United States Patent

Jackson

[15] **3,685,249**

[45] **Aug. 22, 1972**

[54] **APPARATUS FOR WRAPPING ARTICLES OF A SHAPE OF THIN RECTANGULAR PARALLELOPIPEDS**

[72] Inventor: **Donald Richard Patrick Jackson,** 28 Upwood Rd., Lee, London, S.E. 12, England

[22] Filed: **May 4, 1971**

[21] Appl. No.: **140,164**

Related U.S. Application Data

[62] Division of Ser. No. 779,685, Nov. 29, 1968, Pat. No. 3,594,976.

[30] **Foreign Application Priority Data**

Dec. 1, 1967 Great Britain.....54,714/67

[52] **U.S. Cl.** **53/133,** 53/206, 53/208, 53/230

[51] **Int. Cl.**.....**B65b 11/26,** B65b 49/08

[58] **Field of Search**.....53/206, 207, 208, 223, 230, 53/378, 379, 133

[56] **References Cited**

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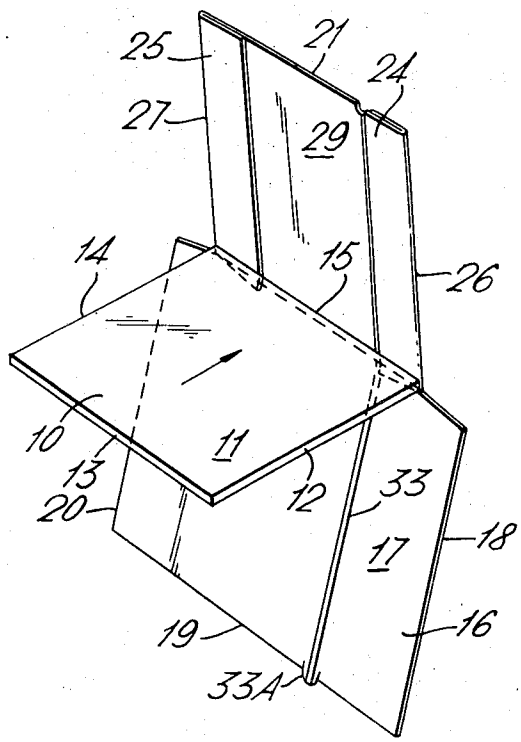
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Primary Examiner—Theron E. Condon
Assistant Examiner—Neil Abrams
Attorney—Craig, Antonelli & Hill

[57] **ABSTRACT**

The methods and apparatus deal with wrapping thin rectangular articles in a rectangular blank and are particularly suitable for gramophone record sleeves. One feature is that side flaps are formed and folded over on to the blank to form two rectangular blank portions, one of the size of the article, the other portion of the blank having side margins which are folded around the article. Another feature is that corners of a side margin of the wrapper at one or more edges of the article are tucked in, and one side margin is folded down on to the edge of the article and on to the other side margin before that side margin is folded around the edge of the article.

11 Claims, 28 Drawing Figures



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SHEET 01 OF 12

Fig. 1.

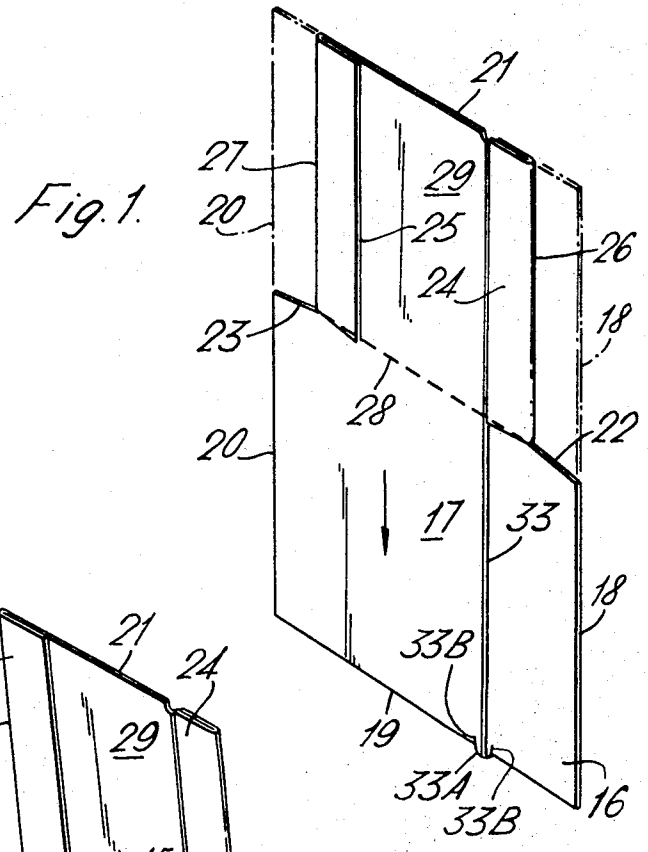


Fig. 2.

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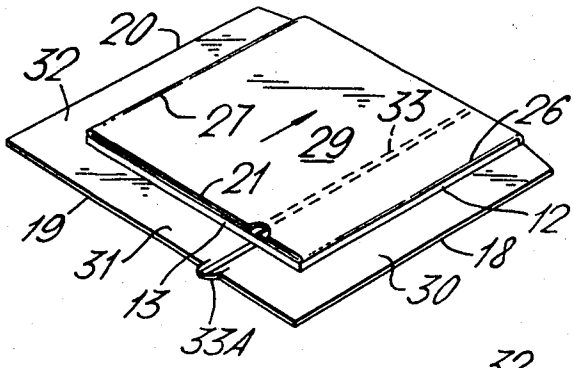


Fig. 3.

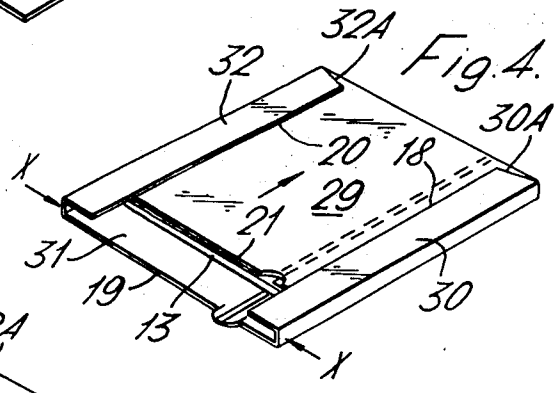


Fig. 4.

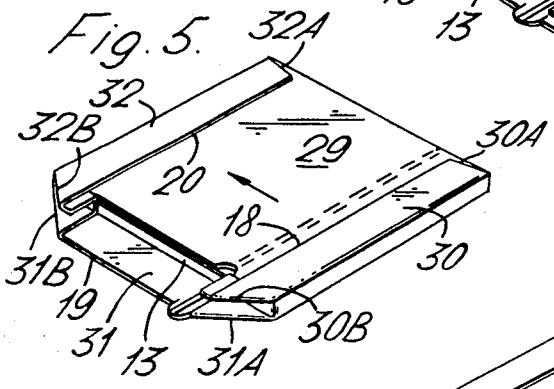


Fig. 5.

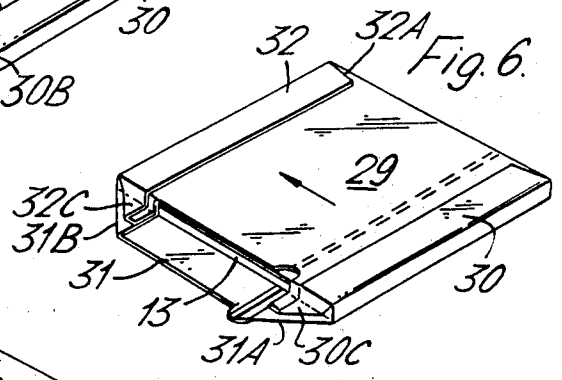


Fig. 6.

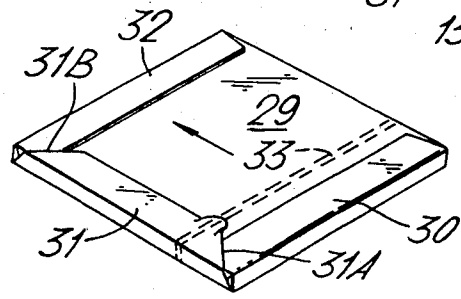


Fig. 7.

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Fig. 13.

