United States Patent [19]

Vedvik

[11] **3,815,319**

[45] **June 11, 1974**

[54] **MEANS AND METHOD FOR UNFOLDING BACON BOARD FLAPS AND THE LIKE**

[75] Inventor: **Andrew H. Vedvik,** Madison, Wis.

[73] Assignee: **Oscar Mayer & Co., Inc.,** Madison, Wis.

[22] Filed: **Mar. 21, 1973**

[21] Appl. No.: **343,346**

[52] **U.S. Cl.**..... **53/29,** 53/183, 53/381 R, 53/DIG. 1

[51] **Int. Cl.**..... **B65b 43/42**

[58] **Field of Search**..... 53/29, 381 R, DIG. 1, 386, 53/382, 183, 74

[56] **References Cited**

UNITED STATES PATENTS

2,907,152 10/1959 Hensgen et al. ..... 53/74 X

3,455,083 7/1969 Rehg..... 53/74

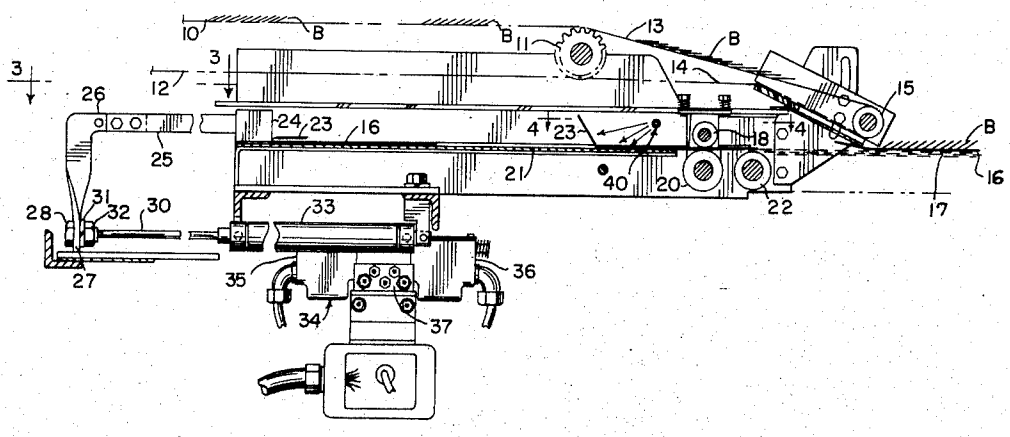
Primary Examiner—Frank T. Yost

Attorney, Agent, or Firm—Lockwood, Dewey, Zickert & Alex

[57] **ABSTRACT**

Apparatus and method for delivering predetermined quantities of product, e.g. sliced bacon in shingled condition, onto an awaiting support, e.g. a bacon board, including means and method utilizing jets of air for unfolding a trailing flap on each bacon board.

