An apparatus and method for securing the open end of a bag neck over a conduit and tensioning the bag neck by holding the bagged product tensioned away from the securing means. In its preferred forms the securing means is a clamp including two arms that pivot to clamp a bag's neck portion against a conduit and are held in clamping position by a catch means at their outer ends. The arms are geared together for complimentary pivoting, biased to the open position, and open and close by pivoting across one another. The tensioning means is a chute having an inclined surface inclined away from the position where the bag is secured.

3 Claims, 5 Drawing Figures
CLAMP AND TENSIONING MEANS FOR BAG NECKS AND THE LIKE

This application is related to copending application U.S. Ser. No. 97,703 filed on Dec. 14, 1970 entitled "Vacuumizing System" invented by Holcombe, Calvert and Kessel and assigned to the same assignee as this application.

BACKGROUND OF THE INVENTION

The present invention relates to an apparatus and method for supporting and positioning bagged products and the like. More particularly, the invention relates to positioning and holding the bag neck of a bagged product and tensioning the bag neck. In special aspects, the invention relates to a clamp.

This invention is particularly adapted to position the bag neck of a bagged product for vacuumizing and closing of the bagged product or package. The invention is particularly useful in packaging poultry and fresh red meat products such as beef and the like. In the past, it has been common practice to manually manipulate the bag's neck during processing for securing it on a vacuuming means and also for positioning the bag's neck in a closing means such as a clipper. The bagged products were transported between processing stations by simply laying them in predetermined disposition at regular intervals on conveying surfaces and the like. The types of bag neck positioning and holding mechanisms employed in the past, when any specialized device was employed, generally constituted bag neck gripping and lifting type means such as are shown in U.S. Pat. No. 3,094,825 assigned to the same assignee as this application.

SUMMARY OF THE INVENTION

By an aspect of this invention in a preferred form thereof an apparatus is provided for positioning and holding a bag neck of a bagged product. The apparatus includes a bag neck securing means that preferably includes an open conduit and a means for securing the neck of the bag in position over the conduit. The bag's neck is secured and trapped between the conduit and an encompassing means. A tensioning means holds the bagged product tensioned away from the securing means. In its preferred form the tensioning means includes an inclined surface sloping away from the securing means. The tensioning means holds the bag's neck sufficiently taut to substantially prevent its collapse due to a vacuum of intended strength being pulled therethrough.

By a particular aspect of this invention a specialized clamp is provided. The clamp in its preferred form includes a first pivotal arm and a second pivotal arm with meshed gears connecting the pivotal arms for complimentary pivotal movement. A catch is provided at the outer ends of the pivotal arms for securing the pivotal arms in clamping position. Preferably the pivotal arms provide a loss on another to open and close. The clamp in its preferred form includes the conduit against which the arms engage. The conduit preferably has at least a portion moveable in response to the clamping action to align the conduit with the pivotal arms during clamping of the conduit therebetween.

By another aspect of this invention in a preferred form thereof a method is provided for positioning and holding the neck of a bag of a bagged product. The method includes securing the open end of the bag over a conduit and continuously pulling the bag away from its securing by placing the bag on an inclined plane slanting away from the securing region.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is an isometric view of the positioning, holding and tensioning apparatus with a bagged product shown in phantom mounted thereon.

FIG. 2 is a front view of the clamp shown in FIG. 1 differing slightly from the specie of FIG. 1.

FIG. 3 is a front view of the mounting base of the clamp of FIG. 2 looking into the housing and showing the spring biasing means therein.

FIG. 4 is a view of a portion of the clamp of FIG. 2 taken along line 4—4.

FIG. 5 is a side elevational view of the restraining chute of FIG. 1 with its inclined surface shown in phantom line.

DISCUSSION OF THE PREFERRED EMBODIMENTS

Looking first at FIG. 1, a bag 10 is shown in phantom line. The bag is shown enlarged at its outer or bottom end to indicate that it is loaded with a product. The bag is secured to and mounted on an apparatus or device 12 which includes a conduit 14. The conduit is suitable for extracting air from the bag when it is connected to a vacuumizing source. Thus a bagged product may be suitably vacuumized via the conduit. The apparatus 12 also includes a clamp 16 and an inclined chute 18. The clamp 16 secures or clamps the neck of the bag 10 onto the outer circumferential surfaces of the cylindrical conduit 14 and thus these surfaces of the conduit 14 serve as a part of the clamping means. A frame member 20 interconnects the parts or elements 14, 16 and 18.

Looking now at FIG. 2 the clamp 16 is shown in greater detail. The clamp has a first arm 22 and a second arm 24 and a first shaft 26 mounting one end of the first arm 22 for pivotal movement and a second shaft 28 mounting one end of the second arm 24 for pivotal movement. The second shaft 28 is adjacent to and has an axis parallel to the axis of the first shaft 26. The arms 22 and 24 have facing circumferential clamping surfaces 30 and 32 respectively at their other or outer ends. These clamping surfaces 30 and 32 are engageable about the conduit which has complimentary cylindrical surfaces as shown in FIG. 1. When the clamp is closed on the conduit it forms an encompassing conduit. There are instances when other encompassing means might be employed to secure the bag neck about the conduit. For example in certain instances, although not preferred, a heavy rubber band could be tied about the bag's neck to clamp it securely on the conduit.