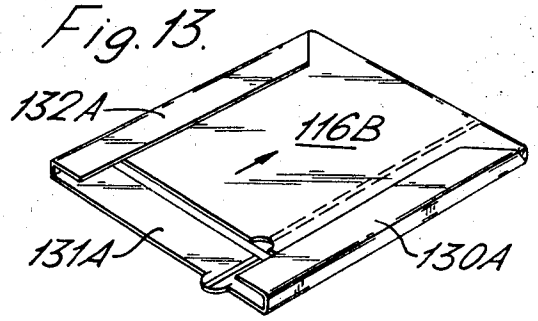


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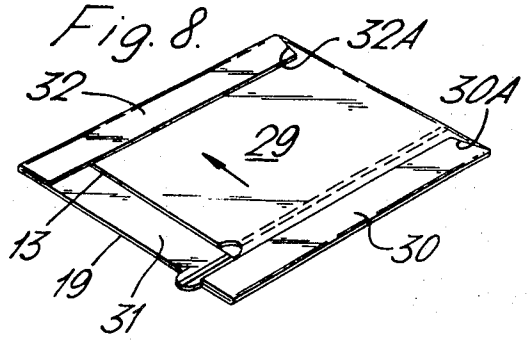
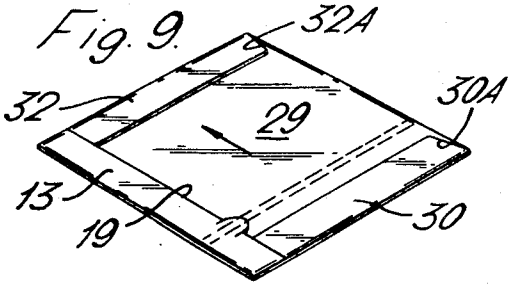


Fig. 9.



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Fig. 10.

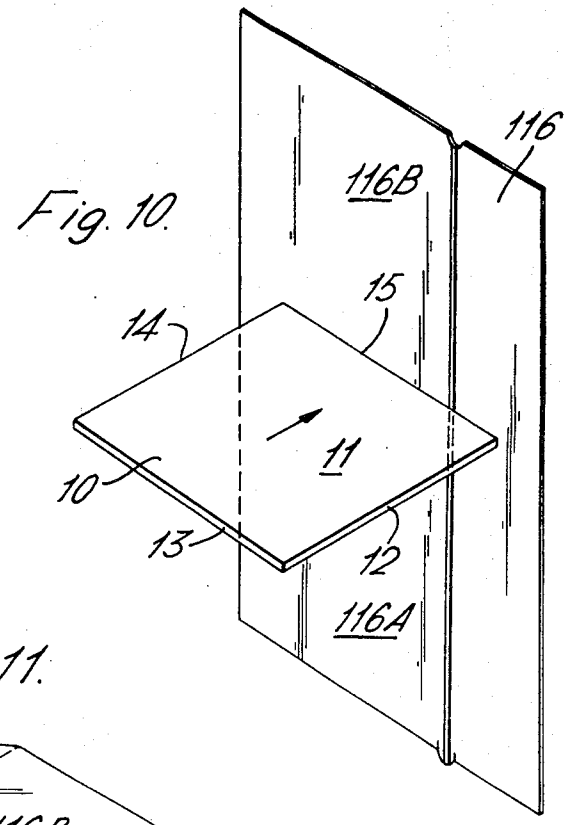


Fig. 11.

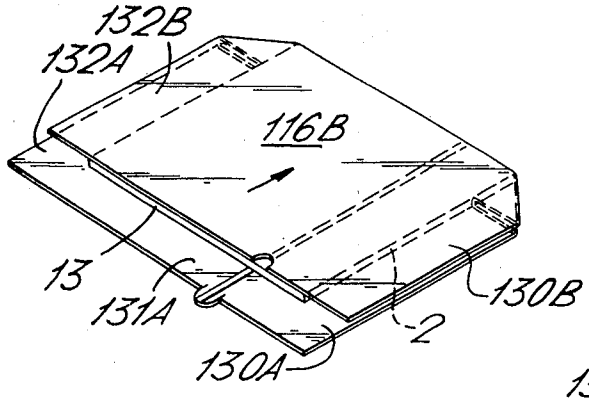
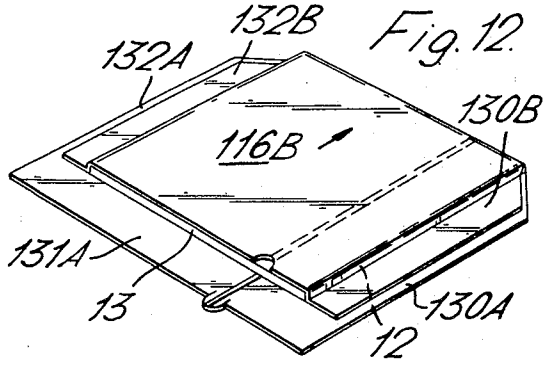


Fig. 12.



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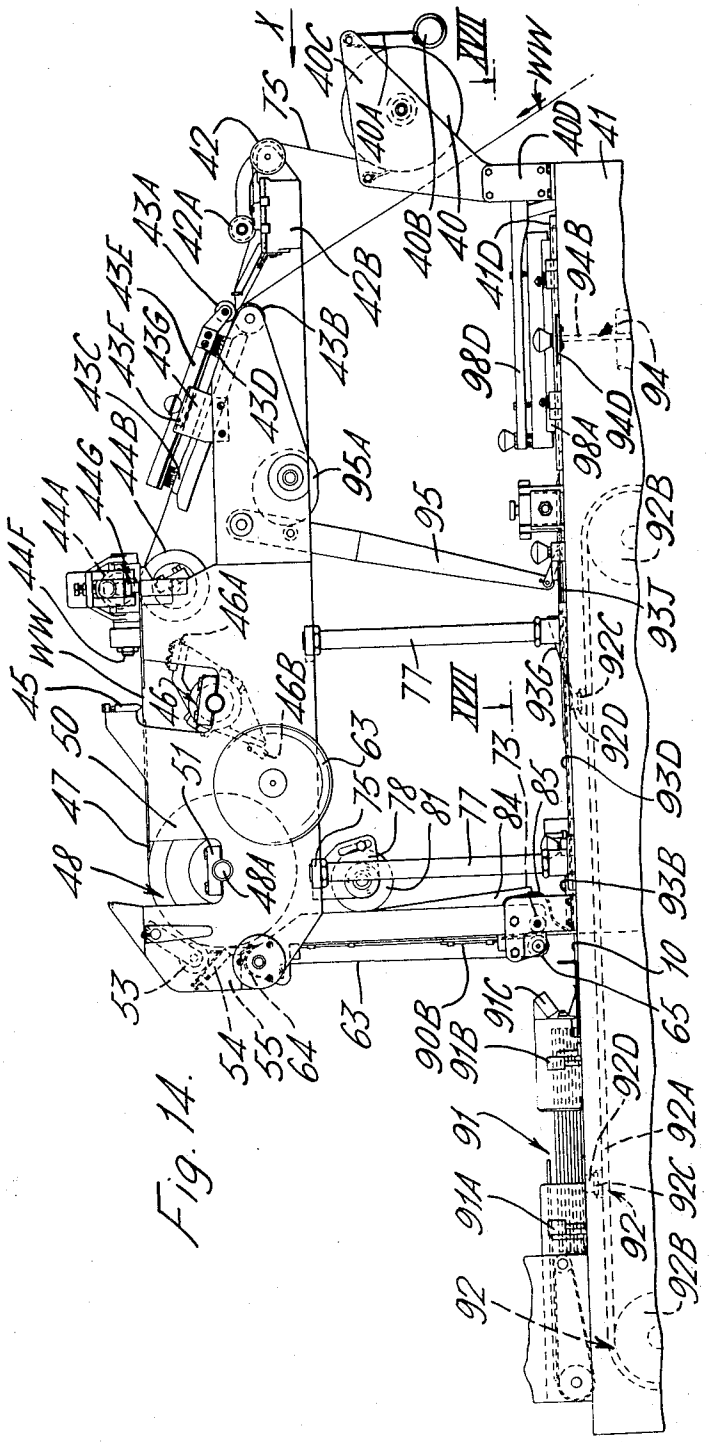


Fig. 14.

