Title: AUTOMATED LOADER WITH CONE HORN

Abstract: An improved automated loader has a cone horn to prevent or minimize contact between the chicken and the bag. The loader has a loading tube and the tube has a cone horn comprising a plurality of plates configured to form a cone, each one of the plurality of plates attached to the proximal end of the loading tube by a spring-loaded hinge, each hinge biased radially inward.
AUTOMATED LOADER WITH CONE HORN

PRIORITY


BACKGROUND OF THE INVENTION

[0002] The present invention relates generally to a device for loading material on an automated loader. The invention relates more specifically to a device for moving material into a bag, casing, or net, especially if there is a high coefficient of friction between the material to be loaded and the material of the bag, casing, or netting.

[0003] Many types of automated loaders are used to encase material in a bag. For example, the automated poultry loader described in United States Published Patent Application No. 2008/0022636 A1, *Two-in-One Bagger*, the disclosure of which is incorporated herein by reference, can be used to encase a whole dressed bird such as a chicken, turkey, or duck. A stack of bags are placed on a bag carriage and presented at the distal end of a pair of horns. A typical plastic bag 20, as shown in elevation view in Fig. 1, has a bottom panel 22 and a top panel 24, joined at three edges by heat, ultrasonic welding, or other means. Bottom panel 22 extends slightly farther than top sheet 24 due to extended portion 26. A perforation line 28 defines the
border between bottom panel 22 and extended portion 26. Plastic bag 20 is typically made of polyethylene film and may have three to ten percent ethylene vinyl acetate (EVA) as a stretch agent.

[0004] Two apertures 30 are punched in extended portion 26. For automated loading operations, a stack 32 of bags 20a, 20b, 20c, etc., is connected by a wicket 34, as shown in FIG. 2. In use, material such as a dressed chicken is loaded into top bag 20a and perforation line 28 separates, leaving the dressed chicken encased in bottom panel 22 and top panel 24. Extended portion 26 remains with stack 32 and is disposed of when stack 32 is depleted. Extended portion 26 is therefore waste.

[0005] In a conventional poultry loader as known in the prior art, an air nozzle initially opens the top bag 20a. Top bag 20a is pulled over the pair of horns, or the horns are inserted into top bag 20a. The horns are separated such as by rotation in a plane, to stretch top bag 20a open, or the horns are separated by axial rotation to stretch top bag 20a open. In either case, top bag 20a has to be opened enough to be pulled over the horns or to receive the horns.

[0006] A ram then pushes poultry, such as a whole dressed chicken, into stretched-open top bag 20a. The ram continues to push the chicken through the horns, in some cases using a hocker pusher like the one described in United States Patent No. 7,178,310, *Poly-stretch Bagger System with Hocking Pusher*, the disclosure of which is incorporated herein by reference. As the chicken is pushed through the horns, it pushes against the bottom of top bag 20a, causing it to come off the horns as well and collapse around the chicken.

[0007] When the chicken is pushed into top bag 20a by the ram, however, the chicken encounters plastic on the bottom and top and steel on two sides. There is a fairly high coefficient of friction between the skin of a dry, dressed chicken (or other poultry) and a plastic bag, made of
polyethylene or similar plastic. Accordingly, there is a tendency for the chicken to tear the bag as the ram pushes it into the bag, which slows production considerably. Chicken baggers could ameliorate the situation by bagging wet chicken, but consumers would not appreciate it. Consumers prefer to purchase dry chicken, so chicken baggers have a marketing incentive to bag the chickens in a dry state. Similar concerns apply to other material that is bagged in a similar manner.

[0008] The present invention addresses these and other deficiencies of the prior art.

SUMMARY OF THE INVENTION

[0009] An improved automated loader has a cone horn to prevent or minimize contact between the chicken and the bag. The loader has a loading tube and the tube has a cone horn comprising a plurality of plates configured to form a cone, each one of the plurality of plates attached to the proximal end of the loading tube by a spring-loaded hinge, each hinge biased radially inward.

A BRIEF DESCRIPTION OF THE DRAWINGS

[0010] The organization and manner of the structure and operation of the invention, together with further objects and advantages thereof, may best be understood by reference to the following description, taken in connection with the accompanying non-scale drawings, wherein like reference numerals identify like elements in which:

[0011] FIG. 1 is an elevation view of a plastic bag used in automated loading operations.
[0012] FIG. 2 is a perspective view of a stack of the plastic bags of FIG. 1.
[0013] FIG. 3 is a side perspective view of the loader of the preferred embodiment of the present invention.
[0014] FIG. 4 is another side perspective view of the loader of FIG. 3.
FIG. 5 a view of a dimpled steel as used in an embodiment of the invention.

