Dec. 21, 1965 E. W. PITT ET AL 3,224,159

METHOD AND APPARATUS FOR PACKAGING LIGHT BULBS WITH COHESIVE CORRUGATED PAPER

Filed Jan. 23, 1963 5 Sheets-Sheet 1

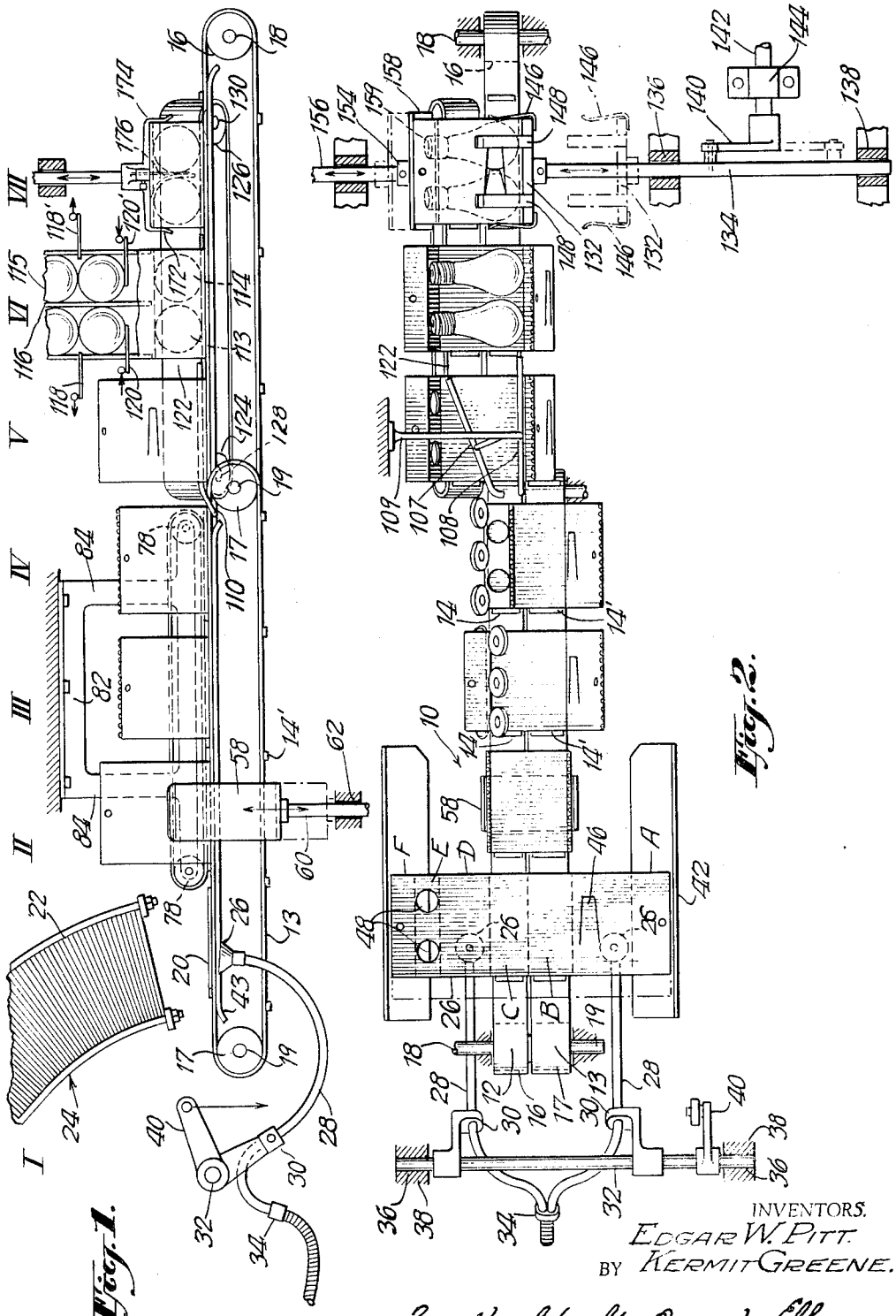


Fig. 1.

Fig. 2.

INVENTORS.
EDGAR W. PITT.
BY KERMIT GREENE.

Ward, Neal, Haselton, Orme & McElhannon
ATTORNEYS.

Dec. 21, 1965 E. W. PITT ET AL 3,224,159

METHOD AND APPARATUS FOR PACKAGING LIGHT BULBS WITH COHESIVE CORRUGATED PAPER

Filed Jan. 23, 1963 5 Sheets-Sheet 2

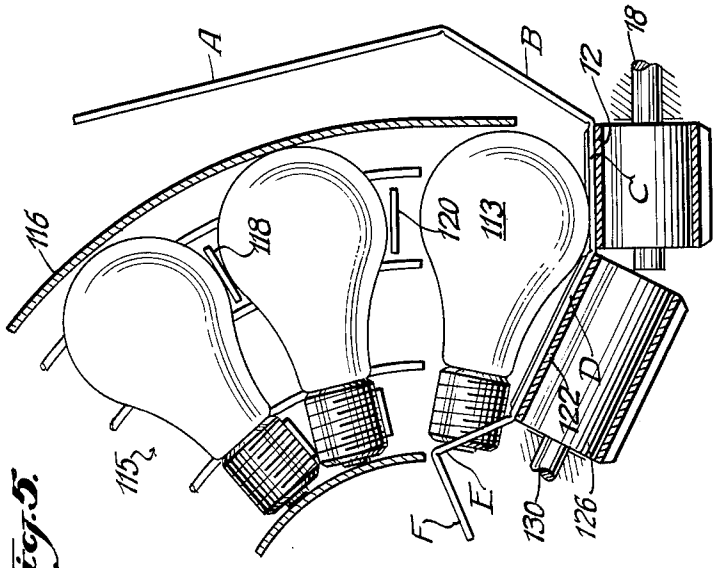


Fig. 5.

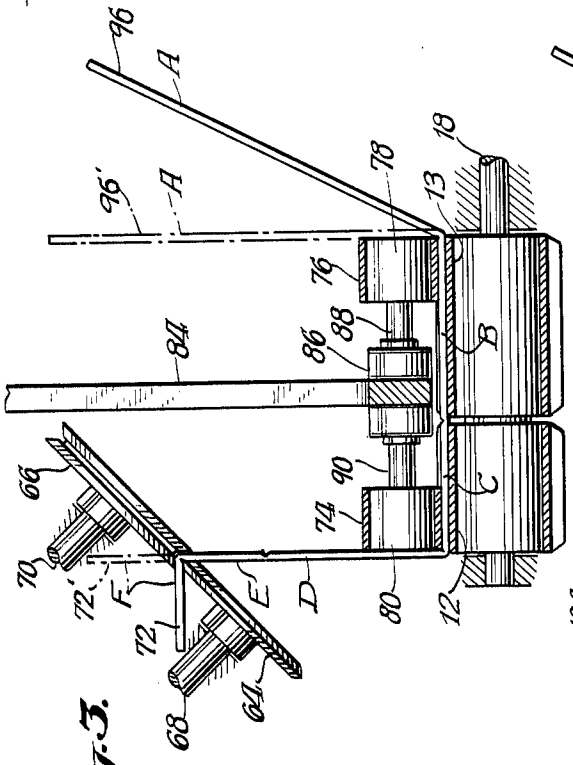


Fig. 3.