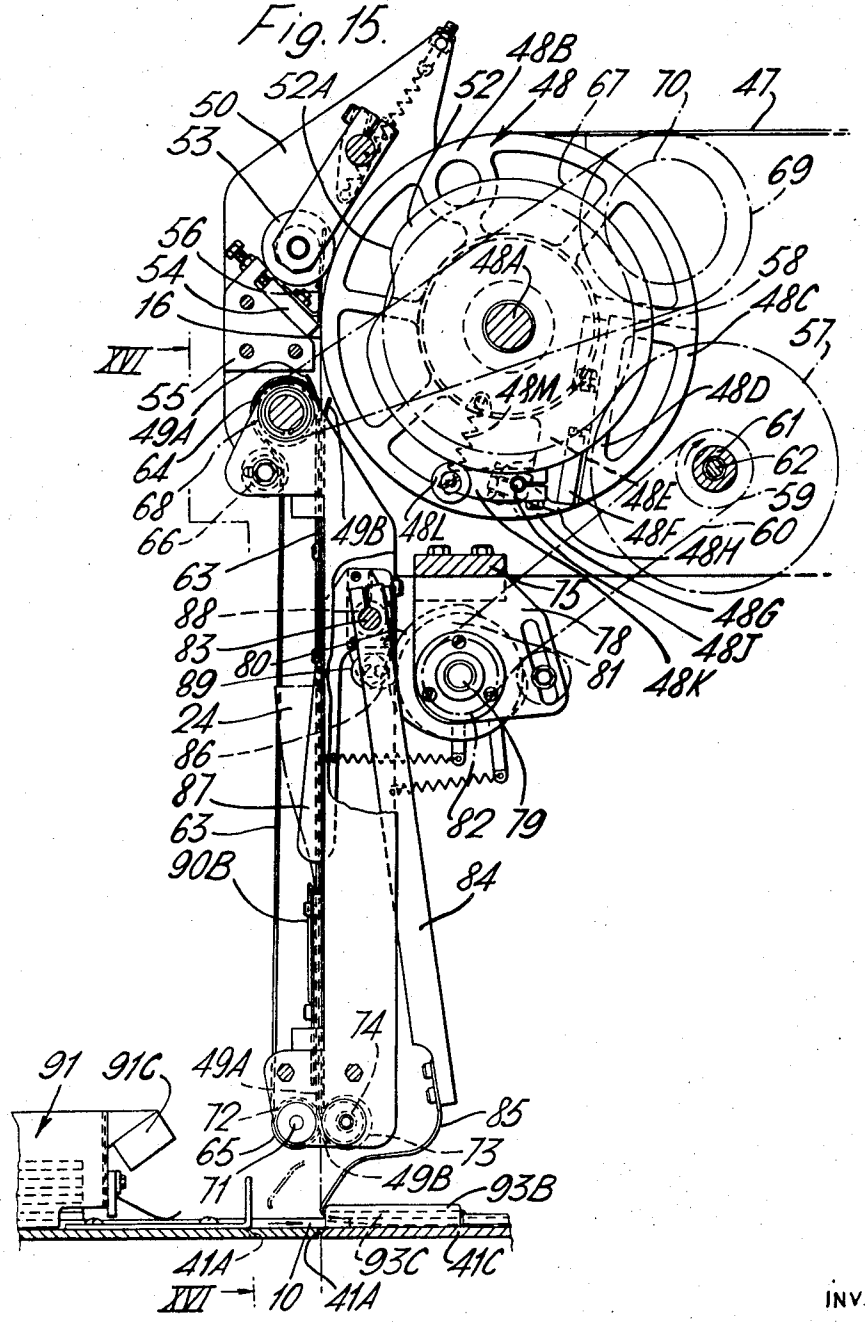
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Fig. 15.



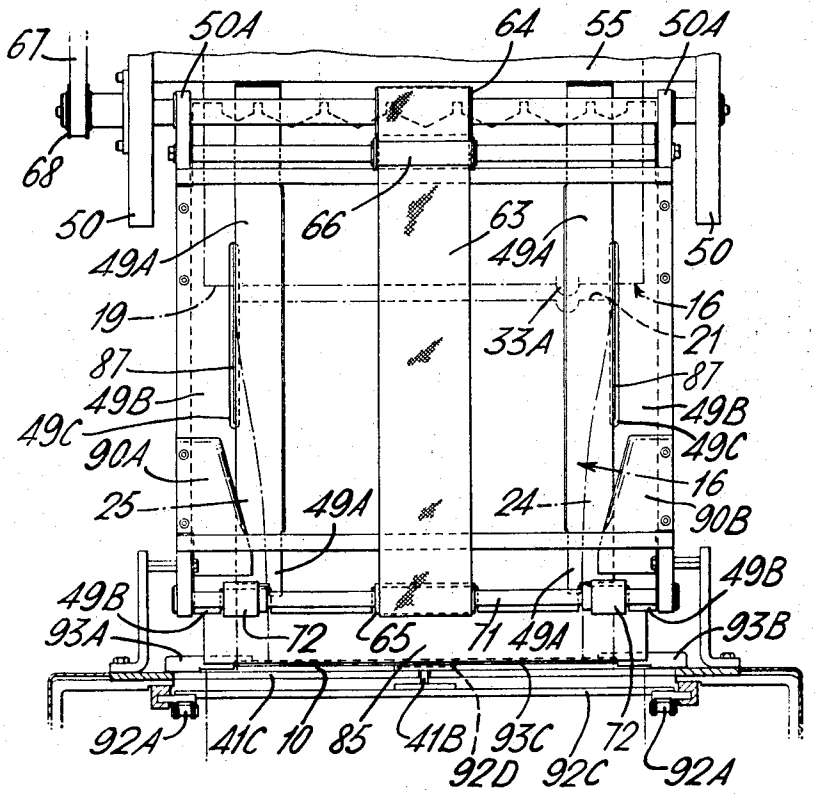
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Fig. 16.



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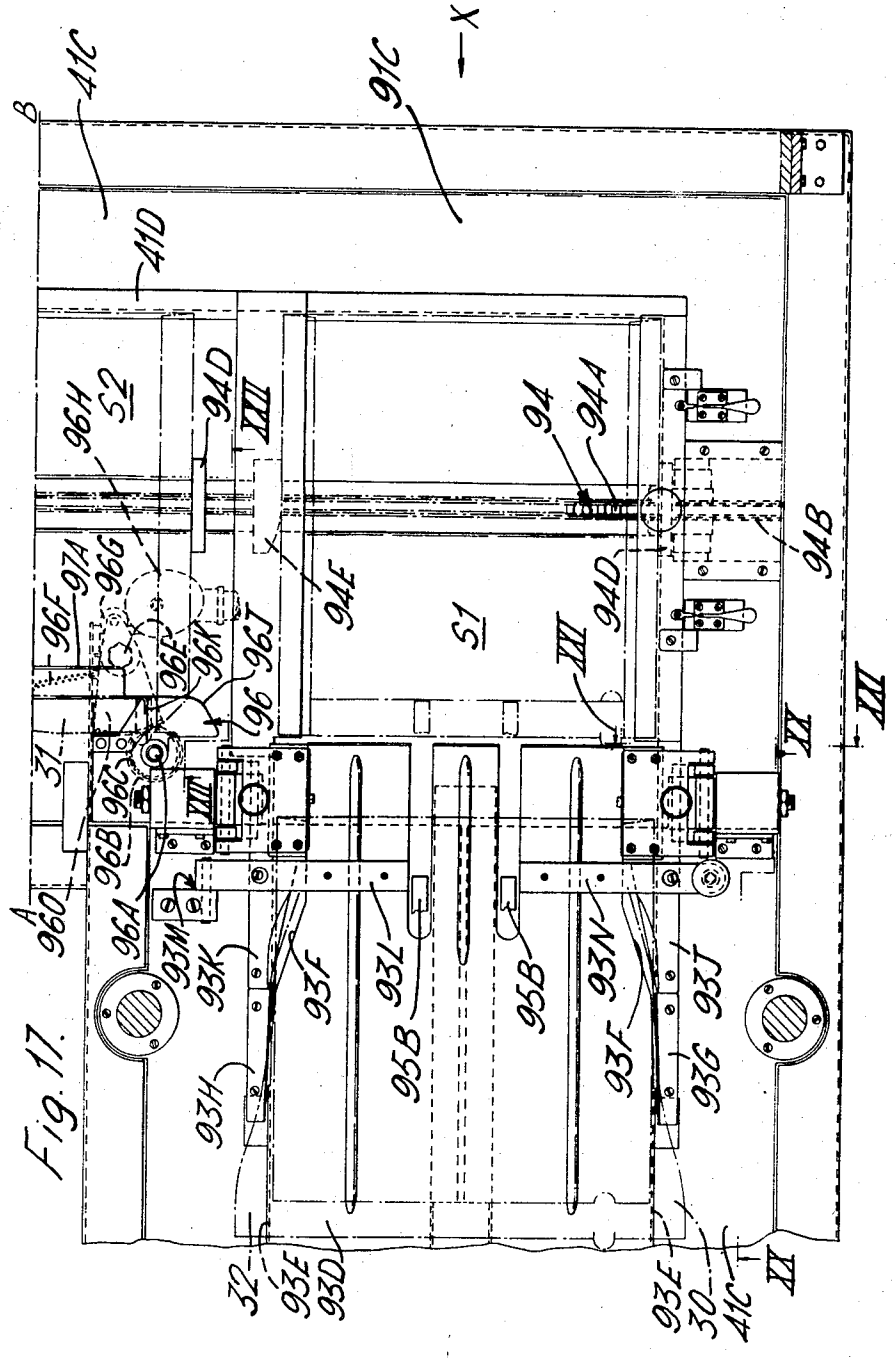


Fig. 17.

