openings **57** in the plate **26** and strikes the surface **37** as the shaft **45** moves downwardly. The resultant force imparted to the shaft **45** by the arm **55** and rod **56** on striking the surface **37** compensates for the binding forces imparted to the shaft **45** by the fork **47**, the clamp **50**, the tool **49** and the punch **53**.

It may be appreciated that the reciprocating motion of the shaft **45** activates each of the components of the multiple purpose element **46** simultaneously. Thus, on the downward movement of the shaft **45**, the fork **47** aligns the handle of a first unit **11**; the tool **49** and clamp **50** respectively bend the handle **23** and bear down on the body **30** of the next preceding unit **11**; the punch **53** knocks the unit **11**, twice removed from the first unit **11**, from the aperture **25**; and, the bar **56** strikes the surface **37** to prevent the shaft **45** from binding.

In examining the sequence of operations effected upon a single unit **11**, it should first be noted that the plate **26** rotates in a counter clockwise direction in discrete steps of 45° as it carries the unit **11** to different phases of treatment. Thus, the unit **11** is introduced into an opening **25** of the plate **26** by the previously described action of the elevator **15**. When the shaft **45** is in its highest position, the plate **26** rotates in a first step of 45°. Each cycle of the apparatus causes the shaft **45** to move from a high position to a low position and back to a high position. The plate **26** remains stationary during the movement of the shaft **45**. Upon completion of each cycle, the plate **26** quickly rotates 45° and stops. The first three such cycles carry the unit **11** along the heated surface **37** and position the handle **23** of the unit **11** under the fork **47**. The next downward movement of the shaft **45** corrects the alignment of the handle **23** of the unit **11** by the centering action of the V-slot fork **47**. When the shaft **45** returns to the highest position, the plate **26** again rotates 45°. This latter movement by the plate **26** moves the unit **11** into position below the arm **51** where it is acted upon by the tool **49** and clamp **50** by the next downward motion of the shaft **45**. Thereafter, when the shaft **45** has completed its downward motion and has returned to its highest position, the unit **11** is moved by another 45° rotation of the plate **26** below the punch **53** where the next downward movement of the shaft causes it to be ejected onto the conveyor **24**.

It will be remembered that when the plate **26** carries several units **11** in the aperture **25**, each cycle of the shaft simultaneously effects a different operation on each of several units **11** as hereinbefore described.

Reference is again made to FIG. 9 of the drawings where it may be seen that each of the openings **25** in the plate **26** is provided with a depending rim **43**. The rim **43** extends below the level of the folding blades **21** and **22** and is cut away, as illustrated, to permit the blades **21** and **22** to close over the cavity **16***a* as hereinbefore described without striking the rim **43**. A notch **44** is provided in the rim **43** preventing the handle **23** from being displaced as the folding blades **20**, **21** and **22** close in under the unit **11**. The notch **44** also assists in maintaining proper alignment of the handle **23** for succeeding steps of the wrapping sequence.

The operation of the folding blades **20**, **21** and **22** may best be seen by reference to FIG. 10 of the drawings. The blades **21** and **22**, are activated, respectively, by the L-shaped member **38** and the mechanism indicated generally at **39**. Thus, the L-shaped member **38** pivots about the fixed pin **29** upon movement of the arm **40** (to the left in the illustration of FIG. 10), effecting a downward or closing movement of the blade **21** through the guides **58** and **58***a*. The mechanism **39** activating the blade **22** includes a link **39***a* rigidly attached to a pin **39***b* which in turn is rigidly attached to a member **39***c*. A pin **39***d* projects up from the end of the member **39***c* and is received by a slot **39***e* in a second member **39***f*. The member **39***f* is hinged at one end to the fixed pin **39***g* and at the other end receives in the slot **39***e* a pin **39***h* which is attached to the blade **22**. The mechanism **39** operates as follows: as the arm **40** moves to the left, the link **39***a* rotates the pin **39***b* which in turn rotates the member **39***c* in a counter-clockwise direction; the movement of the member **39***c* causes the pin **39***d*, acting through the slot **39***e*, to rotate the member **39***f* about the pin **39***g* in a clockwise direction; the member **39***f* acting through the slot **39***e* drives the pin **39***h* which in turn slides the blade **22** upwardly and to the right along the guides **58***b* and **58***c*.