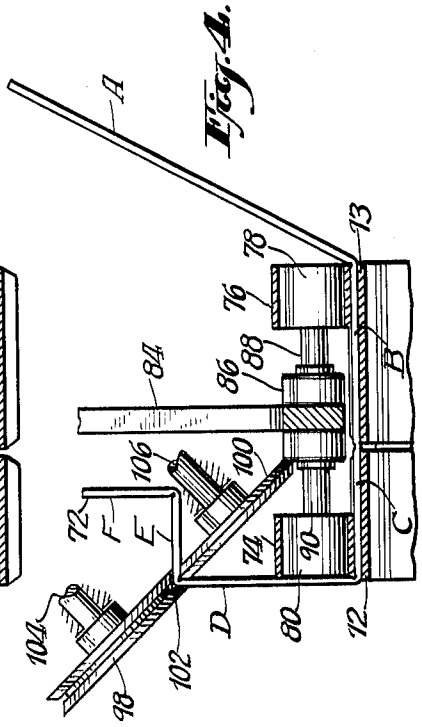


Fig. 4.

INVENTORS.
EDGAR W. PITT.
BY KERMIT GREENE.

Ward Neal Haselton, Orme & McElhannon
ATTORNEYS.

Dec. 21, 1965 E. W. PITT ET AL 3,224,159

METHOD AND APPARATUS FOR PACKAGING LIGHT BULBS WITH COHESIVE CORRUGATED PAPER

Filed Jan. 23, 1963 5 Sheets-Sheet 3

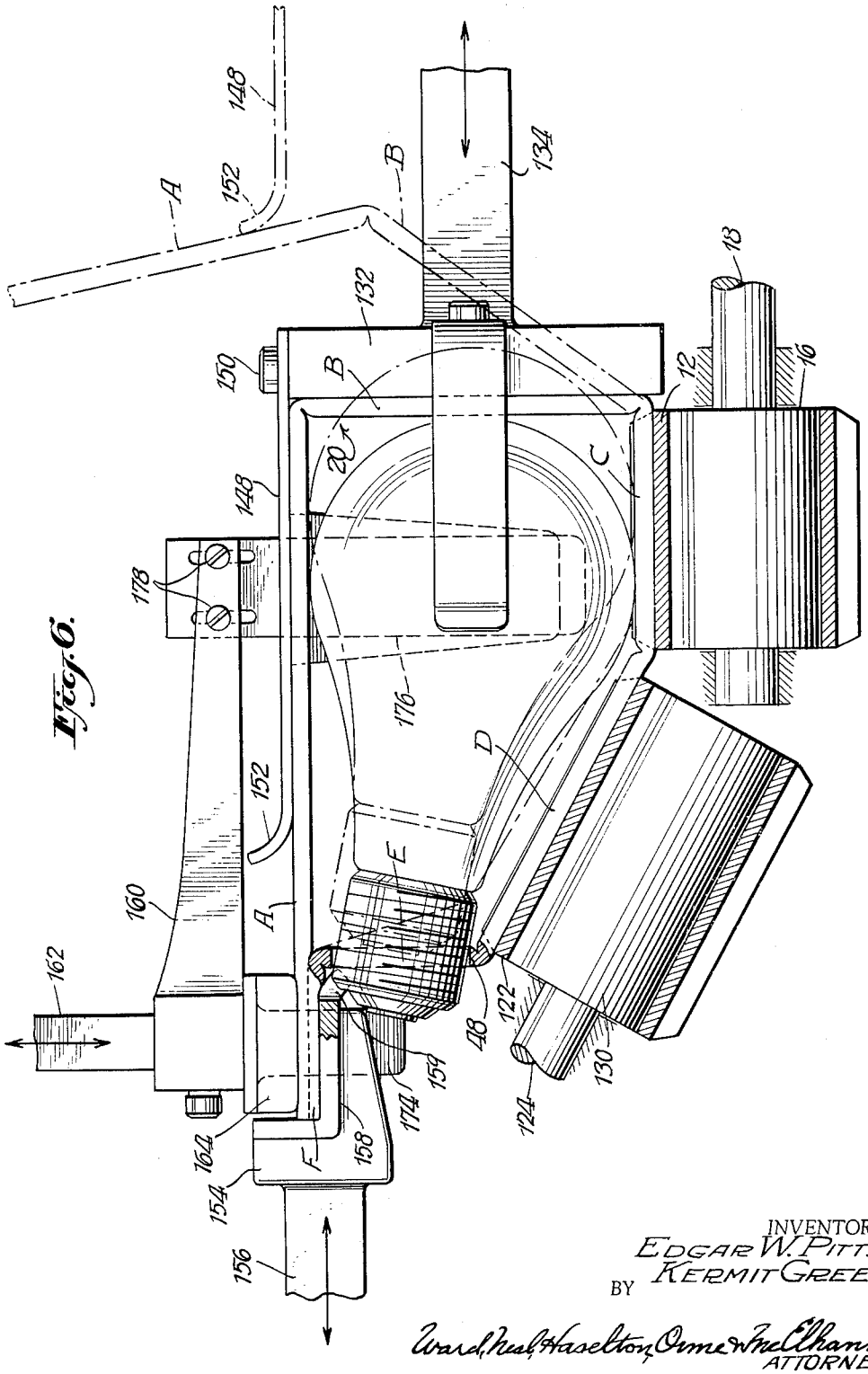


Fig. 6.

INVENTORS.
EDGAR W. PITT.
KERMIT GREENE.
BY

Ward, Hast, Haselton, Orme & McElhannon
ATTORNEYS.