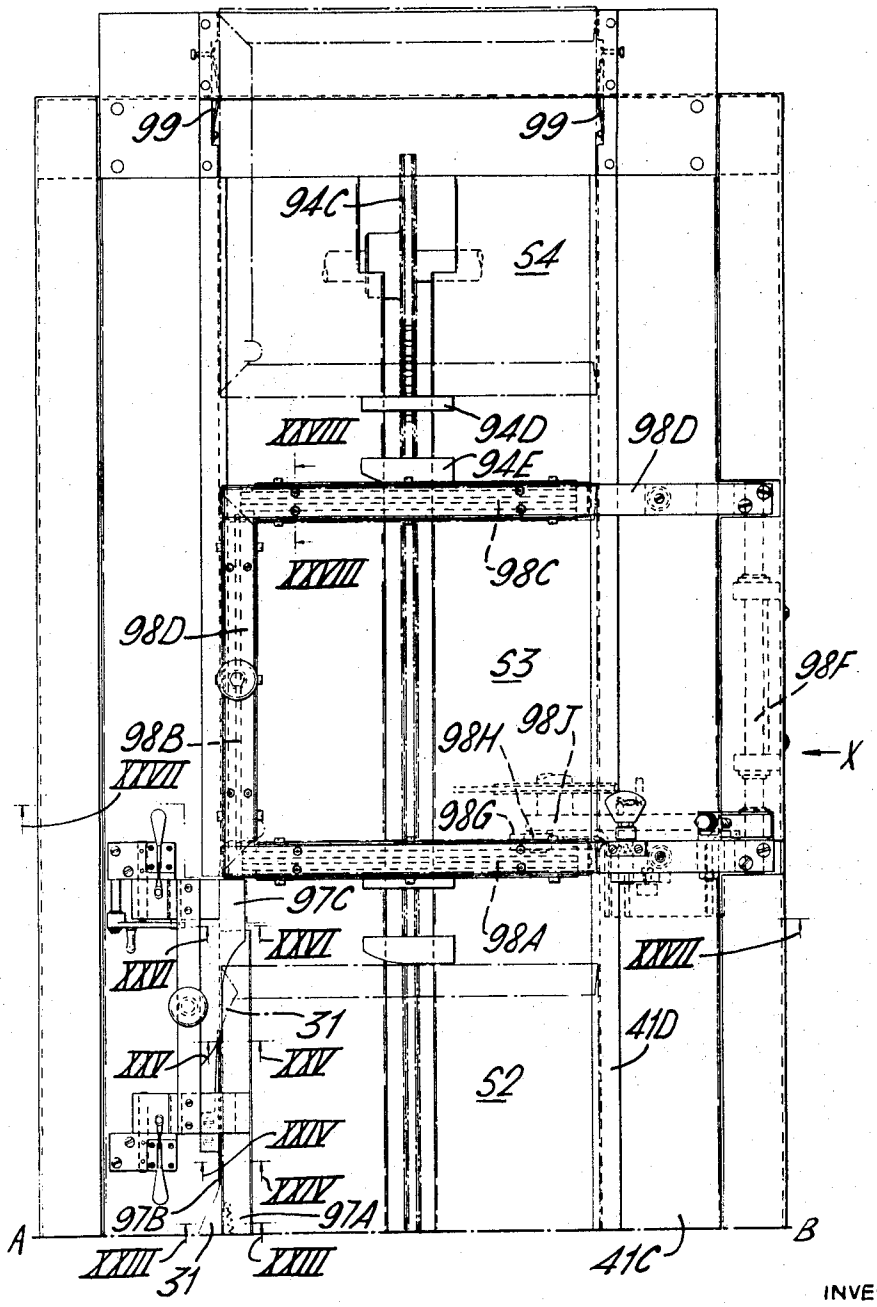
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Fig. 18.



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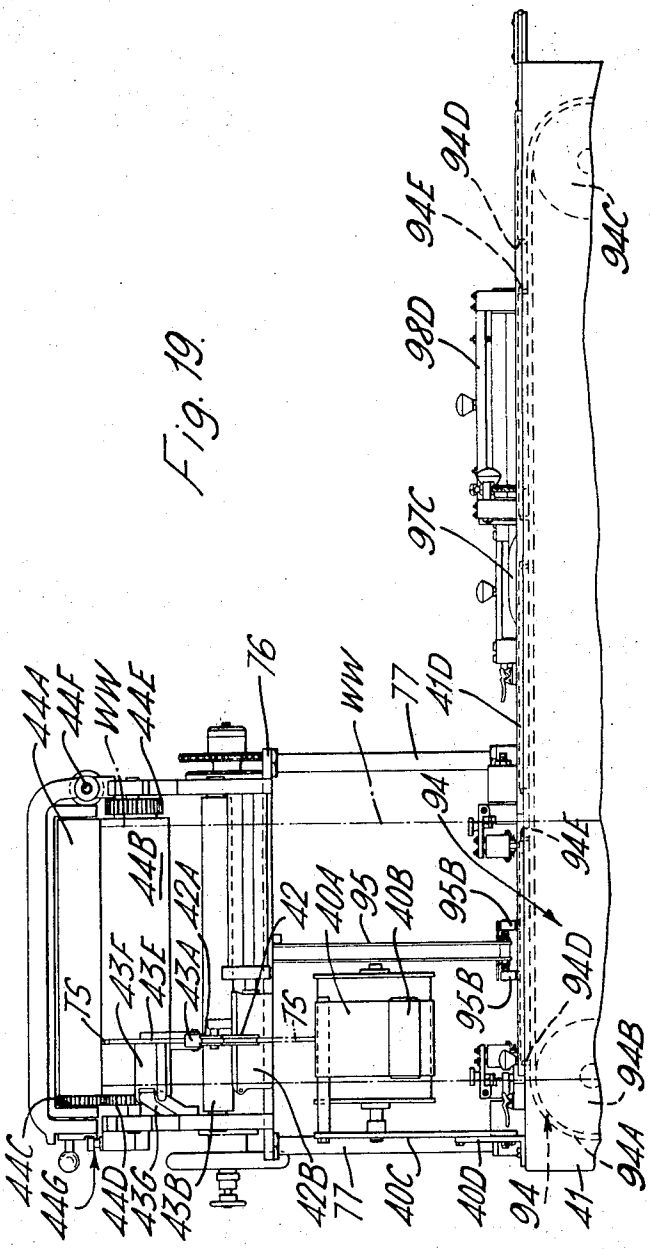


Fig. 19.

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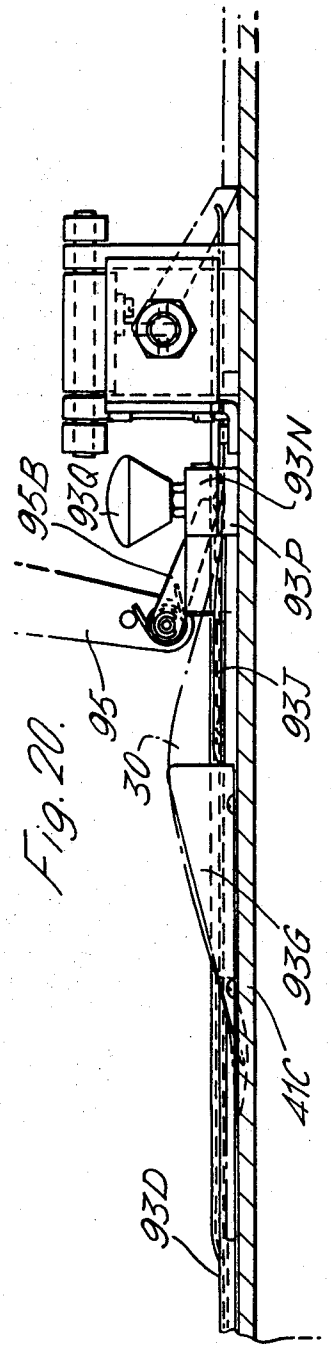


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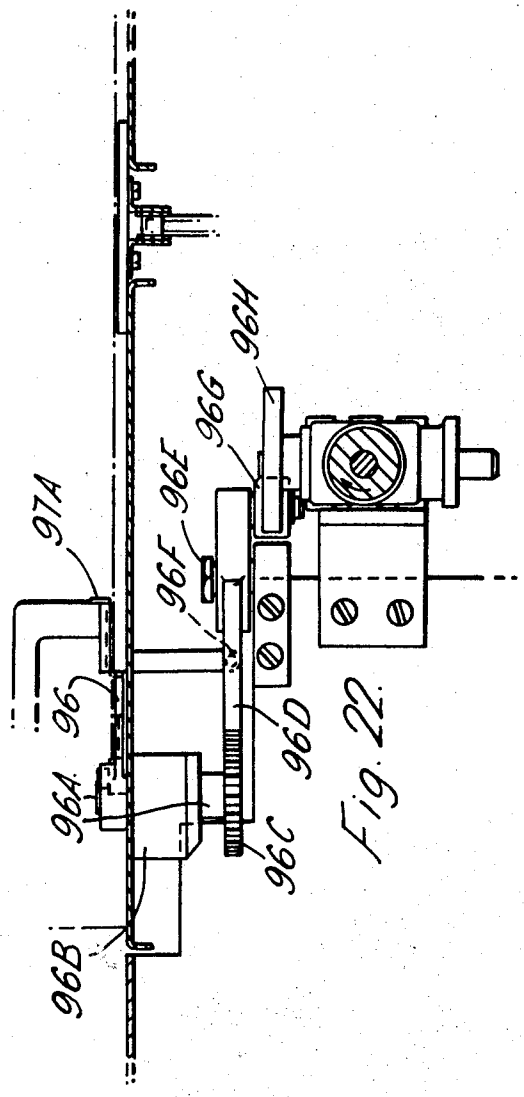
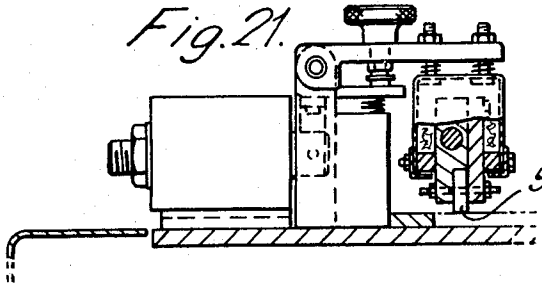


Fig. 22.