FIGS. 6 and 7 are views of other dimpled steel as used in an embodiment of the invention.

FIG. 8 is a top plan view of the loading tube of the loader of FIG. 3.

FIG. 9 is a diagrammatic view of dual cylinder system of an embodiment of the present invention.

FIG. 10 is a diagrammatic front view of the dual cylinder system of FIG. 8.

FIG. 11 is a diagrammatic side view of a ram carriage and a portion of the loader tube as used in an embodiment of the present invention.
DETAILED DESCRIPTION OF THE ILLUSTRATED EMBODIMENTS

[0021] While the invention may be susceptible to embodiment in different toons, there is shown in the drawings, and herein will be described in detail specific embodiments with the understanding that the present disclosure is to be considered an exemplification of the principles of the invention, and is not intended to limit the invention to that as illustrated and described herein. The embodiments of the present invention will be described as part of a bag opener to be incorporated in an automated poultry loader. The present invention, however, can also be used on loaders for bagging and/or netting whole poultry, cut-up poultry, or whole muscle meat products, on other applications in which a material is enclosed in a casing, bag, or netting, such as sealants, adhesives, and explosives, or for any other application in which a bag must be opened in order to insert material to be bagged.

[0022] The preferred embodiment of the automated loader of the present invention is shown in elevation schematic view in FIGS. 3 and 4. Loader 40 comprises in pertinent part a frame 42, a loading tube 44, a dual cylinder ram system 46, a bag carriage assembly 48, and a cone horn 50.

[0023] Loading tube 44 is a hollow cylinder mounted to frame 42 and configured to receive a whole dressed chicken 60. Preferably, loading tube 44 is about 480 mm in diameter, in order to accommodate large birds such as turkeys. Loading tube 44 has a cutout 62 at its distal end 64, in order to receive poultry from the side, as by conveyor belt, roller tray, or other conveyance, or by manual placement.

[0024] Proximal end 66 of loading tube 44 is connected to cone horn 50. Cone horn 50 comprises a plurality of plates 70 forming a cone pointing away from loading tube 44. Preferably, there are three or more plates 70, but two can be used as well.

[0025] Plates 70 are connected to loading tube 44 by spring-loaded hinges 72 which are
biased radially inward. When pushed from inside loading tube 44, plates 70 spring outward: when pressure is released, plates 70 return to their inward position. Plates 70 are preferably formed so that, when in the biased position, they generally form the shape of a cone.

Accordingly, plates 70 are somewhat curved but can be flat as well.

[0026] Tube 44, plates 70, and hinges 72, are preferably made of stainless steel. Plates 70 are more preferably made of highly polished stainless steel, even more preferably dimpled, highly polished stainless steel, with the dimples or textures on the inner surface of plates 70. Preferably, the dimpled or textured stainless steel is diamond-shaped textured stainless steel, such as HS Item Number R813000041, available from McNichols Co., Tampa, Florida, or Teflon®WL, available from Mechanical Metals, Newtown, Pennsylvania. A representative diamond-shaped texture is shown schematically in FIG. 5. Other textures can be used as well, such as the ones shown, by way of example and not by way of limitation, in FIGS. 6 and 7. Preferably, all plates 70 have dimpled inner surfaces, but a cone horn 50 could have dimpled steel on fewer than all plates 70.

[0027] In another aspect of the invention, plates 70 are coated on the inner surface with a slippery synthetic substance. Most preferably, the substance is a thermoplastic polymer, preferably polytetrafluoroethylene, most preferably one of the materials sold under the brand name Teflon® by E.I. du Pont de Nemours and Company or its affiliates. Any other slippery substance can be used as well. The use of a slippery synthetic substance will permit bagging of dry poultry. Nevertheless, the apparatus can also be used with wet poultry and therefore will be more useful to users than an apparatus that can only be used with one or the other. Preferably, all plates 70 have coated inner surfaces, but a cone horn 50 could have coated inner surfaces on fewer than all plates 70.
[0028] In yet another aspect of the invention, plates 70 are made of steel dimpled on the inner surface and the inner surface is also coated with a slippery synthetic substance as described above.

[0029] In yet another aspect of the invention, tube 44 is formed of dimpled steel, with the dimples or textures on the inner surface of tube 44. Additionally, tube 44 can have its inner surface coated with the slippery substance described above. Moreover, tube 44 can be formed of dimpled steel, with the dimples or textures on the inner surface and the inner surface also being coated with a slippery synthetic substance as described above.