Dec. 21, 1965 E. W. PITT ET AL 3,224,159

METHOD AND APPARATUS FOR PACKAGING LIGHT BULBS WITH COHESIVE CORRUGATED PAPER

Filed Jan. 23, 1963 5 Sheets-Sheet 4

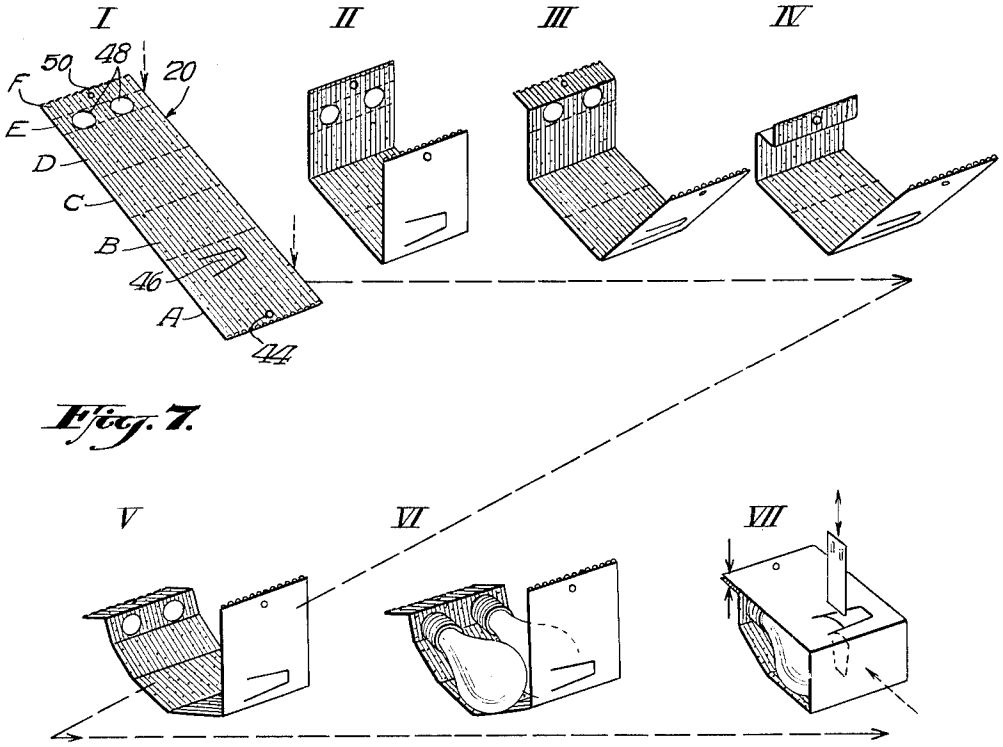


Fig. 7.

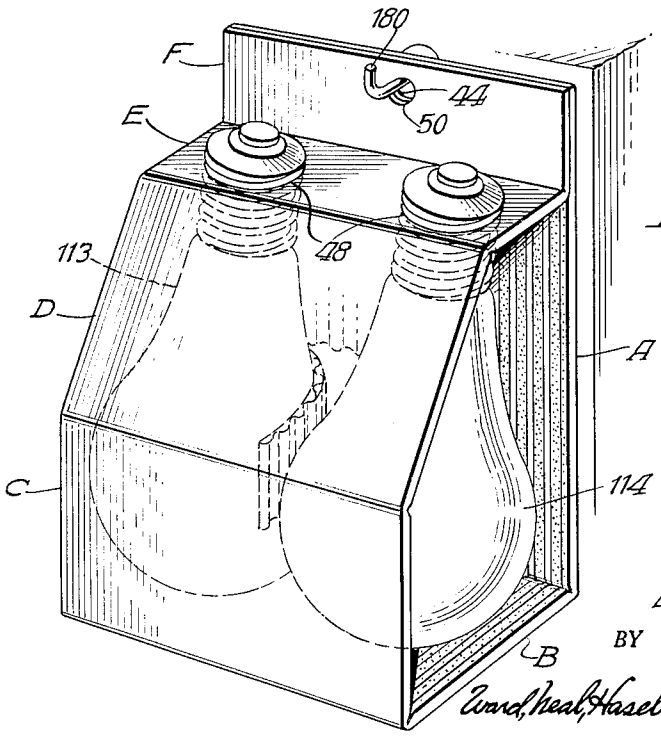


Fig. 8.

INVENTORS.
EDGAR W. PITT.
BY KERMIT GREENE.
Ward, Neal, Haselton, Orme & McElhannon.
ATTORNEYS.

Dec. 21, 1965 E. W. PITT ET AL 3,224,159

METHOD AND APPARATUS FOR PACKAGING LIGHT BULBS WITH COHESIVE CORRUGATED PAPER

Filed Jan. 23, 1963 5 Sheets-Sheet 5

Fig. 10.

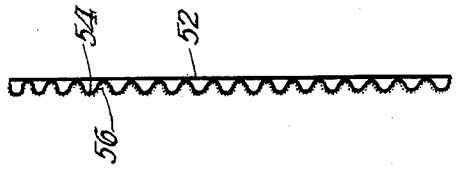


Fig. 9.

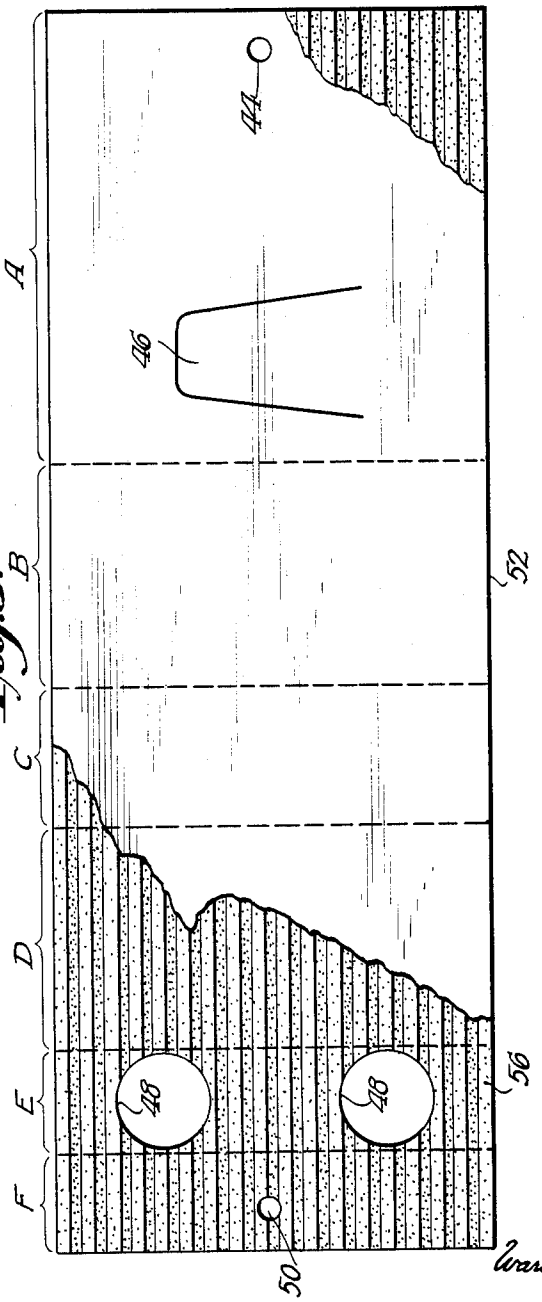


Fig. 12.

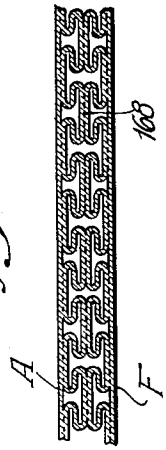
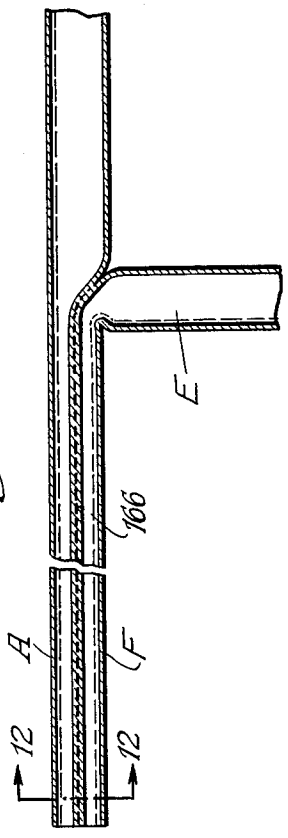


Fig. 11.



INVENTORS.
EDGAR W. PITT.
KERMIT GREENE.
BY
Ward, Neal, Haselton, Orme & McElhannon
ATTORNEYS.