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Fig. 21.



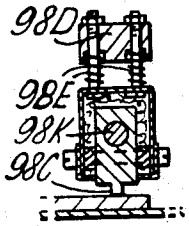


Fig. 28.

Fig. 23.

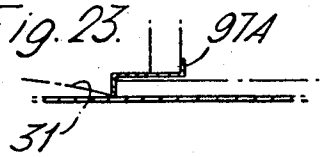


Fig. 24.

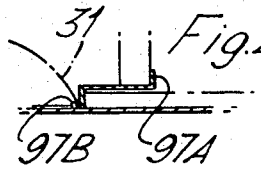


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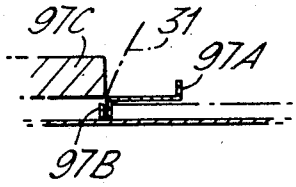


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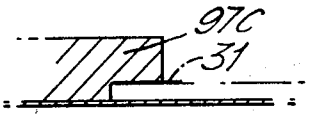
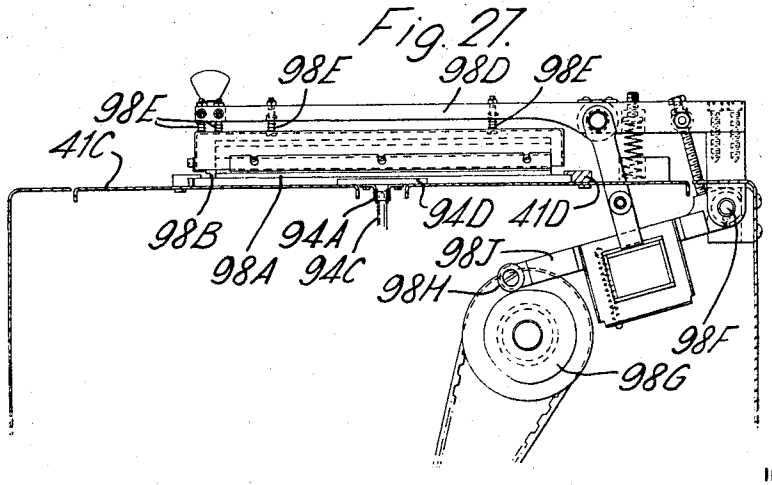


Fig. 27.



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APPARATUS FOR WRAPPING ARTICLES OF A SHAPE OF THIN RECTANGULAR PARALLELOPIPEDS

This application is divided from our copending application Ser. No. 779,685, filed on Nov. 29, 1968, now U.S. Pat. No. 3,594,976.

This invention concerns improvements in or relating to a method of, and apparatus for, wrapping thin rectangular articles such as thin rectangular parallelepipeds.

An example of an article to which the invention applies is a gramophone record sleeve.

According to the present invention there is provided a method of wrapping a thin rectangular article from a rectangular blank of wrapping material which comprises making two cuts extending towards each other from opposite edges of the blank, the cuts being spaced from a third edge of the blank by substantially one of the larger dimensions of the article, and the inner ends of the cuts being spaced apart by substantially the other of the larger dimensions of the article, folding on to the blank the two flaps formed by the cuts to produce a rectangular panel substantially of the dimensions of the largest rectangular face of the article, folding the rectangular panel down on to one of the largest rectangular faces of the article to coincide therewith, folding the remainder of the blank on to the other largest rectangular face so as to leave a side margin on three sides thereof, folding the two oppositely disposed side margins around the article, and folding down the third side margin on to the article.

The two cuts may be made at a small angle to the other two opposite edges of the blank so that the ends of the said two oppositely-disposed side margins at the first fold are inclined to the fold and lie on the face of the article on to which they are folded down.

Where the article has a thickness which although very small in relation to its other dimensions cannot be ignored as a dimension, i.e., the article is a thin rectangular parallelepiped, and is essentially three-dimensional rather than two-dimensional, the folding down of the third side margin may be preceded by tucking in the corners between the third side margin and the other two side margins, and the resulting triangulated ends of the said other two side margins may then be folded down on to the third side margin before the third side margin is folded down on to the article.

An example of such a thin rectangular parallelepiped is a gramophone record sleeve with spines, such as the record sleeve disclosed in U.S. application Ser. No. 747,927, filed July 26, 1968, in the names of George Davey Burcher and David George Parker, now U.S. Pat. No. 3,495,765 issued Feb. 17, 1970.

Further according to the present invention there is provided a method of wrapping with a rectangular wrapper blank an article of the shape of a thin rectangular parallelepiped having a first relatively large rectangular face, a second and similar opposed face and first and second pairs of opposed relatively narrow edges, which comprises folding the blank into a rectangular first portion and a rectangular second portion about a first edge of said first pair of edges for the first and second portions of the wrapper to cover the first and second faces of the article respectively, the first portion of the wrapper having a rectangular side margin at each of the other three edges, and the second portion of the wrapper having a rectangular side margin at least at each of said second pair of edges, at each of the second pair of edges folding at least one of the side margins around the edge, and at the second edge of said first pair of edges tucking in against said second edge the corners between the side margin at said second edge and the side margin at each of said second pair of edges respectively to form triangulated ends, folding down on to said second edge and the side margin at said second edge the triangulated ends, and folding the side margin at said second edge and the triangulated corners on to the second portion of the blank.

A separating cut may be made between the side margins at each of said second pair of edges and the separated side margins may be folded on to said second portion of the blank. Alternatively at each of said second pair of edges the corners of the side margins may be tucked in against the edge and the side margin of said second portion of the blank may be folded down on to the edge and on to the side margin of the first portion of the blank and both side margins may then be folded on to said first portion of the blank.

A tear strip for opening the wrapper may be secured to the inner face of the blank.

Further according to the present invention there is also provided a thin rectangular wrapped article produced by the method of this invention.

Still further according to the present invention there is provided apparatus for carrying out the method.

The present invention will now be described, by way of example, with reference to the accompanying drawings, of which:

FIG. **1** shows a rectangular blank cut in two places and with the resulting flaps folded down,

FIG. **2** shows the article in relation to the blank at the commencement of folding,

FIGS. **3**, **4**, **5**, and **6** show subsequent stages of folding of the blank about the article,

FIG. **7** shows the resulting wrapped article,

FIGS. **8** and **9** illustrate a modification to the method shown in FIGS. **1** to **7**,

FIGS. **10** to **13** illustrate a further modification of the method,

FIG. **14** is a side elevation of apparatus for carrying out the method of FIGS. **1** to **7**,

FIG. **15** is a view of part of FIG. **14** to a larger scale, and with parts broken away,

FIG. **16** is a view on the line XVI—XVI of FIG. **15**,

FIG. **17** is a plan view of part of the apparatus of FIG. **14** taken on the line XVII—XVII of FIG. **14** and ending at the line AB,

FIG. **18** is a plan view of a further part of the apparatus extending onwards from the line AB of FIG. **17**,

FIG. **19** is an end elevation of the apparatus viewed in the direction shown by the arrow X in each of FIGS. **14**, **17** and **18**,

FIG. **20** is a view on the line XX—XX of FIG. **17**,

FIG. **21** is a view on the line XXI—XXI of FIG. **17**,

FIG. **22** is a view on the line XXII—XXII of FIG. **17**, and

FIGS. **23**, **24**, **25**, **26**, **27**, and **28** are sections on the lines XXIII—XXIII, XXIV—XXIV, XXV—XXV, XXVI—XXVI, XXVII—XXVII, and XXVIII—XXVIII respectively of FIG. **18**.

Referring first to FIG. 2, the article which is to be wrapped is shown at 10. This is a gramophone record sleeve which has two oppositely disposed square faces, one of which is shown at 11, which are the largest faces, and four identically dimensioned spines, two of which can be seen at 12 and 13, and the other two of which are at 14 and 15.

Referring now to FIG. 1, 16 is a rectangular blank of thin transparent plastics material, such as polythene which is to be used to overwrap the sleeve 10 containing a record. The method is, of course, applicable also to any other suitable wrapping material. The face 17 is rectangular, the length of the opposite edges 18 and 20 being more than twice as great as the length of the spines 12 and 14, and the length of the opposite edges 19 and 21 being greater than the length of the spines 13 and 15. The blank 16 may be produced by cutting off a length equal to the length of the edges 18 and 20 from a web of the material of a width equal to the length of the edges 19 and 21.