There is one functional difference between the clamping arrangement shown in FIG. 1 and that shown in FIG. 2. The clamp in FIG. 2 has resilient rubber facing members 34 and 36 on respective circumferential clamping surfaces 30 and 32. If a solid conduit tube made of metal is employed these are found to be desirable to assist in taking up for any misalignment of the conduit 14 and the clamp 16 and also any excessive bulking up of the material of the bag's neck at a par-
particular region as against other regions, which bulking up might otherwise cause substantial leaking around the conduit. The specie shown in FIG. 1 does not have the resilient facing members 34 and 36, but instead, the end of the conduit 14 has a Tygon tube conduit 38 at its outer end which is secured to the metal part of the conduit 14 by a hose type ferrule 39. This tubing portion of the conduit is resilient, flexible and moveable, providing excellent adjustment or tolerance control for any misalignment between the clamp arms 22 and 24 and the conduit 14 and also compensating for any bulking up of the material of the bag neck in a specific region and providing a good sealing with the arms. The gauge or thickness of the material in the resilient plastic tubing is sufficiently heavy so that it will not excessively yield to the clamping forces. It is the arms 22 and 24 in clamping action with the conduit 14 that hold the bag secured in air tight engagement between the clamping surfaces of the clamp and the clamping surfaces of the conduit 14 and together function as a single clamp.

Looking once again at FIG. 2, it may be seen that the clamp is operated by a handle 40 which is an integral part of the arm 22. Gears 42 are provided on the first shaft 26 and gears 44 are provided on the second shaft 28. The gears are meshed to connect the first arm 22 with the second arm 42 for complimentary pivotal movement upon the movement of the handle 40. It may be seen from the phantom line presentation that the arms 22 and 24 pivot in parallel overlapping planes across one another to open and close with one another.

Looking now at FIGS. 2 and 3, it may be seen that the clamp includes biasing means including a spring 46, mounted around the first shaft 26 and a pin 48 mounted on the second shaft 28. The spring 46 is engaged at one end against the upper wall 52 of the housing 50 and the other end of spring 46 is engaged against pin 48. The spring is trapped between wall 52 and pin 48 in tensioned condition so that it pushes the shaft 26 and 28 into open pivotal rotation by its natural bias.

Looking now in particular at FIGS. 2 and 4, a catch means 54 is shown at the upper or outer ends of the arms 22 and 24 securing the arms together in clamped position. The arms have overlapping surfaces at their outer ends that pass one another in closing as may be seen and understood from FIGS. 1 and 2. The catch means includes a recess 56 in the surface of arm 22 that overlaps the surface of the opposite arm 24 when the arms are closed. A leaf spring 58 is mounted on arm 24, and biased toward arm 22. The leaf spring is cammed toward its mounting arm 24 by the overlapping surface of the arm 22 when the arms are closed together. The leaf spring moves by its bias into the recess 56 upon full closure of the arms bringing the tip of the leaf spring 58 into alignment with the recess 56, thereby providing a detent means or action. A plunger 60 passes into the bottom of the recess 56 from the side of the arm 22 opposite the arm 24. The plunger is therefore communicable with the bottom of the recess for dislodging the spring means 58 for opening the catch means 54.

Looking next at FIG. 1 and 5, tensioning means is shown. It is the inclined chute means 18. The chute means includes mounting and support frame 62, outer chute guide walls 64 and 66 and inclined lower wall 68. The inclined slant of the lower wall 68 has a sufficient angle of descent to tension the neck of the bag between

the chute 18 and the securing means which includes clamp 16 and the clamping surface of the conduit 14 with which the clamp engages. The products weight pulls the bag back down the inclined surface with sufficient force to prevent the vacuum draw down from collapsing the bag's neck. Of course the external air pressure pushing in on the bag actually collapses the bag's neck in response to the vacuum being drawn through the neck. To prevent the bag's neck from being drawn down onto the upper edge of the inclined chute surface until this surface pushes the bottom portion of the bag's neck against the top portion of the neck closing the bag neck, it is necessary to restrain the downward movement of the bag on the inclined plane. This is done by preventing the bag from sliding down the inclined plane to such an extent. This is done either by providing a restraining surface or member below the inclined region of the chute or position the chute a sufficient distance from the securing arrangement so that the bag is held by the securing means from sliding that far down the chute. In other words the necessary relationship is one that will allow at least the upper portion of the conduit to hold the upper portion of the bag neck away from the top edge of the inclined surface 68.

