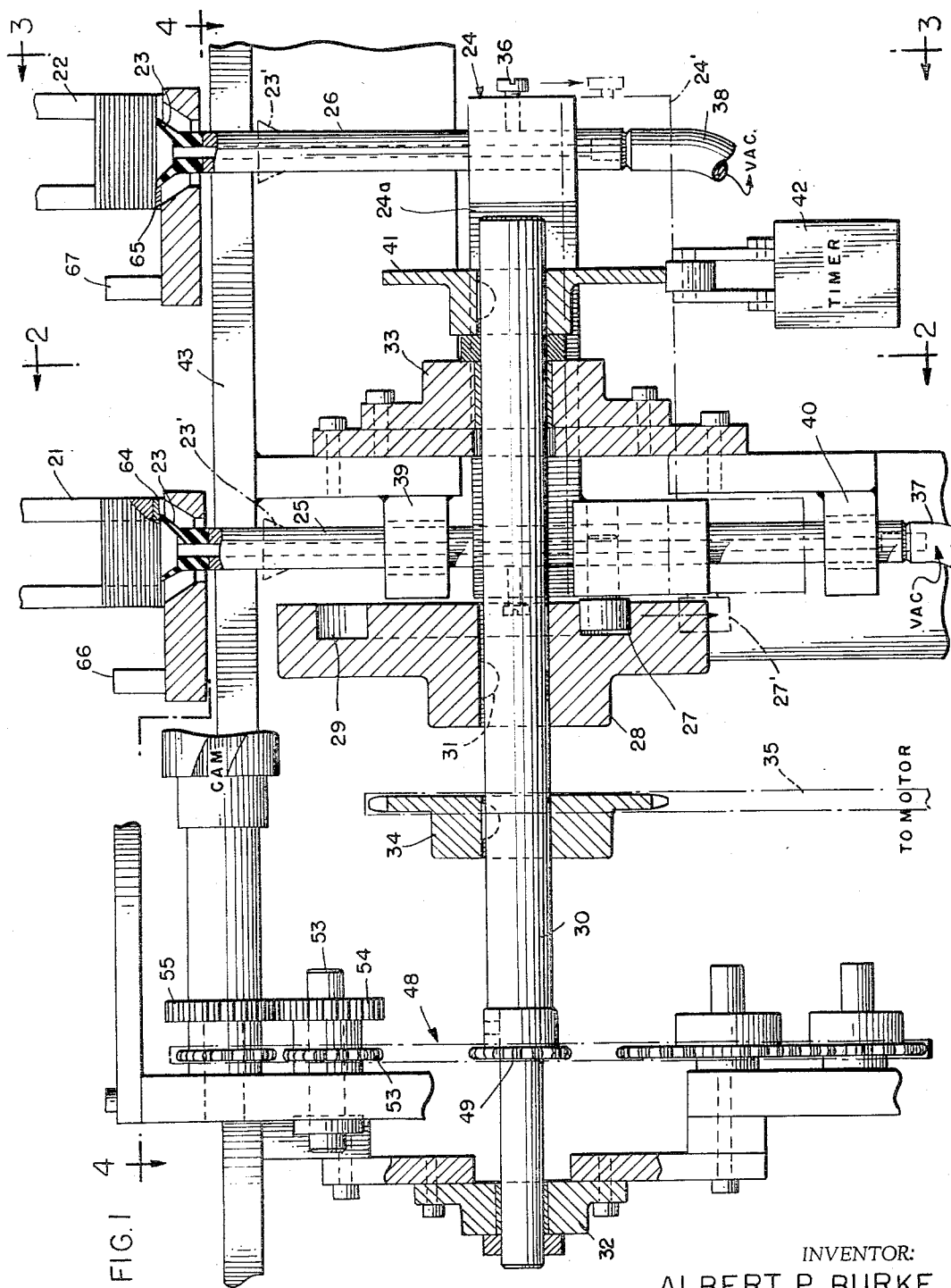


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BY

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ATT'YS

Feb. 14, 1967