A very important feature of the apparatus of the present invention is effected by disposing the blade **22** at an acute angle with respect to the unit handle **23**. Thus as illustrated in FIG. 10, the blade **22** is disposed at an angle of approximately 45° with respect to the unit handle **23**. The illustrated angular relationship between the blade **22** and the handle **23** effects a winding of the wrap-

ping **18** about the base of the handle **23** as the blade **22** closes, thus providing a very tight seal.

Although the foregoing description has related specifically to automatic wrapping of deodorant units in the form of a truncated cone, it will be appreciated that the apparatus of the present invention may, by minor modification, be adapted to wrap many differently shaped units. Thus, the apparatus of the present invention may be modified to automatically wrap semicylindrical units by appropriate modification of the pad **15***a*, the cavity **16***a*, and the plate opening **25**. By way of example rather than limitation, for automatic wrapping of a semicylindrical unit, the circular pad **15***a* may be replaced by a semicircular pad; the cavity **16***a* may be divided longitudinally with an insert element with appropriate brushes atttached to the insert to conform the shape of the cavity to the semicylindrical unit; the circular opening **25** may also be fitted with an insert to conform the shape of the opening to the shape of the deodorant unit; and the shape of the blade **20** may be appropriately modified to effect the appropraite folding action. Moreover, it will also be apparent that the apparatus of the present invention is capable of automatically wrapping units having no projections extending from their bodies as well as units having projections without modification. This is of particular importance in reducing "down time" in converting between wrapping units having projections and those without projections in a single, multi-purpose apparatus.

Although only a single preferred form of the automatic wrapping apparatus of the present invention has been disclosed, many modifications may be made within the scope of the appended claims without departing from the spirit of the invention.

What is claimed is:

1. An apparatus for automatically wrapping a unit having a handle or other projection extending from a body comprising:

(a) die means for receiving a unit and having a slot through which a projection on said body may extend;

(b) elevator means for elevating said unit into said die means with said projection extending into said slot;

(c) wrapping material supply means for providing a sheet of wrapping material between said elevator means and said die means;

(d) folding means for folding the sheet of wrapping material about said body and the base of said projection in overlapping folds; said folding means having folding blades adapted to pass adjacent to and on each side of said projection for folding said wrapping material under said unit while leaving said projection substantially uncovered; and

(e) transporting means for moving said unit to different stages of production.

2. The apparatus of claim **1** above including:

(a) conveyor means for depositing said unit on said elevator means;

(b) a slot provided in said die means for receiving said projection;

(c) brush means disposed along the interior of said die cavity for resiliently drawing the wrapping sheet down around the sides of said body;

(d) first reciprocating means for aligning said projection;

(e) second reciprocating means for bending said projection;

(f) third reciprocating means for holding and pressing said body while said second reciprocating means bends said projection;

(g) fourth reciprocating means for ejecting said unit from said transporting means; and

(h) fifth reciprocating means for effecting a balancing force against the forces exerted by said first, second, third and fourth reciprocating means.

3. The apparatus of claim **1** above including means for crimping and adhering the overlapping folds of the wrapping material about the base of said projection.

4. The apparatus of claim **3** above wherein:

(a) said folding means includes plural folding blades wherein at least one of said blades is disposed for movement at an acute angle with respect to said projection; and

(b) said means for crimping and adhering includes heating means for rendering the folds of the wrapping material plastic to fuse the overlapping folds of wrapping material to each other.

5. The apparatus of claim **4** above further including reciprocating means for aligning and bending said projection, said reciprocating means further including means for ejecting said units and means for balancing the forces exerted by said reciprocating means.

6. The apparatus of claim **1** above including:

(a) heating surface means for rendering the wrapping material plastic to cause the folds in the wrapping material to fuse;

(b) heat conductive lip means projecting from said heating surface means for crimping and heat fusing the wrapping material about the base of said projection; and

(c) reciprocating means attached to a shaft, wherein said reciprocating means includes means for aligning said projection, means for bending said projection and pressing said unit against said heating surface means, means for ejecting said unit from said transporting means, and, means for preventing said shaft from binding.

7. The apparatus of claim **6** above wherein:

(a) said die means includes brush bristles extending into the interior of said die cavity to draw the wrapping material down around the top and sides of said unit;

(b) said folding means includes plural folding blades wherein at least one of said plural folding blades is disposed at an angle of less than 90° with respect to said projection for winding said wrapping material in overlapping folds about the base of said projection; and

(c) said transporting means includes a plate having plural openings, said openings further including depending, cut away, notches rims for holding said projection.

8. The apparatus of claim **7** above wherein said brush bristles overlap and cross at said slot to draw the wrapping material down about the base of said projection when said unit is transported through said die.

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