10 Claims, 5 Drawing Figures



PATENTED JUN 11 1974

SHEET 1 OF 2

3,815,319

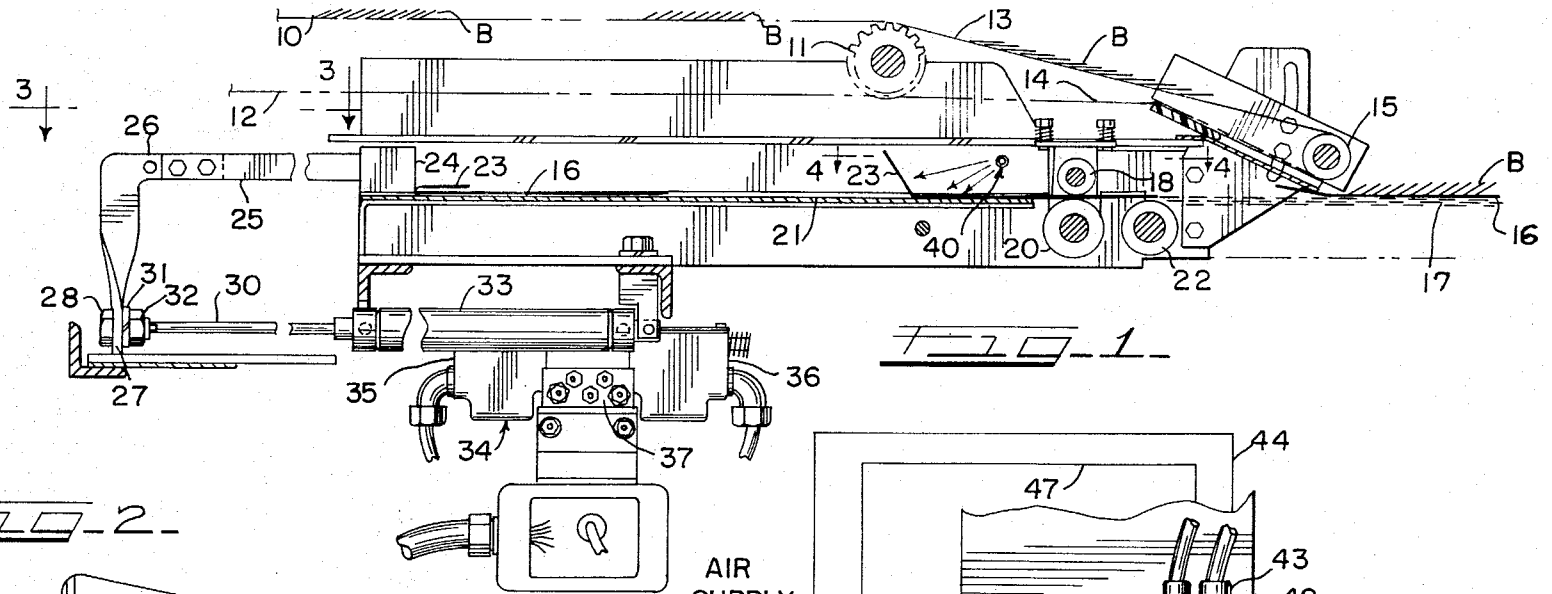
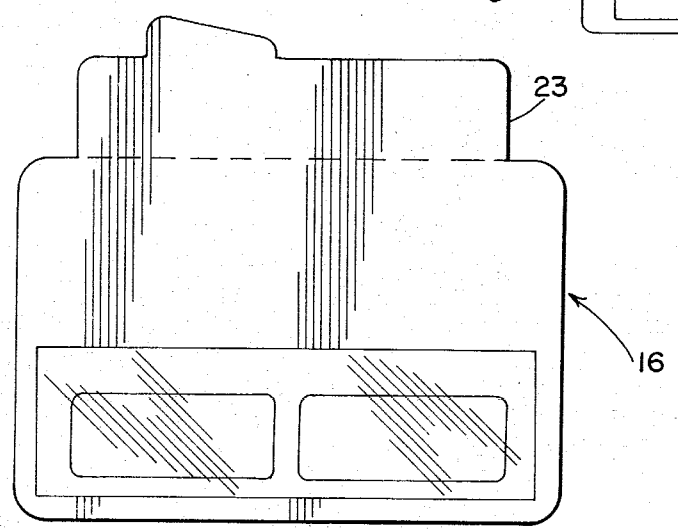