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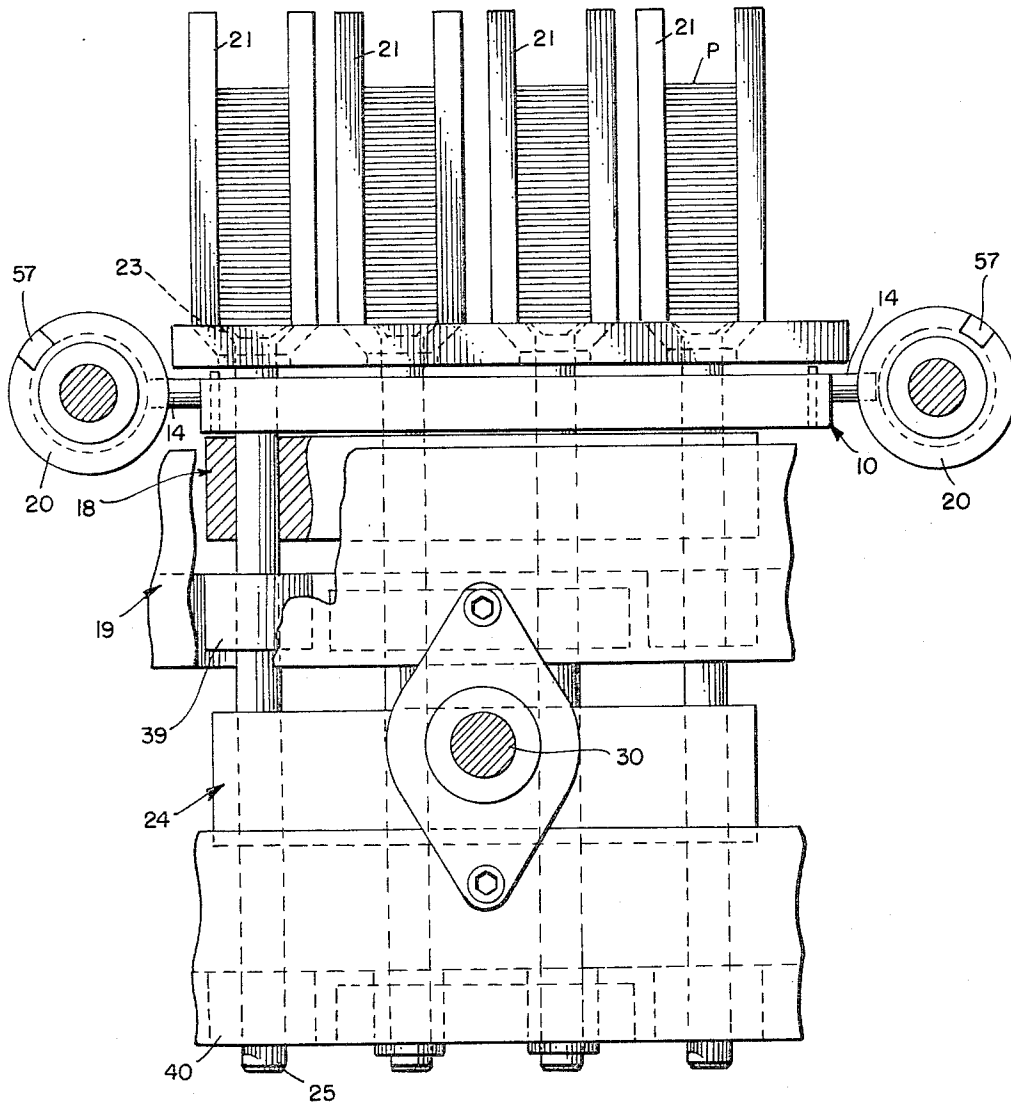
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CONVERTING MACHINE FOR BUTTER PATTY PLATE