A tear strip 33 may be secured to the face of the blank 16. In cutting off the blank 16 from a web of the material each such cut may leave a semicircular piece of material at 33A at the edge 19 and two cuts 33B may be made into the blank. Thus, a corresponding semicircular cut out will be made at the edge 21. The tear strip, as will be seen, is of a length equal to the length of the edges 18 and 20.

Two cuts 22 and 23 extending towards each other from the opposite edges 18 and 20 respectively are first made in the blank. The two resulting substantially rectangular flaps 24 and 25 are folded inwards on to the blank about the lines 26 and 27 respectively, the cuts 22 and 23 being spaced from the edge 21 and the length of the cuts being such that a substantially square panel 29 is produced, its four sides being the edge 21, the fold lines 26 and 27, and the notional line shown dotted at 28 which joins the inner edges of the cuts 22 and 23. The panel 29 is substantially the same size as the face 11 of the record sleeve 10 with the width of the spine at 15 added to its vertical dimension (as seen in FIG. 1). The cuts 22 and 23 are inclined at a small angle to the edges 19 and 21 of the blank so that the inner edges of the flaps 24 and 25 (the inner edges when folded down) are slightly longer than the fold lines 26 and 27.

The record sleeve is now brought against the blank 16 in the direction of the arrow in FIG. 2 and the panel 29 is folded down about the line 28 which coincides with the lower edge of the spine at 15, and a line (not shown) parallel with the line 28 which coincides with the upper edge of the spine at 15, on to the sleeve 10 to coincide with the face 11, the remainder of the blank 16 lying against the face of the sleeve opposite to face 11. The result of this is shown in FIG. 3.

The two opposite side margins 30 and 32 of the blank are now folded about the spines 12 and 14 on to the panel 29 as shown in FIG. 4. The result of the inclination of the cuts 22 and 23 is shown in this figure where the ends 30A and 32A of the side margins 30 and 32 respectively are inclined to the fold about the spine 15 and lie on the panel 29 and the face 11 of the sleeve.

The adjacent ends of the side margins 30 and 31 and 31 and 32 are now folded as shown in FIG. 5 by tucking in on to the ends of the spine 13 the material in side margins 30 and 32 extending past the spines 12 and 14 as indicated by the arrows X,X in FIG. 4. This results in the side margin 31 terminating at inclined fold lines 31A and 31B, and the side margins 30 and 32 terminating respectively at inclined fold lines 30B and 32B.

The ends of the side margins 30 and 32 are then folded down on to the spine 13 and the side margin 31 as shown in FIG. 6 so that the fold lines 30B and 32B lie inside the fold lines 31A and 31B respectively.

The side margin 31 and the triangulated ends 30C and 32C of the side margins 30 and 32 respectively are then folded upwards to overlie the spine 13 and are then folded down on to the panel 29 and the face 11 of the sleeve, as shown in FIG. 7.

The end of the tear strip 33 protrudes from the side margin 31 so that by grasping the semicircular portion 33A and the end of the tear strip the wrapping material to the right of the tear strip as seen in FIG. 7 may be removed. The tear strip 33 is provided as close to the edge of the side margin 30 as possible, the spine 12 forming part of the opening flap of the record sleeve.

The method described above, by the provision of the cuts 22 and 23 and the folding on to the panel 29 of the flaps 24 and 25, avoids a tucking-in operation similar to that shown in FIG. 5 which would be difficult to carry out at this stage on a thin article such as a record sleeve, and, by avoiding this disadvantage, also prevents the advantage than, without the necessity of cutting off the flaps 24 and 25, there is left only a single thickness of material in the side margins 30 and 32 to be stuck down on to the panel 29 e.g. by heat sealing. Thus the sleeve is wrapped from a plain rectangular blank purely by making two cuts and by relatively simple folding operations. The virtue of the rectangular blank is that such blanks may be obtained simply by cutting off lengths from a continuous web of blank material.

FIGS. 10 to 13 inclusive illustrate a further modification of the method of the invention and replace FIGS. 1 to 4. The article to be wrapped is the same as previously described and is again shown at 10. A rectangular blank of wrapping material is shown at 116. The blank 116 is first folded about the edge 15 to form a first rectangular portion 116A and a second rectangular portion 116B. The portion 116B covers the face 11, and the portion 116A covers the opposed and unreferenced face. The portion 116A of the blank is large enough to have side margins 130A, 131A and 132A at the other three edges 12, 13 and 14 respectively of the article. The portion 116B of the wrapper has side margins 130B and 132B only a the edges 12 and 44 respectively. It will be APPRECIATE that the side margins 130B and 132B are the parts of the blank which in FIGS. 1 and 2 formed the flaps 24 and 25 respectively.

The corners of the side margins 130B adjacent the edge 15 of the article are tucked in against the edge 12 of the article as shown in FIG. 11, and simultaneously a similar operation is carried out on the side margins 132A and 132B. The side margin 130B is then folded down on to the edge 12 and on to the side margin 130A, as shown in FIG. 12, and with the side margin 130B so folded the side margin 130A is then folded over the edge 12 on to the portion 116B of the blank, as shown in FIG. 13. A similar folding operation is carried out at the opposite edge 14 of the article. Thereafter,

the wrapping of the article is completed as shown in FIGS. 5, 6 and 7.

FIGS. 8 and 9 illustrate a modification of the method as described with reference to FIGS. 1 to 7 for use with a rectangular article such a that shown at 10 in FIG. 2, but where the four edges 12 to 15 inclusive are very shallow. Such an article is a gramophone record sleeve without spines or, at least, without a spine at the edge 13. FIGS. 8 and 9 replace FIGS. 4 to 7. The steps shown in FIGS. 1, 2, and 3 are carried out as described above with reference to those figures, and the side margins 30 and 32 are then folded over on to the portion 29 of the blank, as shown in FIG. 8. The operations shown in FIGS. 5 and 6 are omitted before the side margin 31 is folded about the edge 13 of the article on the portion 29 of the wrapper, as shown in FIG. 9.

The apparatus shown in FIGS. 14 to 28 for carrying out the method shown in FIGS. 1 to 7 will now be described.

Referring first to FIGS. 14 to 19. A continuous web of wrapper material is shown at WW being fed in to the apparatus in the direction of the arrow. The reel of wrapper material is not shown. At 40 is shown a reel of tear strip material TS. The tear strip material TS is tensioned by means of a belt 40A which passes around the reel 40 and from which is suspended a weight 40B. The reel 40 is carried from a plate 40C secured to a bracket 40D fixed to the bed 41 of the apparatus. The wrapper web WW and the tear strip material are shown in chain dot lines in FIG. 19.

The tear strip TS passes over a roller 42, and between a further roller 42A and a roller (not shown) which applies gum continuously from gum pot 42B to the underside of the tear strip. The tear strip TS and the wrapper web WW pass between rollers 43A and 43B for the gummed tear strip TS to be pressed on to the upper surface of the wrapper web WW.

The wrapper web WW and the tear strip TS pass over a plate 43C and beneath brushes 43D to hold the web and tear strip together until the gum has set.

The roller 43A and the brushes 43D are carried by a member 43E which in turn is carried by a member 43F pivotally supported by a bracket 43G so that the brushes and roller can be swung clear if necessary. The wrapper web WW and tear strip TS then pass between two rollers 44A and 44B which feed the web forwardly. The rollers 44A and 44B are geared together by gearwheels 44C and 44D, and the roller 44B is driven, in a manner not shown, by means of the gearwheel 44E. The top roller 44A can be lifted about a pivot 44F and can be locked in the down position by means of a locking device shown generally at 44G.

The next operation is to make a semicircular cut which will produce a semicircular piece 33A with the cuts 33B as shown in the wrapper blank 16 in FIG. 1, and the following operation is to make the two cuts 22 and 23. The mechanism for carrying out these two operations consists of a stationary knife 45 and a continuously rotating knife carrier 46 which carries at one end a knife 46A to make the semicircular cut and carries at its other end two knives 46B (one of which is shown) which simultaneously make the cuts 22 and 23. The cuts are made as the knives 46A and 46B pass the stationary knife 45.

FIGS. 15 and 16 will now be referred to in addition to FIG. 14. After being cut by the knives 46A and 46B the continuous wrapper web WW passes over a plate 47, and over a drum 48 where it is severed transversely so that each successive leading portion forms a separate wrapper blank 16 as shown in FIG. 1. The wrapper blank 16 then passes downwards between a pair of guide plates 49A and a single guide plate 49B. The guide plate 49B is secured at its edges to two side plates 50A.

The drum 48 is rotatably mounted on a stationary shaft 48A which is retained at its ends in a further pair of side plates 50, the shaft 48A at each end being retained in the side plate by a block 51. Mounted on the shaft 48A at one end is a stationary cam 52 which has an indentation 52A, the cam otherwise being of constant radius. The drum 48 is hollow, its cylindrical outer wall being supported by a number of webs.

