United States Patent [19]

Plumb

[11] **3,903,675**

[45] **Sept. 9, 1975**

[54] **BAGGING APPARATUS**

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[73] Assignee: **Clayton Specialties, Inc.**, Corpus Christi, Tex.

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[21] Appl. No.: **525,912**

[52] **U.S. Cl.** **53/189**; 53/385

[51] **Int. Cl.**[2] **B65B 43/36**

[58] **Field of Search** 53/189, 385

[56] **References Cited**

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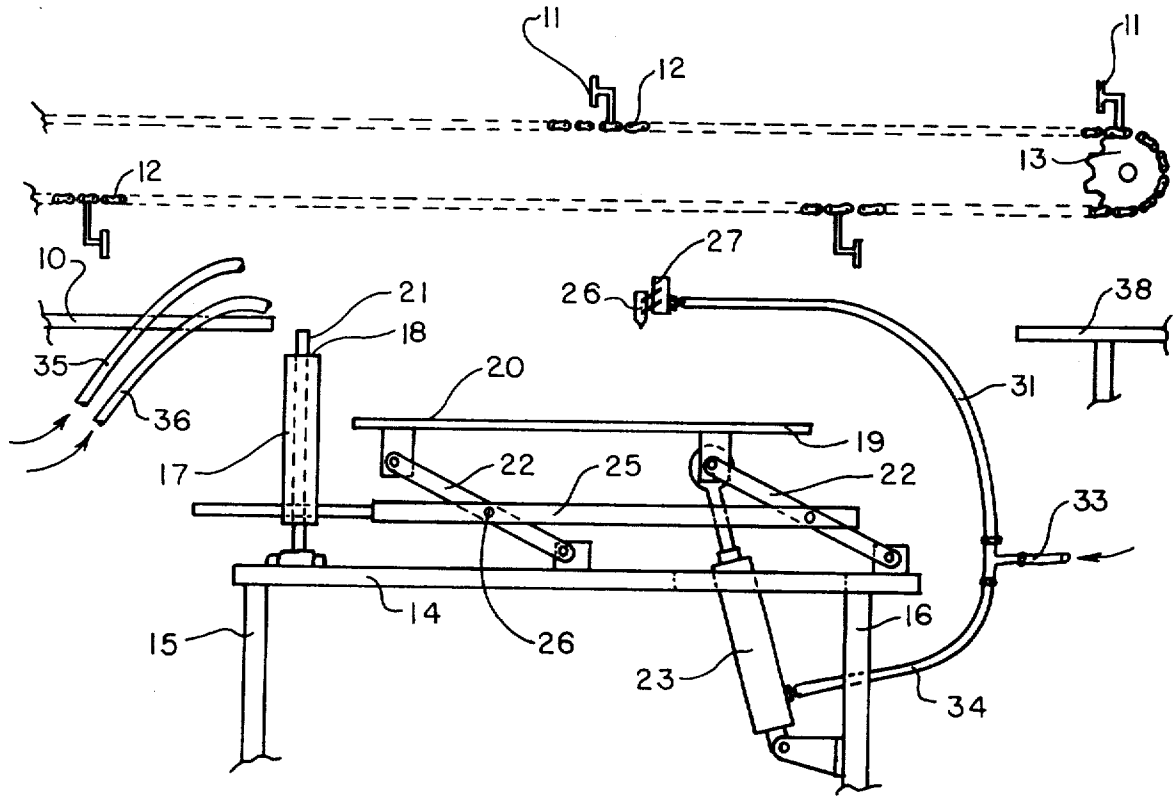
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Primary Examiner—Travis S. McGehee
Attorney, Agent, or Firm—Stewart N. Rice

[57] **ABSTRACT**

An improved bagging apparatus having a split-level bag supply table to accommodate a stack of bags having extended lower lips. The portion of the bag supply table which supports the main body of a stack of bags is lower than the portion which supports the lips of the bags such that the upper bag on a stack is substantially level. The bag supply table moves upwardly as bags are utilized, with the rate of vertical movement of the bag body support being at least twice that of the bag lip support such that the upper bag of a stack is always level.