Filed May 11, 1964

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FIG. 2



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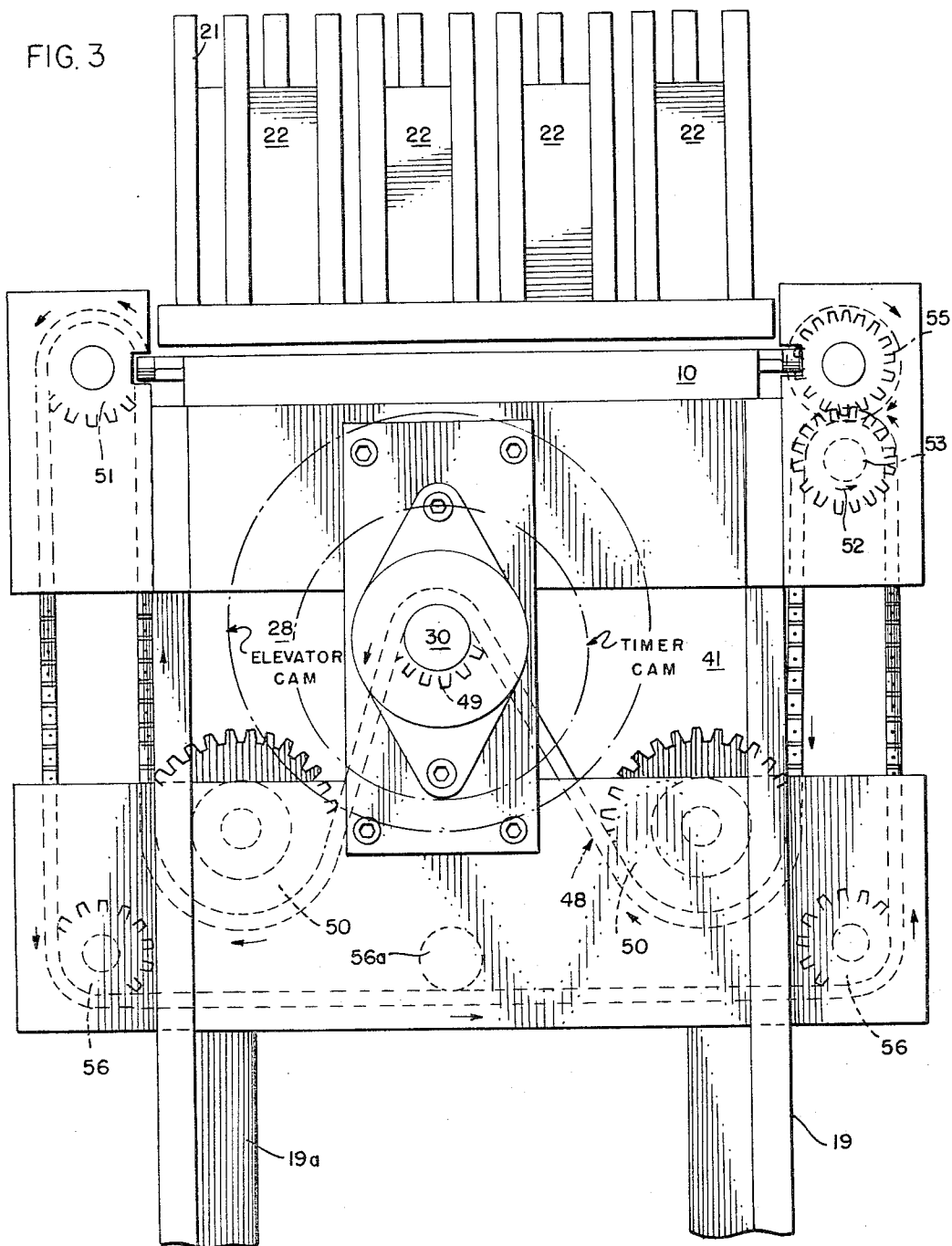
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CONVERTING MACHINE FOR BUTTER PATTY PLATE

Filed May 11, 1964

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FIG. 3



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3,303,759

CONVERTING MACHINE FOR BUTTER PATTY PLATE

Filed May 11, 1964

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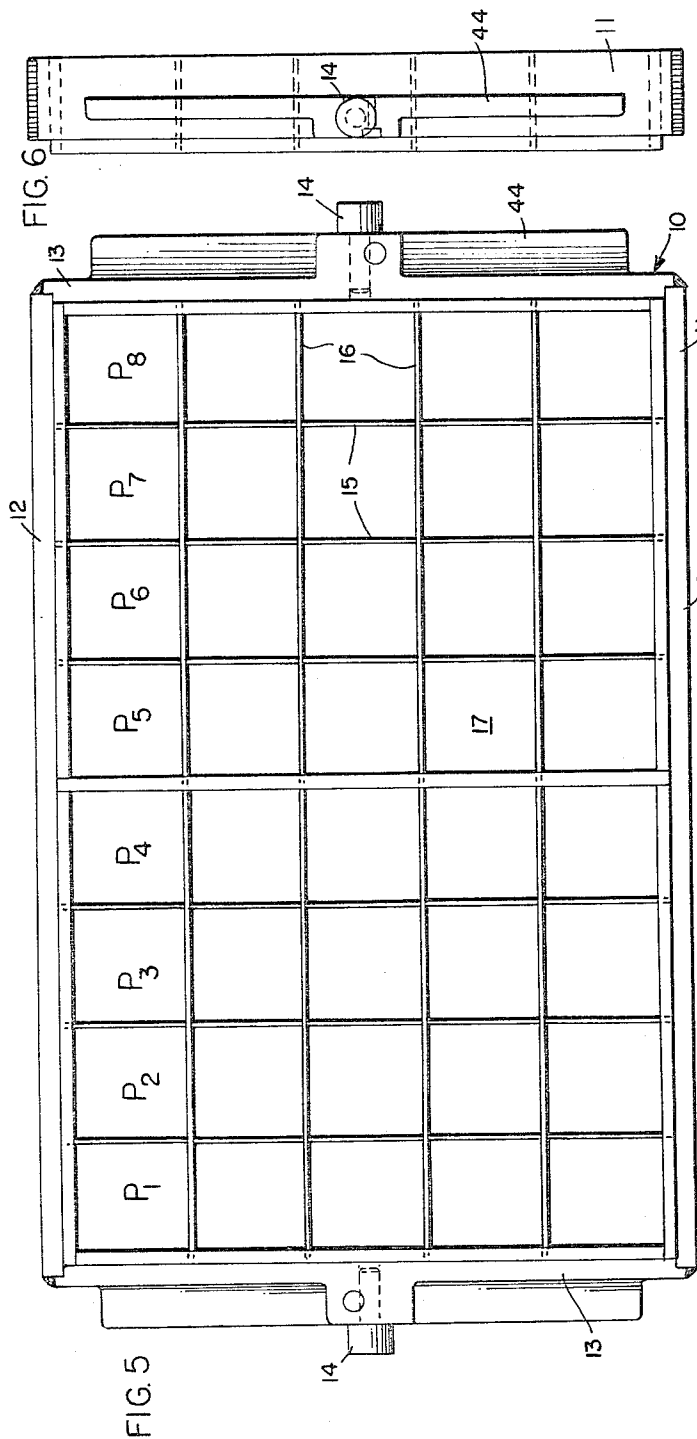