The drum 48 is in two parts, a major part 48B and a minor part 48C, each of which consists of a part-cylindrical outer wall supported by a number of webs. Between a web 48D on the part 48C, and a web 48E on the part 48D, there is retained a knife 48F which extends for the length of the drum but the cutting edge of which is omitted between the positions where the side cuts 33B have been made in the wrapper web WW. The outer surface of the drum 48 has a lengthwise slot 48G through which the cutting edge of the knife 48F just protrudes, and also in this slot 48G is a deflector member 48H which extends for the length of the drum. A shaft 48J also extends within the drum along its length and is journaled in the web 48E, and the deflector member 48H is clamped to this shaft. Outside of the drum 48, and clamped to the end of the shaft 48J, is an arm 48K which carries at its other end a roller cam follower 48L spring-loaded into engagement with the cam 52 by a spring 48M.

The continuous wrapper web WW is held into contact with the drum by a spring loaded roller 53. Below this roller is a stationary knife 54 which is clamped to a block 55 the ends of which are secured to the plates 50. Clamped to the knife 54 is a guide member 56.

The drum 48 is driven by gearwheel 57 which meshes with another gearwheel 58 secured to the drum. The gearwheel 57, and a sprocket wheel 59 which drives an internally-toothed belt 60, are mounted on a shaft 61, coaxially within which is a driven shaft 62 which drives the outer shaft 61 by means of a clutch arrangement (not shown). As can be seen in FIG. 14, a handwheel 63 is mounted on the shaft 61 so that the mechanism can be operated by hand when the drive is declutched. The gearwheel 44E is driven from the shaft 62 in a manner not shown.

On each revolution of the drum 48, as the knife 48F passes the stationary knife 54, the continuous web WW is severed so that the leading portion becomes a blank 16, the web being cut in line with the tear strip end 33A so that the trailing edge of the blank is the edge 21, and the leading edge is the edge 19. The leading edge of the now foremost portion of the web WW will become the edge 19 of the next blank 16 to be cut off. Immediately after the knife 48F has passed the stationary knife 54, the cam follower 48L runs down into the indentation 52A, and the deflector member 48H is moved out of the drum 48 to push the leading edge of the continuous

web (i.e., the edge that will become the edge **19** of the next blank **16**) away from the drum **48** and between the guide plates **49A** and **49B**.

The wrapper blank is carried downwards between the pair of guide plates **49A** and the guide plate **49B** by means of a belt **63** between the pair of guide plates **49A**. The belt **63** passes around a driven roller **64** at its top end, and passes around an idler roller **65** at its bottom end, and is tensioned by a roller **66**. The roller **64** is driven by an internally toothed belt **67** which passes around a sprocket **68** on the shaft of the roller **64**, and around a driving sprocket **69**, which in turn is driven by a gearwheel **70**, which meshes with the gearwheel **58** secured to the drum **48**.

The idler roller **65** is mounted on a shaft **71** which carries two rollers **72** in line with the guide plates **49A** which are cut away at these regions. On the other side of the blank are two rollers **73**, carried on a shaft **74**, so that the blank at each side passes between a roller **72** and a roller **73**. Below these rollers **72** and **73** there is an aperture **41A** in the bed **41** through which the blank is fed downwards.

The two side plates **50** are secured to cross members **75** and **76** which are supported above the bed **41** on four pillars **77**. Secured to the cross member **75** is a bracket **78** in which is journalled a shaft **79** which carries two cams **80** and **81** and a sprocket **82** which is driven by the internally toothed belt **60**. Journalled in the side plates **50A** is a shaft **83** which, at each side, has clamped to it the upper end of one of a pair of members **84**. At their lower ends the members **84** carry a deflector plate **85**. Secured to one of the members **84** is a cam follower **86** which rides on the cam **81**. Between the members **84** are a pair of members **87** which at their upper ends are clamped to a hollow shaft **88** through which the shaft **83** passes, the shaft **88** being free for pivotal movement on the shaft **83**. Carried from the shaft **88** is a further cam follow **89** which rides on the cam **80**.

Rotation of the cam **80** causes the members **87** intermittently to move out to the position, shown in FIG. **15**, through slots **49C** in the plate **49B** at the outer edges of the plates **49A**.

When a blank has reached a position such that the side flaps **24** and **25** are adjacent the members **87** these members are moved out through the slots **49C**, so bringing these flaps around the outer edges of the guide plates **49A** at right angles to the blank. Below the slots **49C** are a pair of folders, or ploughs **90A** and **90B**. Each of the flaps, **24** and **25**, passes between one of the ploughs and one of the guide plates **49A** to be folded flat around the guide plate into the position shown in full lines in FIG. **1**.

A magazine for record sleeves (each containing a record) is shown at **91**, and photoelectric cells **91A**, **91B** and **91C** are provided to detect the quantity of sleeves in the magazine.

Below the level of the magazine **91** is a continuous conveyor mechanism **92** comprising a pair of chains **92A** which pass around sprockets **92B**, and carry between them spaced transverse rods **92C**, each of which carries a pusher **92D**, which run through a slot **41B** in a base plate **41C**.

When a blank has been partially fed down through the slot **41A** the lowermost sleeve **10** in the magazine is pushed out by one of the pushers **92C** and is plunged into the wrapper blank, as shown in FIG. **2**, to carry the blank and sleeve between the base plate **41C** and guides **93A** and **93B** and a plate **93C** which lies between them. The plate **93C** folds down the portion **29** of the blank into the position shown in FIG. **3**, and the guides **93A** and **93B** maintain the side margins **30** and **32** in the position shown in FIG. **3**.

The rate of feed of the continuous web WW is determined by the speed of the rollers **44A** and **44B**. The length of the web which forms one blank **16** is determined by the rotational speed of the knife carrier **46** and that of the drum **48**, both of which make one revolution for each blank in phased relationship with each other. The diameter of the drum **48** is such that its periphery slips slightly under the continuous web, so keeping the web in tension. The speed of the belt **63** is slightly greater than the speed of the web at the drum **48** so that, as each blank is cut off it is separated from the web in the direction of travel.

FIGS. **14**, **17**, **20** and **21** will now be referred to. Immediately following the guides **93A** and **93B** is a plate **93D** which initially is of shallow inverted U-section with side walls **93E** to hold the blank in the position shown in FIG. **3**. At the right hand end of the plate, as seen in FIG. **17**, the sides of the plate **93D** are cut away at **93F** to allow the side margins **30** and **32** of the blank to be folded over into the position shown in FIG. **4**. Initially, the side margins **30** and **32** are folded up at right angles by means of folders or ploughs **93G** and **93H**, and then are folded down through a further right angle by folders or ploughs **93J** and **93K**. The plate **93D** is secured to a cross piece **93L** which is pivotally mounted at **93M**, and at the other side of the plate is a further member **93N** to which the plate **93D** is secured and which rests on a block **93P**. The member **93N** has a knob **93Q** which can be lifted so that the plate **93D** can be raised clear of the bed.

To secure the side margins **30** and **32** in the folded down position, the partially wrapped sleeve at each side runs underneath a heated roller **93R** which heat seals the wrapper.

Running transversely of the conveyor system **92** is a further conveyor system **94** which moves intermittently to take away each partially wrapped record sleeve from the end of the conveyor **92**. The conveyor **94** consists of a chain **94A** which runs around sprockets **94B** and **94C**. The chain **94A** carries lugs **94D** and **94E** which are arranged in alternation so that a sleeve is carried between a lug **94D** and a lug **94E**. Each sleeve is pushed between a lug **94D** and a lug **94E** by means of a pivoted pusher arm **95** which is operated by a cam **95A**. At its lower end the pusher arm carries two pusher members **95B** which are spring loaded on to the top of a sleeve, and which fall down behind the sleeve as it is carried underneath by the conveyor **92**. At this time the cam **95A** causes the pusher **95** to swing to the right so that the sleeve is pushed clear of the conveyor **92** and between a lug **94D** and a lug **94E** on the conveyor **94**. The forward position of the pusher members **95B** is illustrated in chain dot lines in FIG. **17**.

FIGS. **17**, **18**, **19** and **22** to **28** will now be referred. The intermittent motion of the conveyor **94** carries the sleeve from the position at which it is received, indicated at **S1**, successively to the positions indicated at **S2**, **S3** and **S4**.

In proceeding from S1 to S2 the corners of the side margins 31 and 32 are tucked in as shown in FIG. 5, and folded down as shown in FIG. 6, and also the side margin 31 is starting to be folded over towards the position shown in FIG. 7. When the sleeve is at the position S2 the corners between the side margins 30 and 31 are tucked in as shown in FIG. 5. The tucking in is carried out by the following mechanism shown in FIGS. 17 and 22. A plough member 96 is carried by a shaft 96A journaled in a housing 96B. The shaft 96A also carries a gearwheel 96C which meshes with a gear quandrant 96D pivotally mounted at 96E. The quadrant 96D carries a cam follower 96G which is spring loaded by a tension spring 96F against a cam 96H.