United States Patent Office

3,224,159

Patented Dec. 21, 1965

3,224,159

METHOD AND APPARATUS FOR PACKAGING LIGHT BULBS WITH COHESIVE CORRUGATED PAPER

Edgar W. Pitt and Kermit Greene, Newton, Mass., assignors to St. Regis Paper Company, New York, N.Y., a corporation of New York

Filed Jan. 23, 1963, Ser. No. 253,351
13 Claims. (Cl. 53—29)

This invention relates to packaging with cohesive corrugated paper and more particularly to a method and apparatus for packaging irregular objects such as light bulbs with cohesive corrugated paper.

Packaging machines of various types have been heretofore devised for automatically packaging irregular objects and due to the large economic demand for such articles, much effort has been expended towards perfecting such apparatus. However, to the best of applicants' knowledge, methods and apparatus have never been employed utilizing self-adhering corrugated blanks. The present invention employs single-faced corrugated paperboard of which the exposed corrugated surface has a cohesive coating thereon covering its useful area, preferably including both the raised and depressed areas. The surface formed thereby is not truly a sticky surface which will stick to the products being packed but it will cohere to like material and thus form a strong permanent bond therewith. However, such surface has a high coefficient of friction characteristic which makes it ideally suited for packaging irregularly shaped articles for purposes of retaining them in their desired position within the package. Consequently, the use of such cohesive corrugated paper obviates the necessity of employing fastening means such as staples or gummed tapes in order to seal the package. A further disclosure of such cohesive corrugated paper is contained in the copending application of Edgar W. Pitt, Kermit Greene and Paul Alcaraz, Serial No. 249,458 filed January 4, 1963 entitled "Cohesive Corrugated Laminate and Method for Making Same."

The packaging apparatus in accordance with this invention is arranged to receive paperboard sheets which are cut into suitably sized blanks, and carried by conveyor means through a series of folding and processing stations positioned adjacent thereto. Thus, the individual blanks are fed from a stack or hopper of blanks provided for the purpose, and placed one by one upon said conveyor. Preferably suction means such as suction cups are employed for individually removing the blanks from the hopper and positioning them upon the conveyor. Guide means may be provided for accurately aligning the blanks upon the conveyor in a transverse direction. Thence, the conveyor carries the blank to a second station where an upright, U-shaped reciprocating member folds the overhanging portions of the blanks upwardly to a substantially vertical position. Such a reciprocating member may have two arms, one being disposed outwardly of each edge of the conveyor, respectively.

The die-cut blanks being fed into the wrapping machine comprise a series of portions interconnected along crease lines including a back, bottom, front, inclined front, front flap and pressing flap portions, respectively. The successive panels of the blank are bent or folded along the crease lines, thus forming the package. The aforementioned front flap is provided with one or more apertures for receiving the socket portion of a light bulb or such, as will be described more fully hereinafter.

Following the second stage of processing, the main conveyor carries the partially folded blank to the third station wherein the pressing flap is folded substantially perpendicularly to the front flap. Means provided for

such operation include a pair of individually mounted rotatable forming wheels, the periphery of which co-act to fold said portions along the common crease line thereto. Preferably each of the forming wheels is mounted on a separate shaft which is operatively connected in timed relation to the forward travel of the main conveyor belt.

Thence, the main conveyor belt carries the partially folded blank to the next or fourth station wherein means are provided for folding the front flap portion substantially perpendicularly to the inclined front. This operation is performed by a pair of individually mounted rotatable wheels the peripheries of which co-act one with the other to effect said fold along the common crease line provided between the two portions. Likewise, said pair of forming wheels are operatively connected to the main conveyor belt in order to motivate the blank longitudinally in timed relationship with the main conveyor means.

The fifth forming station is designed to partially spread open the blank in order for said blank to be in a position to receive the light bulbs during the subsequent operation. Preferably such operation is performed by means of projecting forming fingers which are fixedly secured to and cantilevered from supporting members positioned adjacent the main conveyor. The free end of the fingers frictionally engage and guide the carton blank as it passes thereby.

The sixth station dispenses the light bulbs upon the blank whereby the socket portion of each light bulb is inserted in its respective aperture in the front flap portion. One or more light bulbs may be simultaneously dispensed as desired. Preferably a hopper containing a plurality of lamp bulbs is disposed adjacent said main conveyor and is provided with reciprocating mouth cover plates which are adapted to individually release said bulbs upon the bottom portion of the blank in such a manner that the sockets of the bulbs are inserted in the apertures.

The packaging apparatus is arranged so that several operations may be carried out simultaneously at the seventh station. Means are provided for holding over the blank whereby the back, bottom and front portions thereof engage the light bulb and, further, means are provided for pressing the pressing flap portion in super-imposed relation to the back portion for permanent adherence thereto. Reciprocating forming finger means which engage the back and bottom portions of the blank may be employed for folding over the blank around the light bulb or bulbs. Reciprocating pressing means are provided for pressing the pressing flap portion in super-imposed relation to the back portion of said blank for permanent adherence thereto, thus completing the wrapping operation. The finished package has a shape roughly corresponding to that of the contained light bulb, with the neck of the light bulb protruding through the circular opening or aperture, thus holding the light bulb in place. The high coefficient of friction of the cohesive coating is effective to grip the packaged objects and retain same in place.

In the preferred form of this invention, the conveyor means comprises an endless belt disposed between two spaced apart sprockets. The belt is provided with a plurality of spaced apart rows of clips, the distance between adjacent rows corresponding to the width of the die cut blanks. That is, such clips are adapted to engage the edge of each blank in order to positively move same from station to station along the conveyor. Preferably an auxiliary conveyor belt operates between the first four stations in order to provide added support for the relatively flexible die cut blank. This belt is positioned adjacent the main conveyor and operates in a similar manner thereto. A top belt is provided between the second and fourth stations to hold at least the bottom portion of the blank securely against the main conveyor belt as it passes

through said stations. A second auxiliary belt conveyor is positioned at an angle slightly inclined from the main conveyor belt for supporting the inclined front portion of the blank as it passes through the fifth, sixth and seventh stations. The aforementioned conveyor belts may be positively driven and operatively interconnected one to the other in order to insure consistent movement of the blanks as they pass from one station to the next. Preferably, the blanks are advanced from station to station with intermittent motion. That is, each blank is advanced to the next adjacent station and temporarily detained there while the particular operation is being performed before being carried to the next station.

Thus, it is seen that the light bulbs or other objects are wrapped by means of the cohesive corrugated paper in such a manner that the coated ends thereof are brought together in order to adhere one to the other in such a manner that the package is easily sealed without the use of conventional staples or gummed tapes. This methd eliminates the usual labeling costs and provides a neat package of pleasing appearance. Further, in the event that the objects are fragile or breakable, the corrugations in the paper provide a cushioning protection. Moreover, the finished package is ideally suited for packing in larger corrugated cases for shipment to the ultimate consumer.

It is within the contemplation of the present invention to provide an apparatus which employs the use of modern mass production manufacturing techniques. That is, it is simple to operate, repair and maintain in order that readily available employees may be utilized without special training. Further, such a machine is capable of rapidly packaging a large quantity of objects in a short period of time. Moreover, the spoilage of the merchandise being packaged is reduced to a minimum.