FIG. 5

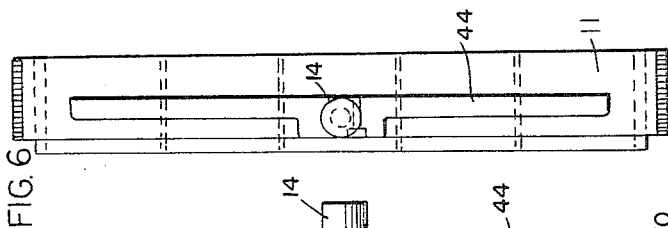


FIG. 6

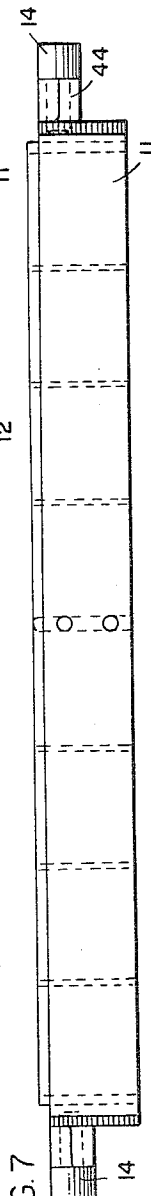


FIG. 7

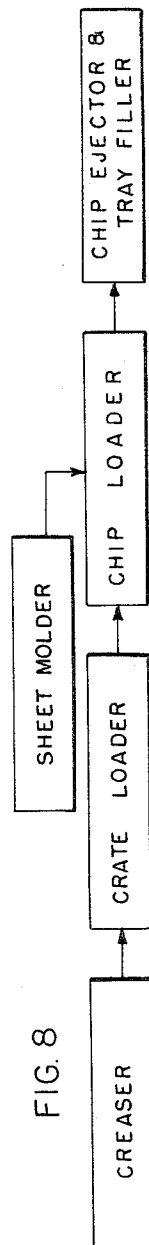


FIG. 8

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3,303,759

## CONVERTING MACHINE FOR BUTTER PATTY PLATE

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Filed May 11, 1964, Ser. No. 366,371

8 Claims. (Cl. 93—1)

This invention relates to a method and means for (1) converting a scored blank of paperboard into a butter patty-holding plate, and (2) positioning a multiple number of said plates in groupings whereby the erected sides of said plates become mutually self-supporting.

The specifications of the scored blank of paperboard, and of the converted butter patty-holding plate, and of the groupings of converted plates, all of which are the concern of this invention, are given in detail in Leo Peters copending application, Serial No. 329,000, filed December 9, 1963.

The machine which is the subject of this invention renders commercially feasible, from a cost standpoint, the production and use of the Butter Fat Packaging which is the subject of the copending application, Serial No. 329,000.

The paper plate structure of said copending application described in the aforesaid application has the following characteristics:

(1) A blank of paperboard of the same base shape as a butter patty, but having linear dimensions slightly larger than the base of the pat, plus an amount for a wing section on each side slightly in excess of the thickness of the pat. This results in linear dimensions for said blank which are approximately 75% greater than the linear dimensions of the area to be occupied by the butter patty.

(2) The blank being scored, creased or perforated along the four outside edge lines at which a centered pat rests on the blank, and the corners to the outside of the lines being scored or cut so that the blank, has four manipulable flanges or wing sections extending beyond the periphery of a centered butter pat, which, in effect, are hinged to the main section of the blank along the scored lines;

(3) Preliminary flexing of these peripheral extensions or hinged flanges, along the score lines to reduce the bending resistance of the paperboard in an amount that will permit said flanges to stand erect in cooperation with and under equal pressure from adjacent patty plates;

(4) Raising the hinged flanges along the score lines so that they stand erect, in which position they are slightly higher than the thickness of the accompanying butter pat; and

(5) Packing numerous patty plates together on a common sheet so that the plates cooperate with each other to maintain their hinged sides erect, in which position the sheet will serve as a base for one grouped layer of patty plates and as a nontouching cover for butter patties of a grouped layer immediately below whose erect hinged flanges support the sheet on which the upper group rests.