FIG. 1

FIG. 2



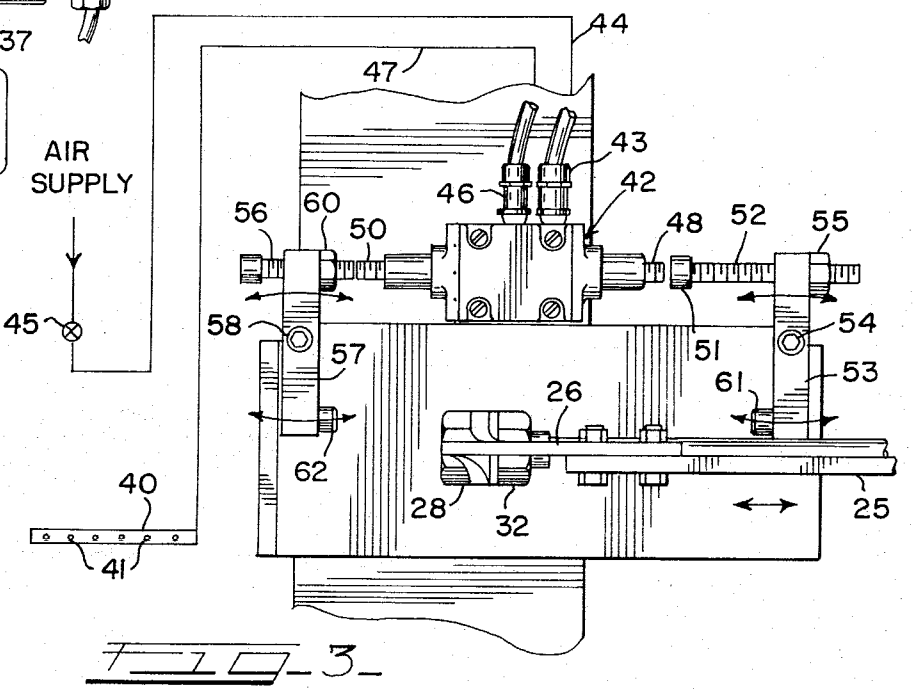


FIG. 3

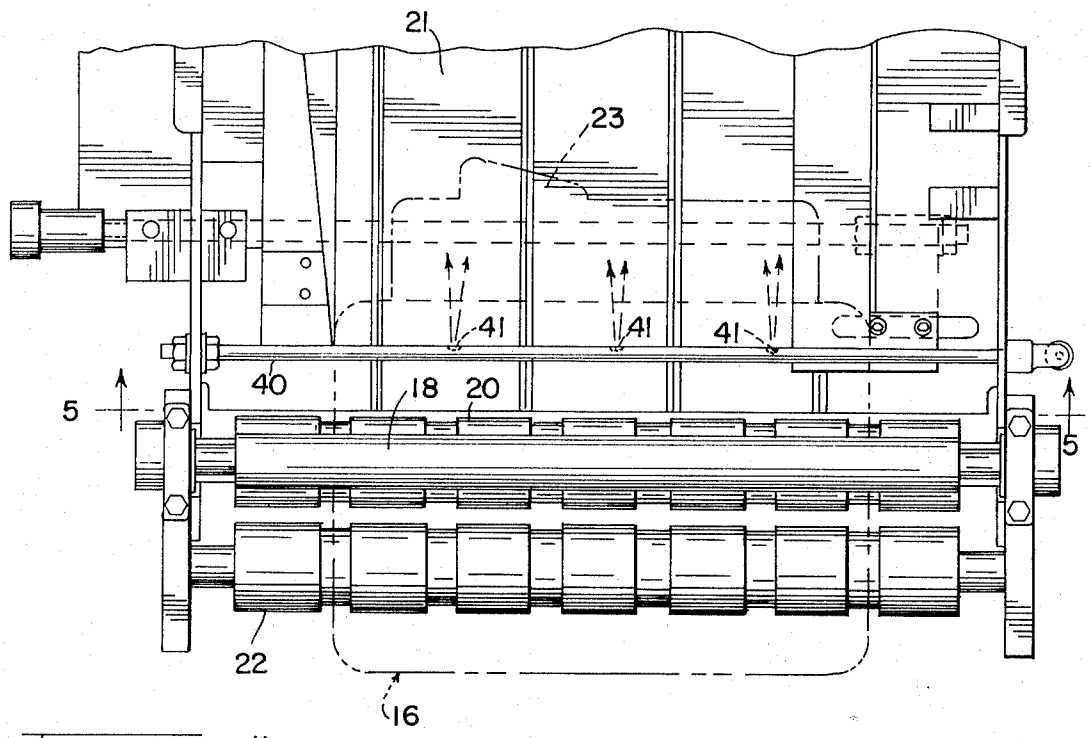


FIG. 4

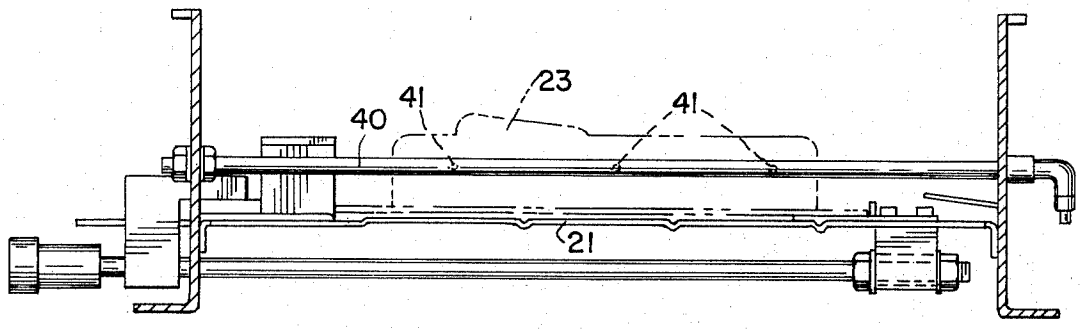


FIG. 5

MEANS AND METHOD FOR UNFOLDING BACON BOARD FLAPS AND THE LIKE

This invention relates generally to innovations and improvements in methods and apparatus or machines for repetitively depositing predetermined quantities of a product, specifically sliced bacon in shingled condition, onto an awaiting support, specifically a so-called bacon board, including improved means and method for unfolding a flap on the trailing end of each bacon board or the like as the same is fed to position for receiving the product. Apparatus and method of this general type are disclosed for example in Marshall et al U.S. Pat. No. 3,405,504 dated Oct. 15, 1968 and Marshall U.S. Pat. No. 3,452,504 dated July 1, 1969. Such apparatus and machines are commercially available and in use employing such methods for conveying and depositing sliced bacon in shingled condition in predetermined quantities (e.g. one half pound, 1 pound, 2 pounds) onto so-called bacon boards for further packaging such as insertion in folding outer cartons or enclosure in evacuated and hermetically sealed envelops of suitable film. Apparatus and machines of the type illustrated in U.S. Pat. No. 3,452,504 operate to feed bacon boards from a stack and to automatically open the folded-over flaps thereon as the same as transferred or advanced into position to receive the deposits of sliced bacon.

However, such prior apparatus and methods have been found unsatisfactory for handling bacon boards of a new type wherein the bacon boards or cards are formed of relatively thin and quite flexible sheet material and the lead ends are provided with relatively large cut-out window areas making the same relatively flimsy.

The object of this invention, generally stated, is the improvement in apparatus and method of the type described which are capable of feeding bacon boards from a supply stack to a station for receiving deposits of sliced bacon in shingled condition, of the mechanism for and method of unfolding the end flaps of the bacon boards thereof as they are being fed or advanced into bacon-receiving position.