Further objects, features and advantages of the invention hereof will appear from the following detailed description given below taken in connection with the accompanying drawings which form a part of this specification and illustrate by way of example, preferred embodiments of the invention.

In the drawings:

FIG. 1 is a side elevation view of a wrapping machine constructed in accordatnce with this invention;

FIG. 2 is a plan view of the machine as shown in FIG. 1;

FIG. 3 is a sectional view of a folding station designated at III in FIG. 1;

FIG. 4 is a sectional view of another folding station designated at IV in FIG. 1;

FIG. 5 is a sectional view of the bulb feeding station designated at VI in FIG. 1;

FIG. 6 is a sectional view of the folding station designated at VII in FIG. 1;

FIG. 7 is a schematic diagram illustrating a cohesive corrugated die cut paper blank after passing through the various stations, designated by Roman numerals, in the packaging apparatus;

FIG. 8 is a perspective view of the completed package containing two light bulbs wrapped therein;

FIG. 9 is a plan view of the die cut blank for making a package in accordance with the invention;

FIG. 10 is an end view of the blank of FIG. 9;

FIG. 11 is an end view of the pressing flap in superimposed relation to the back of the carton for permanent adherence thereto; and

FIG. 12 is a sectional view taken along lines 12—12 of FIG. 11.

As shown most clearly in FIGS. 1 and 2, the apparatus comprises a series of stations designated by the Roman numerals I through VII inclusive. Each station performs one or more operations to the die cut blank as originally supplied when the blank passes thereby during the wrapping process. The main conveyor designated generally at **10** comprises an endless belt **12** having spaced rows of clamps or clips **14** for engaging the rear edge of

the blanks **20** to be pulled or carried through the machine from left to right as viewed in FIG. 1. As illustrated in FIG. 2, two clamps are provided in a transverse row of said belt. Such rows of clamps are spaced apart one from the next in order to provide space for the blanks **20** to rest therebetween. The endless belt **12** passes around sprockets or pulleys **16** positioned at the ends thereof. The sprockets are suitably mounted on shafts **18** provided for the purpose, and at least one of the shafts **18** is driven. An auxiliary conveyor having an endless belt **13** operates between stations I–IV inclusive in order to provide additional support for the relatively flexbile die cut blank as various folding operations are being performed thereon while passing through such stations. The endless belt **13** passes around sprockets or pulleys **17** situated at the ends thereof. The sprockets are suitably mounted on shafts **19**, and preferably one of them is driven in timed relation to shaft **18** of the main conveyor **10**. Further, belt **13** is provided with spaced rows of clamps or clips **14'** which are positioned in adjacent linear relationship to the clips **14** of the main conveyor **10** and perform in a similar manner.

In the first station of operation the die cut blanks **20** are fed from a stack of blanks **22** contained in a feeder **24** or other supply source. Two pivotal suction cups **26** are each mounted at the end of suction tubes **28** which are secured to the arms **30** of a pivotal bracket **32**. The suction tubes **28** are joined together at connection **34** which is connected to a compressor or the like (not shown). The pivotal bracket **32** is suitably journalled at **36** in a frame **38**. An arm **40** actuates the pivotal bracket **32** in timed relation to the advancement of the successive blanks. Thus, the suction cups **26** pivot upwardly and grasp the next adjacent die cut blank **20** from the stack thereof and lowers same down upon the main conveyor belt **12** where it is positioned by means of a pair of side guide brackets **42** disposed outwardly from the conveyor belts **12** and **13**. As illustrated in FIG. 2, the side guides **42** position and guide the die cut blank while it is being passed from station I to station II. A guide and support plate **43** is disposed underlying the belts **12** and **13** in station I for aligning the belts in their proper transverse position as well as absorbing a portion of the impact force from the descending blanks **20**.

Referring now to FIG. 9, a die cut blank of cohesive corrugated paper is illustrated having a series of panels joined together one to the next by fold or crease lines and comprising a back portion designated at A, a bottom portion designated at B, a front portion designated at C, an inclined front portion designated at D, a front flap portion designated at E, and a pressing flap portion designated at F. The back portion A has an aperture or hole **44** positioned towards the marginal edge thereof. A divider flap **46** is die cut in the back portion A for a purpose which will be more fully described hereinafter. The front flap E is provided with a plurality of apertures, two being shown at **48**. These apertures are provided for receiving the stem or receptacle end of lamp bulbs, one aperture is provided for each lamp bulb being packaged. The pressing flap F is provided with a small aperture **50** which will register with aperture **44** when the packaging operation has been completed.

Referring now to FIGS. 9 and 10, the die cut blanks comprise a laminated structure having a backing sheet **52** which may have been previously printed with addressing information or other printed matter. A resilient corrugated material layer **54** is adhered to the backing sheet **52**. The corrugated laminate is covered with a cohesive coating or layer **56** on the outside thereof, such cohesive coating preferably covers the entire exposed surface thereof. The cohesive layer or coating may comprise an aqueous dispersion of latex or natural or synthetic rubber or other elastomeric materials or combinations thereof. Such a cohesive coating has the characteristic that when

two treated surfaces are pressed together they will permanently adhere one to the other. However, the surface is such that it will not adhere to other materials such as the articles being wrapped, for example, but will provide a high coefficient of friction therebetween. That is, the coated surface will tend to grip the surface of the lamp bulbs and retain them in their desired positions in the final wrapped package.

FIG. 7 shows a series of views of die cut blank **20** illustrating the various folding operations performed thereon as the blank passes through the packaging machine. The Roman numerals correspond to the like Roman numerals in FIG. 1, and are utilized in describing the operations performed at the various stations throughout the machine.

The blank is carried by means of belt **12** from station I to station II where an upright U-shaped reciprocating member **58** is provided for folding the outer overhanging portions of the blank upwardly as shown in FIG. 7 at II. Centrally disposed at the bottom of the U-shaped member **58** is a downwardly extending shaft **60** which is suitably journalled at **62**. The shaft is motivated in timed relation with the advancement of the blanks along the conveyor belt.

Thence the blank is carried to the third station wherein the pressing flap F is folded substantially perpendicularly to the front flap E as shown in view III of FIG. 7. Attention is directed to FIG. 3 which shows a sectional view of the apparatus at station III. A pair of angularly disposed forming wheels **64** and **66** are each mounted on rotatable shafts **68** and **70**, respectively. The peripheral surface of the forming wheel **64** has a convex contour while the peripheral surface of the forming wheel **66** employs a mating concave contour. Thus, the two wheels co-act to fold the pressing flap portion F of the blank from position **72'**, illustrated in FIG. 3 by dotted lines, to position **72**, illustrated by solid lines. It is to be pointed out that the shafts **68** and **70** are motivated in timed relation with the forward movement of the main conveyor **10** in order to allow the carton blank to pass smoothly therebetween. It is to be noted that while the blank passes through the third station the back portion A thereof moves slightly outwardly from the position indicated by the dotted line **96'** in FIG. 3 to the position indicated by the solid line **96** due to the force of gravity acting thereon.