12 Claims, 9 Drawing Figures



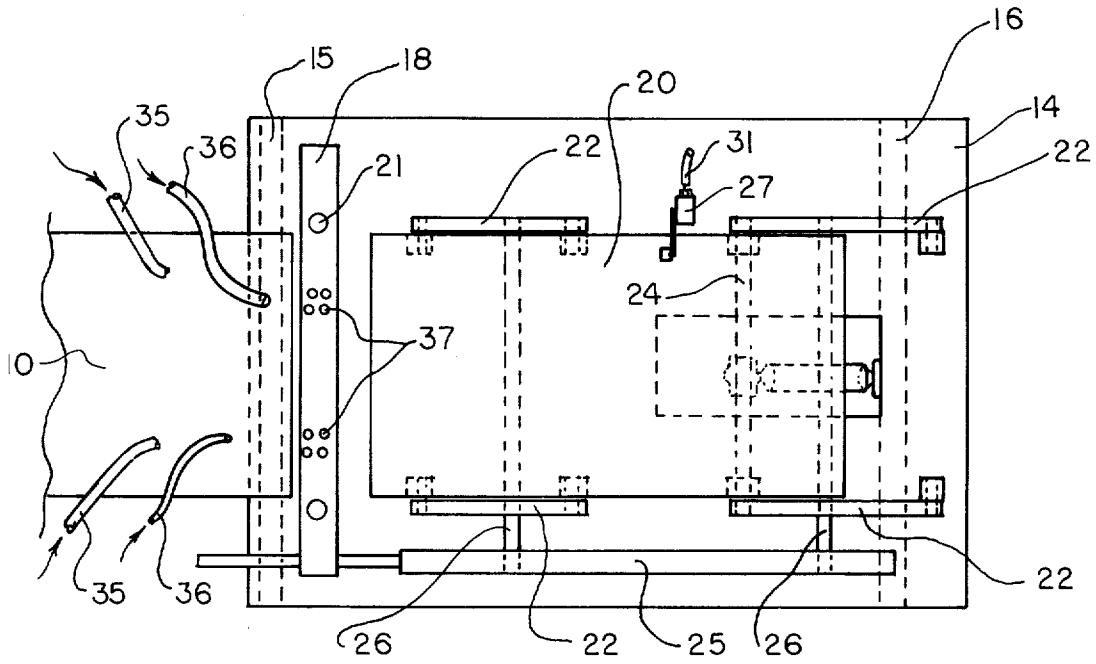

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FIG. 2