An important object of the invention is an improvement of the nature described which may readily be incorporated in and practiced with existing machines and apparatus so as to render them suitable for handling bacon boards of the type formed of thin flexible sheet material which may have relatively large window areas in the lead ends and flaps at the trailing ends which need to be unfolded as the bacon boards are fed or transferred into bacon-receiving position.

A further important object of the invention is the provision of an improved bacon board flap unfolding means and method which utilize jets or streams of air from a superposed transversely extending air discharge pipe with the air pipe itself serving as an end flap engaging element as the flaps pass underneath.

Certain other objects of the invention will be apparent from the following detailed description of the invention.

For a complete understanding of the nature and scope of the invention reference may now be had to the following detailed description of a presently preferred embodiment thereof shown and illustrated in the accompanying drawings, wherein:

FIG. 1 is a side elevational view, partly diagrammatic, with certain parts in vertical section, of an apparatus for repetitively delivering predetermined quantities of sliced bacon in shingled condition onto previously positioned bacon boards having had their trailing end flaps unfolded by air jets as they are fed;

FIG. 2 is a plan view of a bacon board of the type that the apparatus shown in FIG. 1 is particularly suited to handle, the hinged flap of the bacon board being shown unfolded;

FIG. 3 is a partially diagrammatic plan view taken on line 3—3 of FIG. 1 of the control valve for releasing controlled jets of air to an air pipe of the apparatus shown in FIG. 1, including the actuating mechanism for the air control valve;

FIG. 4 is a fragmentary detailed plan view to enlarged scale on line 4—4 of FIG. 1 showing the bacon board feed rolls and a bacon board in phantom outline being fed therethrough; and,

FIG. 5 is a vertical sectional view partly in elevation taken on line 5—5 of FIG. 4.