A pair of top belts **74** and **76** are disposed between the second and fourth stations in order to hold the blank **20** securely against the main conveyor belt **12** and the auxiliary conveyor belt **13** as it passes through said stations. Top conveyor belt **76** is supported by a pair of pulleys **78** disposed at the ends thereof. Likewise, conveyor belt **74** is supported by a pair of pulleys **80** only one of which is shown. A support bracket **82** is disposed over said top belts and is provided with a pair of vertically extending arms **84**. Connected to the lower portion of each arm **84** is a hub **86** which provides the journal for a pair of rotating shafts **88** and **90**. Such shafts carry the pulleys **78** and **80**, respectively, at the ends thereof. Preferably the top conveyor belts **74** and **76** are friction driven by means of their contact with the blank **20** passing thereunder. However, such belts may mechanically driven, if desired. The arms **84** may be provided with means for adjusting the lengths thereof in order to control the downwardly acting force of the belts against the blanks **20**.

Thence, the main conveyor belt **12** and the auxiliary conveyor belt **13** carry the partially folded blank to the next or fourth station IV wherein means are provided for folding the front flap portion E substantially perpendicularly to the inclined front portion D, as illustrated in view IV of FIG. 7. Attention is invited to FIG. 4 which shows a transverse sectional view of the apparatus at station IV. A pair of inclined forming wheels **98** and **100** are provided, the peripheries of which co-act to fold the blank **20** along the crease line between the front flap portion E and the inclined front portion D of the die cut blank at point **102**. The forming wheels are each mounted on shafts **104** and **106**, respectively, which shafts may be driven in timed relation with the forward progress of the main conveyor belt, if desired.

The fifth forming station is designed to partially spread open the blank, as illustrated in view V of FIG. 7. Referring now to FIG. 2, forming fingers **107** and **108** are cantilevered from and supported by support bracket **109** provided for the purpose. Finger **108** is intended to hold down or depress the front portion C, while finger **107** is intended to spread outwardly the pressing flap F, front flap E and inclined front D portions. The marginal portions of the fingers are provided with flared portions which facilitate the initial engagement of the blank therewith. The free end of the fingers frictionally engage and guide the carton blank as it passes thereby. Another finger **110** is positioned underneath the blank and functions to raise the bottom portion B in preparation for later folding operations.

The sixth station of the apparatus dispenses the light bulbs **113** and **114** upon the die cut blank **20** in such a manner that the socket portion of the light bulbs are inserted in the aforementioned apertures **48** in the front flap portion E. The present embodiment illustrates two light bulbs being simultaneously dispensed upon the blank. However, one light bulb or a plurality of light bulbs may be simultaneously dispensed, if desired. Reference is hereby made to FIG. 7, view VI which illustrates the manner in which the light bulbs are received by the packaging blank. Also, attention is invited to FIGS. 1, 2 and 5 which illustrate the light bulbs being supplied from a hopper **115**. The bulbs are aligned and retained in position within the hopper by means of divider plates **116**. The mouth or exit of the hopper is provided with reciprocating mouth cover plates **118**, and **120** and **118'** and **120'** which are mounted for horizontal movement. Simultaneously, cover plates **120** and **120'** move outwardly of the hopper **115** to dispense two light bulbs while the plates **118** and **118'** move inwardly to retain the next adjacent light bulbs contained in the hopper thereabove. Thus, the two lower bulbs are simultaneously released upon the blank **20** as it passes thereunder, as shown in FIGS. 2 and 5. After the lowermost bulbs have been discharged from the hopper, the cover plates **120** and **120'** move inwardly while plates **118** and **118'** move outwardly in order to drop the next two adjacent lamp bulbs into position in preparation for the next die cut blank passing through the station.

A second auxiliary endless belt conveyor is disposed at an inclined angle to the main conveyor belt for purposes of supporting the inclined front portion D of the blank **20** through stations V, VI and VII. As shown in FIGS. 1, 5 and 6, the conveyor comprises an endless belt **122** which is supported at the ends by means of sprockets **124** and **126**. Such sprockets are mounted on rotating shafts **128** and **130** respectively and preferably one of said shafts is driven in timed relation to the advancement of the main conveyor **10**.

Thence, the die cut blank passes through the final or seventh station where several operations are carried out simultaneously. Reference is made to FIGS. 1, 2, 6 and FIG. 7, view VII, which show the various operations performed at this station. The front portion C of the die cut blank **20** is supported by the endless belt **12** while the inclined front portion D is supported by the endless belt **122**. A horizontally reciprocating piston **132** is actuated by a piston rod **134** which is carried in a pair of journals **136** and **138**. Connecting rod **140** converts the rotary motion of drive shaft **142** to the reciprocating motion of the piston rod **134**. Drive shaft **142** is supported in bearings **144** and is motivated in timed relationship with the advancement of the blanks along the main conveyor. A pair of S-shaped side wings **146** are provided in order to retain the light bulbs in their requisite longitudinal

position. A pair of reciprocating forming fingers **148** are cantilevered from the piston **132** and secured thereto by means of screws **150**. The forming fingers **148** are provided with flared marginal portions **152** in order to facilitate the initial engagement with the blank **20**. In operation each finger **148** moves from its initial position, illustrated by the dotted lines in FIG. 6, to its forward position illustrated by the solid lines. Thus, the blank **20** is folded from its initial position illustrated by the dotted lines to its final position illustrated by the solid lines in FIG. 6. An anvil **154** carried by an anvil push rod **156** is adapted for horizontal reciprocating motion in timed relation to the reciprocating motion of the piston **132**. That is, the anvil moves inwardly at the same time that the piston moves inwardly and conversely they both move simultaneously outwardly. The anvil is provided with a shelf-like portion **158**, the end of which is adapted to engage the front flap portion E. Recesses or cut-out portions **159** are provided to allow space for the stem portion of the light bulbs. When the anvil **154** and the piston **132** move simultaneously inwardly the wrapping blank is compressed therebetween as illustrated in FIG. 6. That is, the back A, bottom B, and front C portions of the blank **20** are urged into engagement with the light bulb and the bulb is pressed towards the left, as viewed in FIG. 6, to a position wherein the receptacle portion thereof is further pressed through the aperture **48** in the front flap E.

A pressing head **160** is provided for reciprocating vertical movement. Such head is actuated by means of a reciprocating shaft **162**. Connected to the pressing head **160**, is a pressing die **164** which urges the back portion A against the pressing flap portion F of the die cut blank and, thereby, effectively adheres one surface against the other. That is, the two exposed corrugated surfaces, each having cohesive coating thereon, are pressed together for permanent adherence one to the other. Attention is directed to FIGS. 11 and 12 wherein the single-faced corrugated paperboard is shown in greater detail. The terminal portion of the back A of the blank is pressed against the pressing flap F along the line of coated surfaces **166** producing a laminated structure as shown in the enlarged sectional view FIG. 12. The corrugated surfaces have been crushed so that large exposed contacting surfaces are pressed against each other and, thus, form a strong, permanent joint therebetween, as shown at **168**.

The pressing head **160** further comprises a pair of side wings **172** and **174** which act to retain the bulbs in alignment during the pressing operation. Also, the pressing head **160** is provided with a separating blade **176** which is connected to the head **160** as by means of machine screws **178**. Such blade passes downwardly between the two light bulbs and depresses the divider flap **46** therebetween to separate the two light bulbs one from the other for purposes of protecting the bulbs against accidental contact or breakage.