[0030] Dual cylinder ram system 46 is preferably a pair of dual-action air-operated cylinders, a first ramming cylinder 76 and a second hocking cylinder 78 mounted on frame 42. A conventional ram, using a single air-actuated cylinder, could be used but for faster operation, a pair of air cylinders 76, 78 is preferred in order to have hocking capability. More preferably, dual cylinder ram system 46 comprises ramming cylinder 76 and second hocking cylinder 78 mounted on a ram carriage 80, which is mounted on an electrically-powered conveyor belt 82, which is mounted on frame 42. A compressed air supply 84, either directly from an air compressor or from a plant compressed air supply, operate either the single cylinder or dual cylinders 76, 78. Belt 82 preferably is powered by electrical motor 83.

[0031] Bag carriage assembly 48 is preferably as described in the ‘310 patent or the ’636 publication. A stack 32 of bags 20a, 20b, 20c, etc., is mounted to bag carriage assembly 48 and secured thereon by wicket 34. Bag carriage assembly 48 is located as the proximal end 84 of frame 42. Bag carriage 48 raises to present top bag 20a adjacent cone horn 50. An air nozzle 86 directs a stream of compressed air at the lip 88 formed where top pane! 24 to top bag 20a terminates, slightly opening lip 88. Bag carriage assembly 48 then moves inside frame 42,
pulling top bag 20a over cone horn 50.

[0032] When a chicken is placed in cutout 62, bag carriage assembly 48 operates to pull top bag 20a over cone horn 50. Ram system 46 begins to actuate, prompted either manually or by an electronic or analog controller, shown in FIG. 3 as a wireless electronic controller. Cylinder 76 strokes forward, so that ram head 90 on first ramming cylinder 76 encounters chicken 60 and begins to push chicken 60 through tube 44. When chicken 60 arrives at proximal end 66, chicken 60 begins to push plates 70 outward, further stretching top bag 20a.

[0033] At this point, second hocking cylinder 78 actuates and strokes forward. The hocking head 92 on second hocking cylinder 78 encounters the legs 94 of chicken 60 and hocks them. As second hocking cylinder 78 continues to actuate, chicken 60 is pushed against the bottom of top bag 20a and through cone hone 50. As chicken 60 clears cone horn 50, top bag 20a collapses about chicken 60. Now-bagged chicken 60 is taken away, manually or by a conveyor belt, roller tray, or similar conveyance, for further processing, such as weighing and clipping.

[0034] Both air cylinders 76, 78 retract and plates 70 return to their biased positions, reforming the cone shape of cone horn 50. Loading tube 44 is now ready to receive another chicken.

[0035] In another aspect of the invention, dual cylinder system 46 further comprises a ram carriage 80 mounted on an electrically-powered conveyor belt 82, as shown in FIG. 11. Conveyor belt 82 is powered by motor 83. Dual cylinder system 46 as described above is mounted on ram carriage 80.

[0036] When a chicken is placed in cutout 62, bag carriage assembly 48 operates to pull top bag 20a over cone horn 50. Belt conveyor 82 rotates to move ram carriage 80 moves from a first position, remote from loading tube 44, to a second position adjacent loading tube 44. This
movement begins to push chicken 60 through loading tube 44 as ram head 90 on first ramming cylinder 76 encounters chicken 60. When ram carriage 80 arrives at its second position, first ramming cylinder 76 actuates, continuing to push chicken 60 through loading tube 44 and into cone horn 50. As chicken 60 moves into cone horn 50, plates 70 are pushed outward, further stretching top bag 20a.

[0037]  At this point, second hocking cylinder 78 actuates. The hocking head 92 on second hocking cylinder 78 encounters the legs 94 of chicken 60 and hocks them. As second hocking cylinder 78 continues to actuate, chicken 60 is pushed against the bottom of top bag 20a and through cone hone 50. As chicken 60 clears cone horn 50, top bag 20a collapses about chicken 60. Now-bagged chicken 60 is taken away, manually or by a conveyor belt, roller tray, or similar conveyance, for further processing, such as weighing and clipping.

[0038]  Bag carriage assembly 48 returns to its first position, both air cylinders 76,78 retract, and ram carriage assembly 80 returns to its first position. Plates 70 return to their biased positions, re-forming the cone shape of cone horn 50. Loading tube 44 is now ready to receive another chicken.

[0039]  While preferred embodiments of the present invention are shown and described, it is envisioned that those skilled in the art may devise various modifications of the present invention without departing from the spirit and scope of the appended claims.
I claim:

1. An automated loader comprising:
   a frame having a first end and a second end;
   a ram mounted on a second end of the frame;
   a loading tube mounted on the frame between the frame first end and the ram, the loading tube having an end proximal the frame first end and a second end adjacent the ram; and
   a cone horn comprising a plurality of plates configured to form a cone, each one of the plurality of plates attached to the proximal end of the loading tube by a spring-loaded hinge, each hinge biased radially inward.