Referring to FIG. 1, the upper run of a bacon conveyor is indicated diagrammatically at 10 which passes over a drive roller 11, the lower or return run of the conveyor being indicated at 12. Spaced portions or increments of sliced bacon in shingled condition are indicated at B—B resting on the upper run 10. Each of these quantities B of sliced bacon is transferred to the upper downwardly inclined run 13 of a second in-line conveyor the lower return run of which is indicated at 14. The conveyor runs 12 and 13, like the conveyor runs 10 and 11 are of known construction comprising spaced parallel endless ribbons which run over the roller 11 at their upper ends and over a roller 15 at their lower ends.

The conveyors which include runs 10–11 and 12–13 are of known construction and serve to repetitively discharge the increments B of sliced bacon in shingled condition onto each bacon board 16 after it is fed or transferred to a bacon receiving position under the discharge end of the downwardly inclined upper run 13. The bacon-receiving position as shown is the head end of a diagrammatically indicated upper conveyor run 17 which removes the bacon boards 16 loaded with increments B of bacon for packaging.

The mechanism for feeding or advancing a bacon board 16 onto the conveyor 17 under the lower discharge end of the conveyor run 13 in between the time a bacon board with bacon on it is removed and the next increment B of bacon drops is generally known and includes a set of upper and lower pinch rollers 18 and 20, respectively. The horizontal bight between the rollers 18 and 20 is on approximately the same level as the upper run 17 of the conveyor which removes the loaded bacon boards and the support shelf 21 on which the bacon boards 16 are fed and advanced. The upper run 17 of the removing conveyor passes up over a conveyor support roller 22 in known manner.

The bacon boards 16 are delivered or transferred onto the left hand or receiving end of the shelf or platform 21 in known manner such as by a transferring mechanism of the type shown and described in the above-mentioned Marshall et al U.S. Pat. No. 3,405,504. As fed or transferred onto the shelf 21 the fold-over flaps 23 on the bacon boards 16 will be folded flatwise down on the main bacon-supporting area of the board as shown in FIG. 1, this being the condition in which the boards are stacked. A pusher bar 24 carried on a reciprocating arm 25 slides on the top surface of

the shelf **21** and engages the trailing folded end of each bacon board **16** as shown in FIG. **1** and pushes the same toward and into the feed and pinch rollers **18** and **20** in known manner. The horizontal arm **25** which carries the pusher bar **24** is mounted on the upper horizontal leg **26** of a right angle member the verticle leg of which is twisted 90° at its lower end **27** so that it can be conveniently clamped between the hex head **28** on the distal end of a piston rod **30** and a lock washer **31** which is compressed by a lock nut **32.**

The piston rod **30** is reciprocated by a double-acting air cylinder **33** actuated and controlled in known manner by double solenoid-operated five-port air valve unit indicated at **34** of known commercially available type. This includes a pusher-reverse solenoid **35,** a pusher-advance solenoid **36** and a five-port air valve **37.** It will be understood that the mechanism **34** operates in known manner to alternately advance the pusher bar **24** by moving it to the right so that the leading end of a bacon board **16** is delivered into the bight of the feed rollers **18–20.** Then the pusher bar **24** retracts into position to have another bacon board **16** transferred onto the shelf **21** in front of it.

It will be appreciated and understood that the apparatus and mechanism described above operates in timed relationship and in a conventional known manner and does not form the novel subject matter of the present invention. Rather, the present invention is specifically directed to the mechanism and method that operates to lift or unfold each flap **23** on a bacon board **16** as it is fed and advanced by the feed rollers **18–20.** In FIG. **1** this novel mechanism includes an air pipe **40** which is mounted above the shelf **21** and extends parallel to the bight between the rollers **18–20.**

The air pipe **40** has a plurality of air outlet holes **41—41** formed therein and oriented at approximately the 8 o'clock position as viewed in FIG. **1.** As jets or streams of air are discharged through the ports or holes **41,** they are directed as generally indicated by the arrows in FIG. **1** downwardly and rearwardly onto each of the bacon boards **16.**