Station VII of the machine is the last station and, therefore, the finished package passes therefrom to the end of the conveyor means where it is discharged. The finished package has a shape roughly corresponding to that of the light bulbs contained therein as shown in FIG. 8. The receptacle or neck portion of the light bulbs protrude through the holes or apertures **48** a factor which tends to maintain the bulbs in their respective positions. Further, the bulbous portion of the light bulbs remain in frictional engagement with the back, bottom and front portions of the package and, therefore, are restrained from accidental movement. The finished package may be hung by means of the hole **50** on a hook **180**, or they may be packed in larger corrugated cases for shipment, as desired.

Although certain particular embodiments of the invention are herein disclosed for purposes of explanation, various modifications thereof, after study of this specification, will be apparent to those skilled in the art to which the invention pertains, reference should accordingly be had to the appended claims in determining the scope of the invention.

What is claimed and desired to be secured by Letters Patent is:

1. A method of packaging electrical bulbs with a die cut blank of cohesive corrugated paper having a series of panels interconnected along crease lines comprising; dispensing said blanks upon a conveyor means, moving said blank along said conveyor, partially folding said blank, moving said partially folded blank along said conveyor, partially spreading open said blank, dispensing electrical bulbs upon said blank, moving said blank and electrical bulbs along said conveyor, wrapping said blank about said bulbs, and pressing the end terminal portions of said blank into cohesive engagement one with the other.

2. A method of packaging electrical bulbs with a die cut blank of cohesive corrugated paper having a back, bottom, front, inclined front, front flap, and pressing flap portions joined side-by-side at fold lines comprising; dispensing said blanks upon an elongated conveyor, folding said back and inclined front portions substantially vertically, folding said pressing flap substantially perpendicularly to said front flap, folding said front flap substantially perpendicularly to said inclined front, partially spreading open said blank, dispensing said bulb upon said blank, inserting the socket portion of said bulb into an aperture in said front flap portion, folding over said blank whereby the treated surface of said blank engages said bulb, and pressing said pressing flap in super-imposed relation to said back for permanent adherence thereto.

3. A method of packaging electrical bulbs with die cut blanks of cohesive corrugated paper having a back, bottom, front, inclined front, front flap, and pressing flap portions interconnected along crease lines, respectively, and said front flap having an aperture therein, said method comprising; providing an elongated main conveyor means and a series of stations positioned adjacent thereto, dispensing blanks one by one upon said conveyor at the first station, transferring said blank to the second station, folding said back and inclined front portions substantially vertically at said second station, transferring said blank to the third station, folding said pressing flap substantially perpendicularly to said front flap, transferring said blank to the fourth station, folding said front flap substantially perpendicularly to said inclined front, transferring said blank to the fifth station, partially spreading open said blank, transferring said blank to the sixth station, dispensing said bulb upon said blank, inserting said socket portion of said bulb into said aperture, transferring said blank to the seventh station, folding over said blank whereby said back, bottom and front portions thereof engage said bulb, and pressing said pressing flap in superimposed relation to said back for permanent adherence thereto.

4. A method of packaging electrical bulbs with a die cut blank of cohesive corrugated paper having a back, bottom, front, inclined front, front flap and pressing flap portions interconnected along crease lines, respectively, and said front flap having an aperture therein, said method comprising; providing conveyor means, pivoting suction means for gripping said blanks, releasing suction means for dispensing said blanks upon said conveyor, positioning said blank transversely of said conveyor, reciprocating a U-shaped member to fold the outer overhanging edges of said blank upwardly, rotating a pair of forming wheels which co-act to fold said pressing flap substantially perpendicularly to said front flap, rotating a second pair of forming wheels to fold said front flap substantially perpendicularly to said inclined front, partially spreading open said blank, retracting cover plates from a hopper containing light bulbs to dispense said light bulbs upon said blank, inserting the socket portion of said light bulb within said aperture, pressing a folding finger and an anvil together for folding over said blank to engage said light bulb, and pressing said pressing flap in super-im-

posed relation to said back for permanent adherence thereto.

5. An apparatus for packaging electrical bulbs with a die cut blank of cohesive corrugated paper having a back, bottom, front, inclined front, front flap and pressing flap portions joined side-by-side at fold lines, said front flap having an aperture therein, said apparatus comprising elongated conveyor means, means for positioning said blanks one by one upon said conveyor, means for folding overhanging portions of said blank substantially vertically, means for folding said pressing flap substantially perpendicularly to said front flap and said front flap substantially perpendicularly to said inclined front, means for partially spreading open said blank, means for positioning said electrical bulb upon said blank, means for folding over said blank whereby said blank engages said bulb, means for pressing said pressing flap in super-imposed relation to said back for permanent adherence thereto.

6. An apparatus for packaging electrical bulbs with a die cut blank of cohesive corrugated paper having a back, bottom, front, inclined front, front flap and pressing flap portions interconnected along crease lines respectively, said front flap having an aperture therein, said apparatus comprising elongated conveyor means, means for individually dispensing said blanks upon said conveyor, means for folding said back and inclined front substantially vertically, means for folding said pressing flap substantially perpendicularly to said front flap, means for folding said front flap substantially perpendicularly to said inclined front, means for partially spreading open said blank, means for dispensing said bulb upon said blank whereby the socket portion of said bulb resides within said aperture, means for folding over said blank whereby said back, bottom and front thereof engage said bulb, and means for pressing said pressing flap in super-imposed relation to said back for permanent adherence thereto.

7. An apparatus for packaging electrical light bulbs with a die cut blank of cohesive corrugated paper which comprises a back, bottom, front, inclined front, front flap, and pressing flap portions joined side-by-side at fold lines, said front flap having an aperture therein, said apparatus comprising an elongated endless belt conveyor, means for individually dispensing said blanks upon said conveyor, an upright U-shaped reciprocating member adapted to fold the outer overhanging portions of said blank upwardly, a pair of forming members which co-act to fold said pressing flap substantially perpendicularly to said front flap, a second pair of forming members which co-act to fold said front flap substantially perpendicularly to said inclined front, means for dispensing said bulbs upon said blank whereby the receptacle portion thereof resides within said aperture, a reciprocating folding finger for folding over said blank whereby said blank engages said bulb, means for pressing said pressing flap in super-imposed relation to said back portion for permanent adherence thereto.

8. An apparatus for packaging electrical bulbs with a die cut blank of cohesive corrugated paper having a back, bottom, front, inclined front, front flap and pressing flap portions interconnected along crease lines respectively, said front flap having an aperture therein, said apparatus comprising elongated conveyor means, suction means for individually dispensing said blanks upon said conveyor, guide means for positioning said blank transversely of said conveyor, an upright U-shaped reciprocating member the arms of which are disposed outwardly of each edge of said conveyor respectively and are adapted to fold the outer overhanging portions of said blank upwardly, a pair of rotatable forming wheels which co-act to fold said pressing flap substantially perpendicularly to said front flap, a second pair of rotatable forming wheels which co-act to fold said front flap substantially perpendicularly to said inclined front, means for partially spreading open said blank, a hopper containing bulbs having a mouth cover which reciprocates for individually dispensing bulbs upon said blank whereby the socket portion thereof resides within said aperture, a reciprocating folding finger for folding over said blank whereby said back, bottom and front thereof engage said bulb, means for pressing said pressing flap in super-imposed relation to said back for permanent adherence thereto.