The tucking in of the corners of the side margins 31 and 32 is carried out by the end 96J of the plough member 96, with the plough member in the position shown in FIG. 17. When this tucking in operation is completed, rotation of the cam turns the quadrant 96D anticlockwise, so that the gearwheel 96C turns clockwise, so swinging the plough member 96 clear of the approaching corners of the side margins 30 and 31. When the record sleeve reaches position S2, at which it is stationary, further rotation of the cam swings the plough member clockwise into the position shown, and the edge 96K of the plough member tucks in the corners of the side margins 30 and 31.

After the first tucking in operation has been completed, and whilst the sleeve is still moving from position S1 to position S2, the left hand edge of the sleeve, as seen in FIGS. 17 and 18, runs underneath a folder 97A, the cross section of which is shown in FIG. 23. This folder folds down the corner 32C, as shown in FIG. 6. Further along is a plough 97B which folds up the leading end of the side margin 31 against the edge 13 of the sleeve, and is shown in FIGS. 24 and 25. A further plough 97C, shown in FIG. 26, folds down on to the sleeve the leading end of the side margin 31 so that this leading end is approaching the position shown in FIG. 7, but with the trailing end of the side margin 31, i.e., the corners of the side margins 31 and 30, still as shown in FIG. 4.

Whilst the sleeve is in the positions S1, S2, S3 and S4 its right hand end is between the plate 41C and a guide member 41D.

During the next movement of the conveyor 94, as the sleeve moves from position S2 to position S3, the plough 97C completes the folding down of the side margin 31 on to the sleeve, so that the folding is completed as shown in FIG. 7. The folders 97A and 97B carry out the same folding operations on the corner of the side margins 30 and 31 as they previously carried out on the corner of the side margins 31 and 32.

When the wrapped sleeve is at position S3 the side margine 30, 31 and 32 are finally heat sealed to the portion 29 of the wrapper. This is done by three bar heaters 98A, 98B and 98C. The three heater bars are carried by a framework 98D, springs 98E being interposed between the framework and the heater bars. The framework is pivotally mounted by means of a shaft 98F, and cam 98G and cam follower 98H by means of a linkage 98J alternately lift and lower the framework. Thus, as a sleeve is being moved into position S3 the heaters are raised by the cam and are then lowered on to the sleeve to carry out the heat-sealing operation. The cam 98G is driven in phase with the conveyor 94 to make one revolution for each movement of a sleeve from one position to the next. Each heater bar has a heating element 98K as shown in FIG. 28. After the heat-sealing operation the cam lifts the heater bars clear of the sleeve which is then moved to position S4, the delivery position from which the completed wrapped sleeves are taken away. At position S4 a pair of springs 99 hold the sleeve from continuing its forward movement as the lug 94E moves downwards to pass around the sprocket 94C.

In order to perform the modified method described with reference to FIGS. 8 and 9, the apparatus could be modified as follows. As the sleeve will be thinner for the folding operation shown in FIGS. 8 and 9 to be carried out, the guides 93A and 93B will be somewhat shallower, and the plate 93C will be slightly lower. The plate 93D of inverted U-section will also be shallower, and the ploughs 93J and 93K will be of a slightly different shape appropriate to the thinner sleeve. The plough member 96 will be omitted. Plough members similar to the plough members 97A, 97B and 97C could be used, but with their dimensions somewhat changed because of the thinner sleeve. Alternatively, the plough members 97A, 97B and 97C could be replaced by a pair of ploughs similar to the ploughs 93H and 93K, but again of slightly different shape appropriate to the thinner sleeve.

In order to perform the modified method described with reference to FIGS. 10 to 13, the apparatus could be modified as follows. The knives 46B would be omitted from the knife carrier 46. The members 87, and their operating mechanism, and the folders, or ploughs, 90A and 90B would be omitted. Also, the guides 93A and 93B would be omitted, but a folding plate similar to 93C would be retained. The plate 93D and the ploughs 93G, 93H, 93J and 93K would be omitted, and at each side of the sleeve there would be a stationary plough, similar to the plough 96, followed by ploughs similar to the ploughs 97A, 97B and 97C. There would also be a plate across the top of the sleeve.

In each of FIGS. 1 to 13 an arrow shows the direction in which the wrapper and the article travel through the apparatus.

What I claim as my invention and desire to secure by Letters Patent is:

1. Mechanism for wrapping a rectangular article in a rectangular wrapper, comprising means for feeding forwardly a continuous wrapper web, means for making two cuts extending towards each other from opposite sides of the web, means for cutting off a length of the web to form a wrapper blank, means for feeding forwardly the cut-off blank, means for folding on to the blank the two flaps formed between the cuts and one end to form a rectangular panel of the size of the article, means for plunging an article into the blank and for feeding the article and blank forwardly, means for folding the blank about the article with the rectangular panel covering one side of the article, and with the remainder of the blank covering the other side of the article with a side margin on three sides thereof, means for folding the two oppositely disposed side margins around respective sides of the article onto the rectangular panel, means for folding the third side margin around a side of the article onto the rectangular panel, and means for securing the side margins to the rectangular panel.

2. Mechanism as claimed in claim 1 comprising, in advance of the means for folding the third side margin, plough means for tucking in the corners between the side margins and the adjacent other two side margins to form triangulated ends, and means for folding down the triangulated ends on to the edge of the article and on to the third side margin.

3. Mechanism as claimed in claim 1, and further comprising means for feeding forwardly into contact with the continuous wrapper web a continuous tear strip, means for gumming the tear strip to the wrapper web, and means for cutting the end of the tear strip at the position along the web where a blank will be cut off.

4. Mechanism as claimed in claim 3 wherein the means for making the two cuts extending towards each other, and the means for cutting the tear strip, comprise an oppositely disposed pair of knives carried by a rotatable knife carrier, and a stationary knife with which the rotating knives cooperate, in alternation, on rotation of the knife carrier.

5. Mechanism as claimed in claim 1 further comprising guide plates between which the blank passes after being cut off, the means for feeding the blank forwardly comprising a driven belt, and the means for folding the two flaps on to the blank comprising a pair of oscillating folders and a pair of stationary folders, slots being provided in the guide plates for the oscillating folders to pass through.

6. Mechanism as claimed in claim 1 wherein the means for cutting off a length of the blank comprises a stationary knife and a rotatable drum containing a knife which cooperates with said stationary knife.

7. Mechanism as claimed in claim 6 wherein the drum carries a pivoted deflector member, the deflector member being operated by a stationary cam to deflect the leading edge of the web away from the drum after the blank has been cut off, so that the web passes between the guide plates.

8. Mechanism as claimed in claim 2 further comprising means for conveying the article and blank transversely after the oppositely disposed side margins have been folded down, the means for tucking in the corners of the adjacent pairs of side margins to form triangulated ends comprising an oscillating plough member, one end of which tucks in the leading corner of the side margins, is then retracted, and is returned to its original position when the trailing corner of the side margins has passed, for the opposite end of the plough member to tuck in the trailing corner of the side margins.

9. Mechanism for wrapping an article of the shape of a thin rectangular parallelepiped in a rectangular wrapper, which comprises means for feeding forwardly a continuous wrapper web, means for cutting off a length of the web to form a wrapper blank, means for feeding forwardly the cut-off blank, means for plunging an article into the blank and for feeding the article and blank forwardly, means for folding the blank about the forward edge of the article to cover the oppositely disposed large faces and leave a pair of side margins at each side edge of the article and a single side margin at the rear edge of the article, means at each side of the article for tucking in the forward corner of each pair of side margins, means at each side for folding down one of the pair of side margins against the edge of the article and on to the other side margin, and means at each side for folding said other side margin around the edge, means for conveying the article and blank transversely, means at the rear edge of the article for tucking in the corners of adjacent side margins to form triangulated ends comprising an oscillating plough member, one end of which tucks in the leading corner of the side margins, is then retracted, and is returned to its original position when the trailing corner of the side margins has passed, for the opposite end of the plough member to tuck in the trailing corner of the side margins, means for folding the triangulated ends on to the rear edge of the article and on to the single side margin, means for folding the single side margin around the rear edge, and means for securing all of the folded side margins to the face of the blank.

10. Mechanism as claimed in claim 9 wherein the means for cutting off a length of the web to form a wrapper blank comprises a stationary knife and a rotatable drum carrying a knife which cooperates with the stationary knife, the drum also carrying a pivoted deflected member which is operated by a stationary cam to deflect the leading edge of the web away from the drum after the blank has been cut off, so that the web follows the blank forwardly.

11. Mechanism as claimed in claim 9 wherein the means for securing all of the folded side margins comprises, in advance of the means at each side for folding said other side margin a heat-sealing roller at each side of the article for securing said other side margin to the face of the blank, and following the means for folding the single side margin a further heat-sealing roller for securing the folded single side margin to the face of the blank.

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