The concern of this invention centers on the mechanical production of steps (4) and (5) above, so that said grouped plates with the erected flanges are in position to receive butter pats and then be stacked and packed for shipment. To accomplish these two steps, three major problems are involved:

(A) To reduce the dimension of the center-to-center positions of adjacently aligned flat blanks of paperboard by approximately 75% less for the blanks adjacently aligned with their four wing sections in erected position.

(B) To convert the wing sections from a horizontal to a vertical plane.

(C) To maintain the reduced center-to-center alignment of the blanks with the vertically converted wing sec-

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tions in adjacent relationship during the placement and packaging of the butter patty so the combined elements become the completed butter patty-holding plate as defined in copending application, Serial No. 329,000.

The necessity of producing items (4) and (5) by mechanical means becomes obvious when one considers the quantitative logistics of the numbers and movements involved. For example, the copending application illustrates 40 butter patty-holding plates grouped together, with four flanges on each plate in erect and mutually self-supporting relationship. It is necessary, then, to erect and hold in erected position 160 side flanges and then group and hold together in grouped relationship against the bending resistance of the paperboard 40 side-erected plates ready to receive placement of butter pats. To do this by manual means would produce costs that would make the packaging methods and structure of the copending application commercially prohibitive.

It is, therefore, both the general and specific object of this invention to mechanize steps Nos. 4 and 5 of the aforesaid copending application, Serial No. 329,000.

It is a specific object of the invention to reduce the center-to-center positions of adjacently aligned blanks of paperboard.

A further specific object is to convert to an erected position the outer sides of said blanks while reducing the center-position alignments.

Another specific object is to maintain the converted blanks in aligned position to receive and hold for shipment the plated butter patty described in copending application Serial No. 329,000.

A general object of the invention is to provide a machine and method for handling butter patty plates equipped with upstanding, wing-like flanges, the machine being operative to convert these from an essentially planar condition into a final condition wherein the flanges upstand and further wherein the plates are self-supported within a crate-like holder.

Other objects and advantages of the invention may be seen from the details of construction and operation set down in this specification.

The invention is described in conjunction with an illustrative embodiment in the accompanying drawing, in which—

FIG. 1 is a fragmentary side elevational view, partially in section, of the inventive machine;

FIG. 2 is a sectional view (in fragmentary form) taken along the sight line 2—2 applied to FIG. 1;

FIG. 3 is a fragmentary sectional view taken along the line 3—3 of FIG. 1;

FIG. 4 is a fragmentary sectional view (essentially plan) taken along the line 4—4 of FIG. 1;

FIG. 5 is a top plan view of the crate-like holder employed in conjunction with the machine of the preceding views;

FIGS. 6 and 7 are, respectively, side and front elevational views of the holder of FIG. 5; and

FIG. 8 is a schematic flow diagram showing the various operations performed in developing a package unit of butter patties.

Referring now to FIGS. 5–7, the numeral 10 designates generally the crate-like holder which, as illustrated, is equipped with 40 pockets defined by five transverse rows of eight pockets each. The holder 10 is adapted to receive the plates P which, before insertion, have the form seen in FIG. 4. The generally square center or base is equipped along its four sides with outstanding wings or flanges W. Ultimately, these are folded into upstanding relation relative to the base to provide mutual support and also protection for the surface-decorated butter patty positioned on the plate. Further details of this can be

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seen in the above-mentioned Leo Peters application, Serial No. 329,000.

Still referring to FIG. 5, it will be seen that the holder 10 includes a generally rectangular perimetric frame 11 defined by front and rear walls 12, along with interconnected side walls 13. Each side wall 13 is equipped with a cam roller or follower 14 employed for advancing the holder along a loading path in the machine seen in the other sheets of the drawing.

The already-mentioned pockets 17 which receive individual plates P are defined by fore and aft divider walls 15 and transverse walls 16, each of which is relatively thin, being constructed of metal of the order of 0.010" thick.