It will be seen that the air from the air pipe **40** impinges each bacon board **16** under each of the folded down flaps **23** and serves to unfold and turn it rearwardly, maintaining it in this position until each flap **23** passes underneath the air pipe **40** itself. Preferably, the air pipe is positioned low enough to be engaged by each up-turned flap **23** as it passes thereunder. After the upper end of a flap **23** clears the underside of the air pipe **40,** it will not thereafter have a chance to become folded down on the main portion of a bacon board **16.** As each flap **23** passes between the bight between the rollers **18** and **20,** it is sufficiently pressed down at the fold or score line so that it does not return to its original folded-over position.

In one successful installation and operation, the air pipe **40** was formed of stainless steel with an outside diameter of one-fourth inch. The pipe was 15 ⅜ inches long and had **3** outlet holes or ports **41** therein spaced on 3 inch centers. These air holes were one-sixteenth inch in diameter and the center of the air pipe **40** was located twenty-nine thirty-seconds inch above the shelf **21** and 2 inches reawardly from the bight between the feed rolls **18** and **20.** The line of holes or ports **41** was oriented at approximately 8 o'clock as viewed in FIG. **1.** Air under pressure was delivered to the air pipe **40** under the control of the off-on valve **42** (FIG. **3**). The valve **42** has an inlet connection **43** which is connected by an air line indicated diagrammatically at **44** to the discharge side of a pressure regulator **45** of known commercial type the inlet to which is connected to the plant air supply. The regulator **45** delivers air into line **44** which is connected to connection **43** of valve **42.** The discharge port or outlet port **46** of the valve **42** is connected by a line indicated at **47** to the air pipe **40.**

Regulator **45** delivers air into line **44** at an adjusted pressure sufficient to lift the flap **23** of each on-coming bacon board **16** to a vertical position which keeps air consumption and noise to a practical minimum. The length of time the air is on during each cycle of operation is determined by adjustment of the air-on projection **48** extending from one side of the control valve **42** and the speed of the pusher bar **25** in advancing and retracting. However, the air is on only momentarily. The length of time the air to pipe **40** is off is the difference between the total cycle time and the time the air is on, the total cycle time being determined by the speed of the conveyor runs **10–11** and **12–13** and the spacing between portions of sliced bacon.

The control valve **42** has an air-off projection **50** extending from the side opposite air-on projection **48.** The projection **48** is engaged by the head **51** on a screw **52** which extends through a threaded opening therefor in a rock lever **53** pivotally mounted at **54** intermediate its opposite ends. The position of the cap head **51** is fixed by tightening the lock nut **55** in known manner.

The air-off projection **50** is engaged by the end of a screw **56** threaded through the upper end of a rock lever **57** pivotally mounted as indicated at **58.** A lock nut **60** serves to fix the screw **56** in the desired adjusted position.

The rock lever **53** carries on its lower end, on the side thereof facing the valve **42** a button **61** which is positioned to be engaged by the lock nut **32** as the piston rod **30** moves inwardly during the feed stroke of the cross bar **24** engaging and shoving a bacon board **16** into the bight between feed rolls **18–20.** Similarly, the rock lever **57** carries a button **62** positioned to be engaged by the hex head **28** on the piston rod **30** as the piston rod moves outwardly during the retraction of the pushbar **24.** Accordingly, it will be seen that each time the piston rod **30** reciprocates the valve **42** is actuated, first to turn the air on by having the cap screw head **51** engage the air-on projection **48** and then to turn the air off when the end of the screw **56** engages the air-off projection **50** on retraction of the push bar **24.**

It will be seen that by properly positioning the screws **52** and **56** adjustment can be made for the air to be turned on and delivered to the air pipe **40** at the desired position of the push bar **24** and to remain on for the desired period before being turned off.