9. In apparatus for packaging electrical bulbs in pairs with a die cut blank of cohesive corrugated paper having a back, bottom, front, inclined front, front flap, and pressing flap portions interconnected along crease lines respectively, said front flap having two apertures therein, the combination comprising elongated main conveyor means, a dispensing hopper containing a plurality of die cut cohesive corrugated paper blnaks, a pivotal suction-cup means for individually removing blanks from said hopper and positioning them upon said conveyor, guide means for positioning said blanks transversely on said conveyor, an upright U-shaped reciprocating member the arms of which are disposed outwardly of each edge of said conveyor respectively and are adapted to fold the outer overhanging portions of said blank upwardly, a pair of top belts extending parallel to said main conveyor means for downwardly urging said blanks against said main conveyor means, a pair of individually mounted rotatable forming wheels which co-act to fold said pressing flap substantially perpendicularly to said front flap, a second pair of individually mounted rotatable forming wheels which co-act to fold said front flap substantially perpendicularly to said inclined front, said first and second pair of rotatable forming wheels being operatively connected to said main conveyor means, forming fingers for partially spreading open said blank, a hopper containing a plurality of electrical bulbs disposed adjacent said main conveyor and being provided with reciprocating mouth cover plates, said mouth cover plates being adapted to individually release bulbs upon said bottom portion of said blank whereby the socket portions of said bulbs reside within said apertures, an auxiliary endless belt being positioned adjacent said main conveyor and in engagement with said inclined front portion of said blank, reciprocating forming finger means for folding over said blank whereby said back, bottom and front portions thereof frictionally engage said bulb, reciprocating pressing means for pressing said pressing flap in super-imposed relation to said back for permanent adherence thereto.

10. In apparatus for packaging electrical bulbs with die cut blanks of cohesive corrugated paper having a back, bottom, front, inclined front, front flap, and pressing flap portions interconnected along crease lines respectively, said front flap having an aperture therein, the combination comprising elongated main conveyor means, a series of stations positioned adjacent said conveyor, a first station having means for dispensing said blanks one by one upon said conveyor, a second station for folding said back and inclined front substantially vertically, a third station for folding said pressing flap substantially perpendicularly to said front flap, a fourth station for folding said front flap substantially perpendicularly to said inclined front, a fifth station for partially spreading open said blank, a sixth station for dispensing said bulb upon said blank whereby the socket portion of said bulb resides within said aperture, a seventh station for folding over said blank whereby at least said back portion thereof engages said bulb, an eighth station for pressing said pressing flap in super-imposed relation to said back for permanent adherence thereto, a first auxiliary conveyor means passing from the first station to the fourth station for providing additional support for said blanks, a second inclined auxiliary conveyor belt passing from the fifth station to the eighth station for supporting said front portion of said blank.

11. An apparatus for packaging electrical bulbs with die cut blanks of cohesive corrugated paper having a back, bottom, front, inclined front, front flap and pressing flap portions interconnected along crease lines re-

spectively, said front flap having an aperture therein, said apparatus comprising an elongated main conveyor means, a series of stations positioned adjacent said conveyor, a first station having a dispensing hopper containing a plurality of die cut cohesive corrugated paper blanks, pivotal suction-cup means for individually removing blanks from said hopper and positioning them upon said conveyor, a second station having an upright U-shaped reciprocating member for folding the outer overhanging portions of said blank upwardly, a third station comprising a pair of individually mounted rotatable forming wheels which co-act to fold said pressing flap substantially perpendicularly to said front flap, a fourth station comprising a second pair of individually mounted rotatable forming wheels which co-act to fold said front flap substantially perpendicularly to said inclined front, a fifth station comprising means for dispensing said bulb from a hopper to said blank whereby the socket portion thereof resides within said aperture, a sixth station comprising means for folding over said blank whereby said blank engages said bulb, and a seventh station comprising means for pressing said pressing flap in super-imposed relation to said back for permanent adherence thereto.

12. An apparatus for packaging electrical bulbs with die cut blanks of cohesive corrugated paper having a series of panels joined side-by-side along fold lines including a back, bottom, front, inclined front, front flap, and pressing flap portions, said front flap having a plurality of apertures therein, said apparatus comprising an elongated endless belt conveyor, a series of stations positioned adjacent said conveyor, a first station including means for dispensing said blanks one by one upon said conveyor, a second station having an upright U-shaped reciprocating member the arms of which are disposed outwardly of each edge of said conveyor respectively and are adapted to fold the overhanging portions of said blank upwardly, a third station having a pair of individually mounted rotatable forming wheels which co-act to fold said pressing flaps substantially perpendicularly to said front flap, a fourth station having a second pair of individually mounted rotatable forming wheels which co-act to fold said front flaps substantially perpendicularly to said inclined front portion, said first and second pair of rotatable forming wheels being operatively connected to said main conveyor belt, a fifth station for partially spreading open said blank, a sixth station having a hopper which supplies two light bulbs for each blank passing thereby, means for inserting the socket portions of said bulbs in said apertures, respectively, a seventh station having a reciprocating forming finger, an anvil which co-acts with said reciprocating forming finger for folding over said blank whereby said back, bottom and front portions thereof frictionally engage said bulb, a reciprocating pressing die which co-acts with said anvil for pressing said pressing flap in super-imposed relation to said back portion for permanent adherence thereto, and means for interposing a divider flap between said light bulbs.

13. An apparatus for packaging electrical bulbs with die cut blanks of cohesive corrugated paper having a back, bottom, front, inclined front, front flap, and pressing flap portions interconnected along crease lines respectively, said front flap having a pair of apertures therein, said apparatus comprising an elongated main endless belt conveyor, a series of seven stations positioned adjacent said conveyor, first auxiliary conveyor means disposed between stations one and four for providing additional support for said blanks, inclined auxiliary conveyor means disposed between stations five and seven for supporting said front portion of said blank, a pair of top endless belts extending parallel to said main conveyor for downwardly urging said blanks against said main conveyor means, a first station having means for dispensing said blanks one by one upon said conveyor, a second station for folding said back and inclined front portions substantially vertically, a third station for folding said pressing flap substantially perpendicularly to said front flap, a fourth station for folding said front flap substantially perpendicularly to said inclined front, a fifth station for partially spreading open said blank, a sixth station for dispensing a pair of bulbs upon said blank whereby the socket portions of said bulbs resides within said apertures respectively, a seventh station for folding over said blank whereby a portion of said blank engages and restrains said bulb, an anvil, a reciprocating pressing die which co-acts with said anvil for pressing said pressing flap in super-imposed relation to said back for permanent adherence thereto.

References Cited by the Examiner

UNITED STATES PATENTS

2,966,020	12/1960	Bacsak	53—185 X
3,085,377	4/1963	Ganz	53—48 X

FOREIGN PATENTS

719,191	2/1932	France.

TRAVIS S. McGEHEE, *Primary Examiner.*