OPERATION

It is intended to position and hold the neck of a bag securely around the open end of a vacuumizing conduit or to some other securing means and continuously pull the bag away therefrom and thereby tension the neck of the bag. To this end an operator places the open end of the bag over the conduit or securing means 14 and clamps the bag's neck thereagainst by closing clamp 16 through the movement of handle 40. Initially the operator places the bag at the lower or outer end of chute 18 and pulls the bag forward by its neck until the bag's neck is positioned over and around the end of the conduit 14. This pulls the portion of the bag containing the product up against and generally at least partially up the inclined chute 18. The operator holds the bag tensioned in this position with one hand while pushing the clamp handle 40 down with his other hand to close the clamp and secure the bag in position. The bag is continuously pulled away from its securing means by or in response to the backward pull caused by the product in the bag sliding down the inclined plane which slants away from the securing means. After such processing as may be desired, such as vacuumizing the bag, the handle 40 is operated again by the operator who meshes inwardly on the plunger or unlocking element 60 which allows the arms 22 and 24 to spring open due to their natural bias from spring 46. If the apparatus, which also serves as a product locator, is mounted on a conveying belt a camming element may be positioned to engage the outer end of the plunger and mesh it inwardly releasing the spring 58 from engagement in recess 56 allowing the arms 22 and 24 to spring open due to their open bias. It is contemplated that the bag may be closed and its neck severed before release. Thus the severed end of the bag would then be lifted off of the conduit 14 by the operator after the clamp opened. Of course, the severed end of the bag could be removed by other means such as an air blast. In its preferred usage the apparatus 11 is designed to mount bagged products for transportation horizontally in rela-
tively laid down disposition and transversely to the
direction in which the bag’s neck is disposed for
processing and closing. This positions the bag’s neck in
very desirable position for sequential actions to be car-
ried out on it in line.

The shape of the circumferential clamping surfaces
of the arms 22 and 24 and the areas leading into them is
such that they cause or function to finally gather the
neck of the bag about the conduit 14. The operator
provides a general gathering of the bag’s neck but it is
the arms 22 and 24 that provide the final gathering as
they close about the bag neck. It should be observed
that the region of the arms 22 and 24 that includes the
circumferential clamping surfaces are somewhat scoop
shaped so as to gather in the neck of the bag.

In certain preferred embodiments of the invention
the spring 46 is replaced with a helical tension spring
mounted on shaft 28 and trapped at one end in a
mounting moving with the shaft and at the other end
against the housing 50 so that it is wound up by the
closing of the arms and biases the arms to open posi-
tion, partially unwinding as the arms open. The spring
is mounted so that it has some open bias even when the
arms 22 and 24 are fully open to hold the arms in open
position.

While in accordance with the patent statutes, we
have described what at present is considered to be the
preferred embodiments of our invention, it will be obvi-
ous to those skilled in the art that numerous changes
and modifications may be made therein without depart-
ing from the invention and it is therefore aimed in the
appended claims to cover all such equivalent variations
as fall within the true spirit and scope of the invention.

We claim:

1. An apparatus for positioning and holding the bag
neck of a bagged product comprising:
   a. bag neck securing means comprising:
      i. open-ended conduit at least a portion of which is
         resilient and movable for alignment;
      ii. first and second cooperating arms;
      iii. a first shaft mounting one end of said first arm
          for pivotal movement;
      iv. a second shaft adjacent to and having its axis
          parallel to the axis of said first shaft and mount-
          ing one end of said second arm for pivotal move-
          ment;
   v. an interengaging gear fixed to each of said arms
      and associated with each of said shafts whereby
      when one arm is rotated the interengagement of
      the gears will cause the other arm to rotate in
      the opposite direction;
   vi. biasing means including a spring mounted
      around said first shaft and a pin on said second
      shaft, said spring engaged about said pin to push
      said shafts into open pivotal rotation;
   vii. catch means at the outer ends of said arms
      securing said arms together in a clamped posi-
      tion, said arms pivoting in parallel overlapping
      planes to close with one another and having
      overlapping surfaces at their outer ends that
      pass one another in closing, said catch means in-
      cluding a recess on one of said arms in said over-
      lapping surface of said other arm and moving by
      its bias into said recess on full closure of said
      arms;
   viii. a plunger on said arm with said recess commu-
        nicable with the bottom of said recess for
        dislodging said spring means for opening said
        catch means;
   ix. a complementary recessed portion in each of
      said arms forming a clamping surface thereon
      whereby a bag neck placed over said conduit
      can be clamped securely against said conduit by
      said clamping surfaces, said recessed portions
      conforming generally to the shape of said con-
     duit which said recessed portions contact; and,
   b. tensioning means comprising an inclined chute
      sloping away from said bag neck securing means.

2. The apparatus of claim 1 wherein said recessed
portions forming said clamping surfaces are provided
with resilient facing members.

3. The apparatus of claim 2 wherein a handle is as-
associated with one of said arms whereby rotation of the
handle will cause both of said arms to rotate about their
respective pivots.

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