What is claimed is:

1. In apparatus for depositing predetermined quantities of sliced bacon in shingled condition on bacon boards having hinged flaps, said apparatus including conveyor means for depositing predetermined quantities of sliced bacon in shingled condition in a predetermined position on a support surface and bacon board feeding means for delivering said bacon boards with their said flaps folded to said predetermined position on said support surface so that each bacon board receives one of said predetermined quantities of sliced

bacon thereon, said bacon board feeding means including bacon board advancing means delivering said bacon boards oriented with said flaps trailing into bacon board gripping and feeding roller means operating to transfer said bacon boards from said advancing means to said support surface, the improvement comprising: an air pipe disposed above said bacon board advancing means upstream of said bacon board gripping and feeding roller means, conduit means for delivering air under pressure into said air pipe, said air pipe extending crosswise to the direction in which said bacon boards are advanced and having at least one air outlet aperture therein oriented to discharge at least one stream of air onto said bacon boards in a direction opposite to that in which said bacon boards are advanced so as to unfold said hinged flap on each bacon board as it is being transferred by said bacon board gripping and feeding roller means.

2. In the apparatus of claim **1** said support surface being the upper run of a conveyor on approximately the same level as the horizontal bight between said bacon board gripping and feeding roller means, and said bacon board feeding means including a bacon board supporting shelf approximately level with said bight.

3. In the improvement called for in claim **1** said air pipe extending approximately parallel to the bight between said bacon board gripping and feeding roller means and having a plurality of air outlet apertures therein.

4. In the improvement called for in claim **1** said bacon board advancing means including a support shelf on which said bacon boards are supported as they are advanced and said air pipe being mounted above said support shelf and extending approximately parallel to the bight between said bacon board gripping and feeding roller means and having a plurality of air outlet apertures therein.

5. In apparatus for depositing predetermined quantities of sliced bacon in shingled condition or bacon boards each having a hinged flap, said apparatus including conveyor means for depositing predetermined quantities of sliced bacon in shingled condition on bacon boards pre-positioned on a support surface station and bacon board feeding means for delivering said bacon boards with their said flaps folded to said support surface station whereat each bacon board receives one of said predetermined quantities of sliced bacon thereon, said bacon board feeding means including bacon board advancing means operating to deliver said bacon boards oriented with said flaps trailing into the horizontal bight between a set of upper and lower bacon boarding gripping and feeding rollers operating to transfer said bacon boards from said advancing means to said support surface station, and said bacon board advancing means including a shelf, a pusher bar for shoving said bacon boards one-by-one into said rollers and reciprocating means for advancing and retracting said pusher bar, the improvement which comprises: an air pipe disposed above said shelf with its axis approximately parallel to said bight and having a plurality of aligned air outlet holes therein for discharging jets of air downwardly onto said bacon boards in a direction opposite to their direction of advance on said shelf so as to unfold the flap hinged on each bacon board as it is being transferred by said rollers, conduit means for delivering compressed air into said air pipe from a source of supply, and off-on control valve means in said conduit means operatively interconnected with said reciprocating means so as to be actuated thereby to the ON condition during advancement of said pusher bar and actuated to the OFF condition on each retraction thereof.

6. In the method of depositing predetermined quantities of sliced bacon in shingled condition on bacon boards each having a flap hinged thereon wherein said bacon boards with said flaps folded down are removed from a stack and advanced along a supporting surface with said flaps trailing into the bight of gripping and feeding rollers by means of which they are delivered into a predetermined bacon-receiving station and wherein predetermined quantities of bacon in shingled condition are deposited on pre-positioned bacon boards in said bacon-receiving station, the improvement which comprises, impinging at least one jet of air onto each bacon board as it is advanced along said supporting surface so as to flow under the folded down flap thereon and lift the same.

7. The improvement called for in claim **6** wherein there is a plurality of said air jets impinging on each bacon board.

8. The improvement called for in claim **6** wherein after each of said flaps has been lifted by action of said jet or jets of air, said flaps are engaged by an air pipe from which said air jet or jets issue and thereby turned rearwardly in respect to the direction of advance of said bacon boards.

9. The improvement called for in claim **6** wherein each said jet of air comes on shortly after the leading edge of a bacon board enters said bight.

10. The improvement called for in claim **9** wherein each said jet is turned off approximately as each flap passes under said air pipe.

* * * * *