#### Operation generally

The operation generally can be appreciated from a consideration of FIG. 2, where the numeral 18 designates a horizontally disposed guide platform along which the holder 10 moves during the loading operation. The platform 18 is provided as part of a frame generally designated 19 and which is shown in fragmentary form in various parts of FIGS. 1-4. In general, the frame 19 is rectangular, including upstanding posts as at 19a in FIG. 3. Referring again to FIGS. 2 and 4, the numeral 20 designates spiral cams which cooperate with the followers 14 to advance the holders 10 under two transverse rows of magazines 21 and 22. As can be seen from FIG. 4, the rows of magazines 21 and 22 are spaced apart covering alternate rows over holder 10. The alternate spacing of the magazines enables plates P as seen in planar wide-spaced relationship in FIG. 4 to be realigned in erected reduced space relationship in holder 10, as shown in FIG. 5. FIGS. 2 and 4 show the planar relationship of plates P with extended wing sections to the area into which they are pulled in holder 10. To fit into holder 10, plates P can only do so with their wing sections erect. Erection of the wing sections takes place as the plates are pulled into the holder pockets. As can be seen from FIGS. 1 and 4, the row of magazines 21 is first encountered by the holders 10 as they advance along the path provided by the platform 18, and then magazines 22 are encountered. Each magazine is made up of four upstanding posts (see FIG. 4 at M).

Referring again to FIG. 2, the numeral 23 designates a suction cup which is seen in a position just below the magazines in the first row 21.

In operation, the suction cups 23 are vertically reciprocated in order to withdraw the lowermost plate P from each magazine and pull it into its juxtaposed or associated pocket 17. Thereupon, vacuum is released, the suction cup 23 further retracted, and the holder 10 advanced by virtue of the cooperation of the followers 14 and the spiral cams 20.

#### Plate removal mechanism

Under this heading, I describe in greater detail the means for reciprocating the suction cups 23, and reference to FIGS. 1 and 2 reveals that a subframe generally designated 24 is provided for the purpose of performing this reciprocation. The subframe 24 rigidly carries pipes 25 and 26. The pipes 25 upstand for coaction with the first row of magazines 21, and the pipes 26 are associated with the second row of magazines 22 (see particularly FIG. 1).

In FIG. 1, the numeral 27 designates a cam follower which is rotatably supported on the subframe 24 (approximately center of the showing in FIG. 1) which engages a ring cam 28. The ring cam 28 is equipped with a cam groove 29 serving to move the subframe 24 vertically. The lower position of the subframe 24 is seen in dashed line and designated 24'. In similar fashion, the lower position of the suction cups is shown in dashed line and designated 23', while the lower position of the cam follower roller is designated 27'.

For rotating the cam 28, a main power shaft 30 is

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provided (still referring to FIG. 1) which is seen to be coupled to the cam 28 by means of a key 31). The shaft 30 is carried by the frame, more particularly by an entering end bearing as at 32. A second bearing, adjacent the leaving end of the machine, is designated 33 and this also is carried by the frame. The subframe 24 is centrally apertured as at 24a to extend around bearing 33.

For the purpose of driving the shaft 30, a sprocket 34 is fixed thereto (see the center left-hand portion of FIG. 1) and the drive sprocket 34 in turn is rotated by a chain 35 coupled to a motor (not shown).

The numeral 36 designates capscrews (see particularly the extreme center right-hand portion of FIG. 1) which secure the pipes positionably in place within the subframe 24. The numerals 37 and 38 are associated with the pipes 25 and 26 for coupling the same to a source of vacuum (not shown).

Still considering the pipes 25 and 26, it will be seen that the subframe 24 is guided by means of the pipes, this being done by upper and lower pipe guides 39 and 40, respectively, associated with the pipes 25. It will be appreciated that in the illustration given, four pipes 25 are provided—one for each of the magazines 21.

Still concerning the reciprocating mechanism, it will be seen that the numeral 41 refers to a cam (see the right-hand portion of FIG. 1) which is fixed to the shaft 30 and which coacts with a timer 42 in applying or connecting the vacuum to the flexible hoses 37 and 38. Still referring to FIG. 1, the numeral 43 designates a guide rail associated with the platform 18 for engagement with the holder flanges 44 during the advance of the holder 10 by the spiral cams 20.

#### Holder-advancing mechanism

Referring now particularly to FIG. 4, the numeral 45 (see the upper and lower right-hand portions) designates journals for the spiral cams 20. The journals 45 are rotatably carried in bearings 46 associated with the leaving end of the machine and suitably secured to the frame 19. Bearings 47 are provided at the entering end of the machine for the spiral cams 20.

The spiral cams are driven by a chain drive which can be best seen in FIG. 3, wherein the chain drive is generally designated 48 and is seen to be entrained on a sprocket 49 carried by the shaft 30. The numeral 50 designates idler sprockets suitably carried by the frame 19 and about which the chain 48 is entrained. The numeral 51 designates a sprocket for the left-hand spiral cam in FIG. 3, while the numeral 52 designates a sprocket for the right-hand spiral cam 20 (as seen in FIG. 3). It will be noted that the sprocket 51 is provided as part of the associated spiral cam 20—being coaxial therewith—while the right-hand sprocket 52 is carried by an idler shaft 53 (see also FIG. 1). The idler shaft 53 also carries a gear 54 which coacts with a spur gear 55 coaxially related to the right-hand spiral cam 20. In this fashion, the two cams are caused to rotate in opposite directions, as indicated by the arrows in FIGS. 3 and 4. The need for this will be brought out shortly hereinafter.