2. The automated loader of claim 1, wherein at least one of the plurality of plates has an inner surface and the inner surface comprises dimpled steel,

3. The automated loader of claim 1, wherein each one of the plurality of plates has an inner surface and each inner surface comprises dimpled steel,

4. The automated loader of claim 1, wherein the tube has an inner surface and the inner surface comprises dimpled steel,

5. The automated loader of claim 1, wherein at least one of the plurality of plates has an inner surface and the inner surface is coated with a slippery synthetic substance.

6. The automated loader of claim 4, wherein the substance comprises a thermoplastic polymer.

7. The automated loader of claim 5, wherein the thermoplastic polymer comprises polytetrafluoroethylene.

8. The automated loader of claim 1, wherein each one of the plurality of plates has an inner
surface and each inner surface is coated with a slippery synthetic substance.

9. The automated loader of claim 4, wherein the substance comprises a thermoplastic polymer.

10. The automated loader of claim 5, wherein the thermoplastic polymer comprises polytetrafluoroethylene.

11. The automated loader of claim 1, wherein the tube has an inner surface and the inner is coated with a slippery synthetic substance.

12. The automated loader of claim 1, wherein the ram is mounted on a ram carriage, the ram carriage is mounted on a conveyor belt, and the conveyor belt is mounted on the frame.

13. The automated loader of claim 1, wherein the ram comprises a pair of air-actuated cylinders.

14. The automated loader of claim 13, wherein a one of the pair of air-actuated cylinders comprises a hooking head.

15. The automated loader of claim 14, wherein the ram is mounted on a ram carriage, the ram carriage is mounted on a conveyor belt, and the conveyor belt is mounted on the frame.

16. The automated loader of claim 15, wherein at least one of the plurality of plates has an inner surface and the inner surface comprises dimpled steel.

17. The automated loader of claim 15, wherein the tube has an inner surface and the inner surface comprises dimpled steel.

18. The automated loader of claim 15, wherein at least one of the plurality of plates has an inner surface and the inner surface is coated with a slippery synthetic substance.

19. The automated loader of claim 15, wherein the tube has an inner surface and the inner is coated with a slippery synthetic substance.
I claim:

1. An automated loader comprising:
   a frame having a first end and a second end;
   a ram mounted on a second end of the frame;
   a loading tube mounted on the frame between the frame first end and the ram, the loading tube having a first end proximal the frame first end and a second end adjacent the ram; and
   a cone horn comprising a plurality of plates configured to form a cone, each one of the plurality of plates attached to the first end of the loading tube by a spring-loaded hinge, each hinge biased radially inward.

2. The automated loader of claim 1, wherein at least one of the plurality of plates has an inner surface and the inner surface comprises dimpled steel.

3. The automated loader of claim 1, wherein each one of the plurality of plates has an inner surface and each inner surface comprises dimpled steel,

4. The automated loader of claim 1, wherein the tube has an inner surface and the inner surface comprises dimpled steel.

5. The automated loader of claim 1, wherein at least one of the plurality of plates has an inner surface and the inner surface is coated with a slippery synthetic substance,

6. The automated loader of claim 1, wherein the substance comprises a thermoplastic polymer,

7. The automated loader of claim 5, wherein the thermoplastic polymer comprises polytetrafluoroethylene ,

8. The automated loader of claim 1, wherein each one of the plurality of plates has an inner surface and each inner surface is coated with a slippery synthetic substance.
9. The automated loader of claim 4, wherein the substance comprises a thermoplastic polymer.

10. The automated loader of claim 5, wherein the thermoplastic polymer comprises polytetrafluoroethylene.

11. The automated loader of claim 1, wherein the tube has an inner surface and the inner is coated with a slippery synthetic substance.

12. The automated loader of claim 1, wherein the ram is mounted on a ram carriage, the ram carriage is mounted on a conveyor belt, and the conveyor belt is mounted on the frame.

13. The automated loader of claim 1, wherein the ram comprises a pair of air-actuated cylinders.

14. The automated loader of claim 13, wherein at least one of the pair of air-actuated cylinders comprises a hocking head.

15. The automated loader of claim 14, wherein the ram is mounted on a ram carriage, the ram carriage is mounted on a conveyor belt, and the conveyor belt is mounted on the frame.

16. The automated loader of claim 15, wherein at least one of the plurality of plates has an inner surface and the inner surface comprises dimpled steel.