Still referring to FIG. 3, the numeral 56 designates other idler sprockets suitably rotatably mounted on the frame 19, while the numeral 56a designates a take-up sprocket suitably positionably mounted on the frame 19.

The numeral 57 (see FIG. 2) designates a way or groove carried by each spiral cam 20, and reference to FIG. 4 reveals that the groove generally designated 57 includes in each convolution a transverse portion as at 58. Thus, when the followers 14 are in the portion 58, the holders 10 are stationary relative to longitudinal movement on the machine. Each revolution of the cams 20 thus includes a portion wherein the holders are stationary and a portion wherein they are advanced longitudinally of the machine. The numerals 59, 60 and 61 designate portions of the way 57 wherein the pitch is greater so as to develop faster movement of the holders 10. The cam

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followers 14 are taken up by the portion 59 of the way 57 and rapidly advanced under the first row of magazines 21. Thereafter they are stepped intermittently five times to receive five series of plates P. Thereafter, the holders are advanced relatively rapidly by the faster pitch portion 60 until each holder is positioned under the second row of magazines 22. Again, there is a five-step operation until the portion 61 of the way 57 takes over and moves a particular holder to discharge position.

It will be further noted that the magazines in the two rows are transversely offset in order to afford ample space for the wings W which ultimately are folded into upstanding relation with the bases of the plates P.

#### Operation

The crates 10 are advanced along the table 18 until the rollers 14 are engaged by the longitudinal spiral cam 20. Thereafter the subframe 24, which is synchronized with the cams 20 by virtue of being driven from the same shaft 30, operates to move the suction cups 23 into contact with the lowermost plate P in each magazine in the first row 21. The vacuum heads are then energized by means of the timer 42 to engage the lowermost plate and draw the same downwardly into the associated pocket 17. As the plate moves downward into pocket 17, its flanges are forced upward into erected position. Thereafter, the holder 10 is stepped ahead until the second transverse row of pockets is under the magazines 21 and the subframe 24 is again reciprocated to draw four more plates into associated pockets. This is continued until all five rows are filled in alternate positions—in FIG. 5, the positions designated P<sub>1</sub>, P<sub>3</sub>, P<sub>5</sub> and P<sub>7</sub>.

Thereafter, the tray is advanced to a position under the second row of magazines 22 and stepped five times to fill the positions designated P<sub>2</sub>, P<sub>4</sub>, P<sub>6</sub> and P<sub>8</sub> (see FIG. 5).

In order to insure that no plates are withdrawn inadvertently, the frame is provided with microswitches as at 62 and 63 actuated by the holders 10 as each holder approaches the magazines 21 and 22, respectively.

Further aiding in the removal of plates P from the various magazines is a vibrator mechanism including pads 64 and 65 of resilient material interposed under the magazines 21 and 22, respectively. These are energized by air-actuated vibrators 66 and 67 (see FIG. 1).

Referring now to FIG. 8, the sequence of steps employed in developing a final product is set down in schematic form. First, the plates are processed through a creaser wherein the wing-like flanges are folded slightly to facilitate later folding in the machine seen in FIGS. 1-4. They are then delivered to the magazine associated with the crate loader, i.e., the machine detailed herein, after which the holders 10 are removed to a chip loader. Previous to that, chips or pats of butter have been provided in molded sheets, as shown more fully in the copending application of Leo Peters and Albert P. Burke, Serial No. 308,785, filed September 13, 1963, now abandoned.

After the butter patties are positioned in the holders 10, more particularly, the plates P supported by the holders 10, the plates are ejected into paperboard trays to provide a product of the nature shown in the copending Leo Peters application, Serial No. 329,000.

The inventive machine is seen to provide magazines having four upstanding posts (see particularly FIG. 4) wherein the magazine does not disturb the pre-breaking or creasing of the wings W. In this connection, there is no disturbing the residual fight existing between the wing and the base of each plate P, so that when the plate is pulled into the pocket 17 of the holder 10, the plate is enabled to support itself by engagement with the thin walls 15 and 16 of holder 10.

While in the foregoing specification a detailed description of an embodiment of the invention has been set down for the purpose of illustration, many variations in the details herein given may be made by those skilled in the

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art without departing from the spirit and scope of the invention.

I claim:

1. Apparatus for assembling perimetric wing flange-equipped butter patty plates, comprising:

- a frame providing a generally horizontally-extending guide,
- a grill-like holder slidably mounted on said guide, said holder being equipped with a plurality of generally square, thin-walled pockets adapted to receive individual plates, with the perimetric flanges thereof upstanding,
- a plurality of magazines positioned above said guide for dispensing said plates into said pockets,
- a suction head positioned below each magazine for drawing said flanges into upstanding position and then moving said plates into said pockets, and
- means for advancing said holder and reciprocating said suction heads in synchronism.

2. Apparatus for assembling perimetric wing flange-equipped butter patty plates from an enlarged to a reduced center-to-center aligned relationship, comprising:

- a frame providing a generally horizontally-extending guide,
- a grill-like holder slidably mounted on said guide, said holder being equipped with a plurality of generally square, thin-walled pockets adapted to receive individual plates, with the perimetric flanges thereof upstanding,
- a plurality of magazines positioned above said guide for dispensing said plates into said pockets, said magazines being arranged in two alternate stages along the length of said guide, said advancing means including cam means for indexing each holder between stages at a faster speed than when indexing each holder below a given magazine,
- a suction head positioned below each magazine for drawing said flanges into upstanding position and then moving said plates into said pockets, and
- means for advancing said holder and reciprocating said suction heads in synchronism.

3. Apparatus for assembling perimetric wing flange-equipped butter patty plates in a reduced center-to-center aligned relationship, comprising:

- a frame providing a generally horizontally-extending guide,
- a grill-like holder slidably mounted on said guide, said holder being equipped with a plurality of generally square, thin-walled pockets adapted to receive individual plates, with the perimetric flanges thereof upstanding,
- a plurality of magazines positioned above said guide for dispensing said plates into said pockets, said advancing means including a spirally grooved cam, each holder being equipped with a cam follower riding in said cam groove,
- a suction head positioned below each magazine for drawing said flanges into upstanding position and then moving said plates into said pockets, and
- means for advancing said holder and reciprocating said suction heads in synchronism.

4. Apparatus for assembling perimetric wing flange-equipped butter patty plates, comprising:

- a frame providing a generally horizontally-extending guide,
- a grill-like holder slidably mounted on said guide, said holder being equipped with a plurality of generally square, thin-walled pockets adapted to receive individual plates, with the perimetric flanges thereof upstanding,
- a plurality of magazines positioned above said guide for dispensing said plates into said pockets, said magazines being arranged in at least two rows, with each row extending transversely of the length of said guide, the magazines in each row being spaced apart

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to introduce plates into alternate transverse pockets of said holder,

a suction head positioned below each magazine for moving said plates into said pockets, and  
means for advancing said holder and reciprocating said suction heads in synchronism.

5. Apparatus for assembling perimetric wing flange-equipped butter patty plates from a planar center-to-center aligned relationship to a flanges-upstanding center-to-center aligned relationship, comprising:

a frame providing a generally horizontally-extending guide,

a grill-like holder slidably mounted on said guide, said holder being equipped with a plurality of generally square, thin-walled pockets adapted to receive individual plates, with the perimetric flanges thereof upstanding,

a plurality of magazines positioned above said guide for dispensing said plates into said pockets, each magazine being equipped with four spaced-apart posts defining generally the corners of a square to center and confine the wing flanges of said plates for coaction with the associated suction head,

a suction head positioned below each magazine for drawing said flanges into upstanding position by moving said plates into said pockets, and  
means for advancing said holder and reciprocating said suction heads in synchronism.

6. Apparatus for assembling perimetric wing flange-equipped butter patty plates, comprising:

a frame providing a generally horizontally-extending guide,

a grill-like holder slidably mounted on said guide, said holder being equipped with a plurality of generally square, thin-walled pockets adapted to receive indi-

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vidual plates, with the perimetric flanges thereof upstanding,

a plurality of magazines positioned above said guide for dispensing said plates into said pockets, each magazine being resiliently mounted on said frame, vibrator means on said frame for compacting the plates in each magazine,

a suction head positioned below each magazine for drawing said flanges into upstanding position by moving said plates into said pockets, and  
means for advancing said holder and reciprocating said suction heads in synchronism.

7. A method of handling perimetric wing flange-equipped butter patty plates constructed of paper, or the like, wherein each plate is generally square with the wing flanges defined by lines of weakness in said plate, comprising:

initially flexing the wing flanges to reduce bending resistance thereof, and

introducing said plates into a crate-like holder having an open-topped, open bottomed pocket for each plate while bending said flanges to provide support for each plate solely by the engagement of its wing flanges with the pocket walls.

8. The method of claim 7 in which said pockets are arranged in a plurality of rows and in which said plates are introduced simultaneously only into alternate pockets in each row.

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