17. The automated loader of claim 15, wherein the tube has an inner surface and the inner surface comprises dimpled steel.

18. The automated loader of claim 15, wherein at least one of the plurality of plates has an inner surface and the inner surface is coated with a slippery synthetic substance.

19. The automated loader of claim 15, wherein the tube has an inner surface and the inner is coated with a slippery synthetic substance.
Please amend the claims of this application pursuant to Article 19(1). Replacement pages 10 and 11 are submitted to replace original pages 10 and 11.

Claim 1 is amended to clarify that the end of the loading tube that is proximal to the frame first end is the first end of the loading tube. No other claim amendments are made.

Applicant notes that the Authorized Officer considers claim 1 not to involve an inventive step as being obvious over May't in view of Andrews and Lemer. Applicant respectfully requests that this conclusion be withdrawn for at least the following reasons:

© Claim 1 recites a cone horn in which the plates are attached to the loading tube.
* Lemer’s spring-loaded fingers 172, 174 are not attached to Lemer’s loading tube.
• Similarly, Andrews’ bag-opening horns 29, 30 are separate from the loading tube,
• May’s horn 17 does not rotate relative to the axis, but instead move apart laterally relative
to the axis. Accordingly, Mays requires an additional actuator 19, a structure not needed in the present application.

To combine these references to get to the structure of claim 1 would require different and additional structure not described in those references. The combination is therefore improper and claim 1 is patentable.

Additionally, Applicant disputes the Authorized Officer's conclusion that it would have been obvious to use dimpled steel. The Authorized Officer cites no evidence to support this conclusion. In fact, the conclusion that using dimpled steel will prevent poultry from sticking to the flat surface is contrary to basis physics. One would expect poultry to slide more easily over a flat surface than over a dimpled surface. Adding surface features to a flat material should increase friction. Certainly, a textured-steel floor would be expected to be less slippery than a flat steel floor.

The use of texture steel for poultry horns is, in fact, surprising. It is an unexpected result and these claims are therefore non-obvious. Applicant accordingly respectfully requests withdrawal of this conclusion.

if there are any questions regarding this transmission, the Authorized Officer is respectfully urged to contact the undersigned.

Respectfully submitted,

Date: August 19, 2013

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INTERNATIONAL SEARCH REPORT

International application No. PCT/US2013/033838

A. CLASSIFICATION OF SUBJECT MATTER

IPC(8) B65B 5/00 (201 3.01) USPC - 53/259
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC(8) - B65B 5/00, 25/06, 25/08, 25/11, 25/14, 25/20, 35/00, 35/12, 35/20, 43/00, 43/12; B65G 47/00 (2013.01)
USPC - 53/138.1, 167, 169, 235, 255, 258, 259, 260, 261, 262, 384.1, 385.1, 391; 198/468.11, 468.7, 469.1, 474.1, 482.1; 474/8, 149, 150, 901

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
CPC - B65B 5/00, 5/08, 25/06, 35/24, 47/00, 67/04 (2013.01)

Electronic database consulted during the international search (name of database and, where practicable, search terms used)
Minesoft Patbase, Google Patent, Google

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category*</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
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<tbody>
<tr>
<td>Y</td>
<td>US 201 1/0232238 A1 (MAY et al) 29 September 201 1 (29.09.201 1) entire document</td>
<td>1-19</td>
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<tr>
<td>Y</td>
<td>US 4,352,263 A (ANDREWS JR) 05 October 1982 (05.10.1982) entire document</td>
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<td>Y</td>
<td>US 2006/0021292 A1 (NORTON et al) 02 February 2006 (02.02.2006) entire document</td>
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<td>5-1,11,18,19</td>
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<td>Y</td>
<td>US 3,052,075 A (VELASQUEZ) 04 September 1962 (04.09.1962) entire document</td>
<td>12,15-19</td>
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</table>

Further documents are listed in the continuation of Box C.

* Special categories of cited documents:
  "A" document defining the general state of the art which is not considered
  to be of particular relevance
  "E" earlier application or patent but published on or after the international
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  "P" document published "prior to the international filing date but later than
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X document of particular relevance; the claimed invention cannot be
considered novel or cannot be considered to involve an inventive
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Y document of particular relevance; the claimed invention cannot be
considered to involve an inventive step when the document is
combined with one or more other such documents, such combination
being obvious to a person skilled in the art

- member of the same patent family

Date of the actual completion of the international search
04 June 2013

Date of mailing of the international search report
18 JUN 2013

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PCT CRD: 571-272-7774

Form PCT/ISA/210 (second sheet) (July 2009)