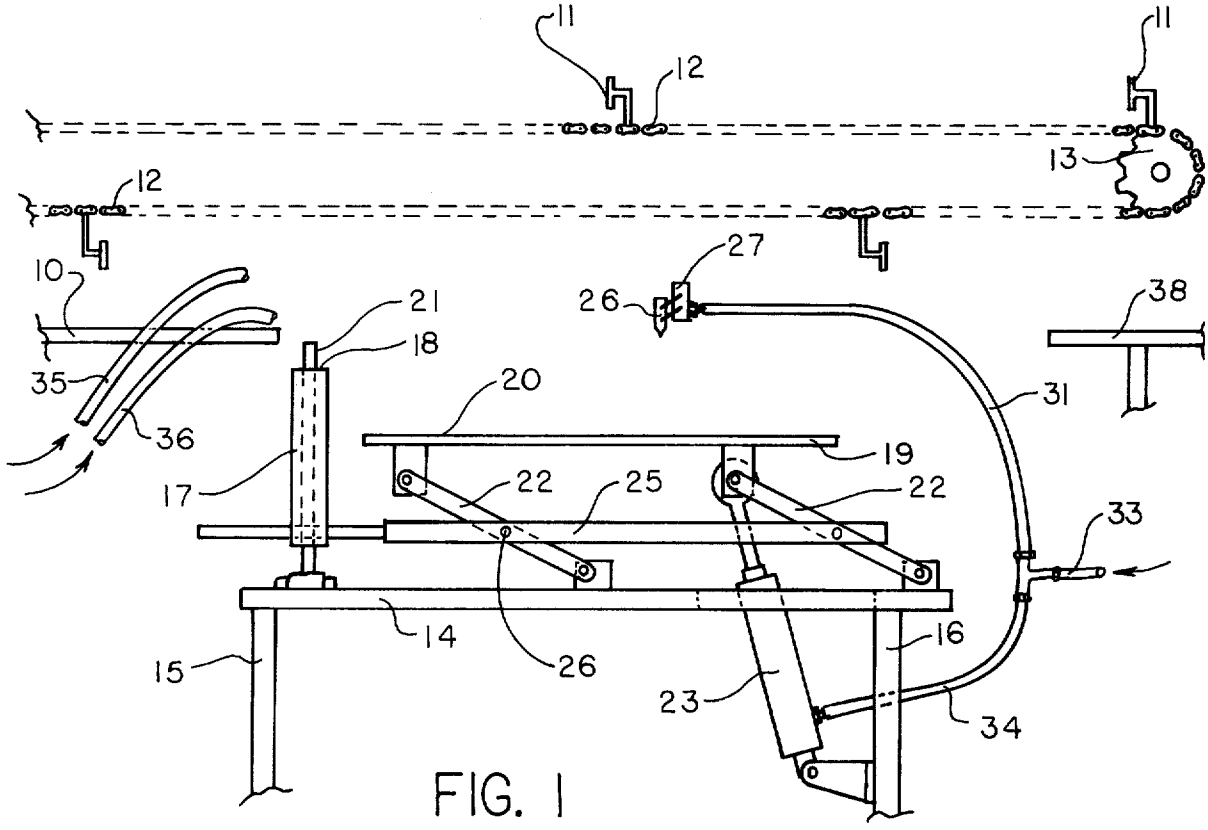

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FIG. 1

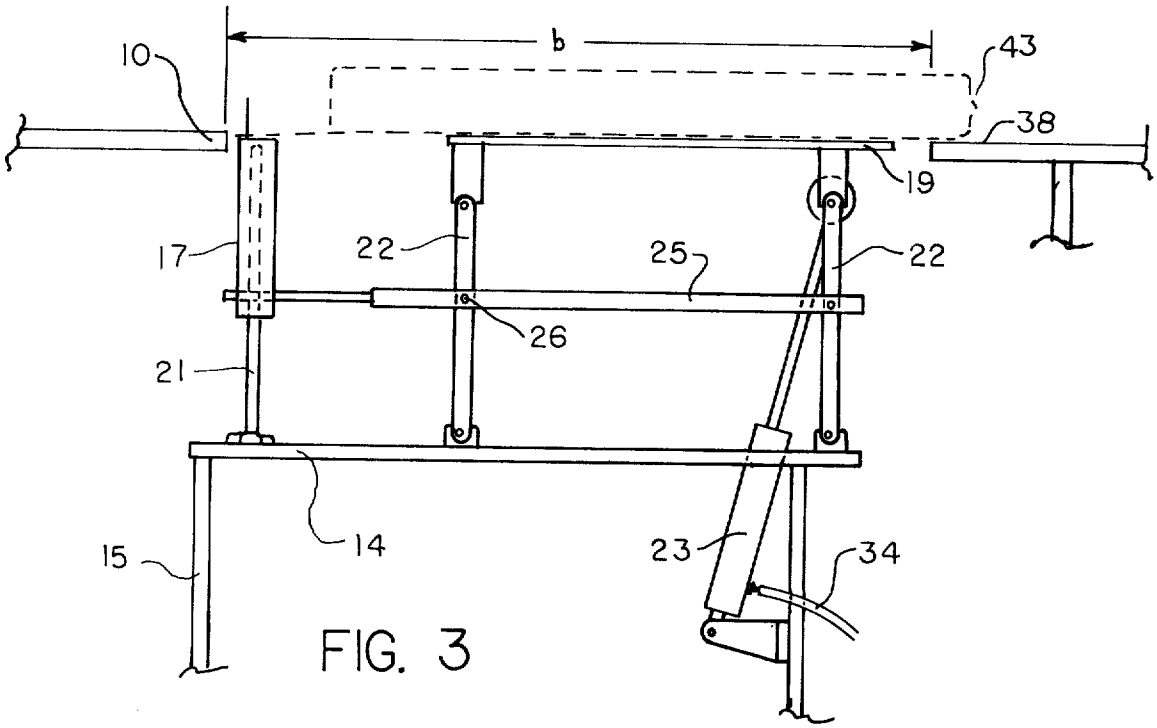


FIG. 3

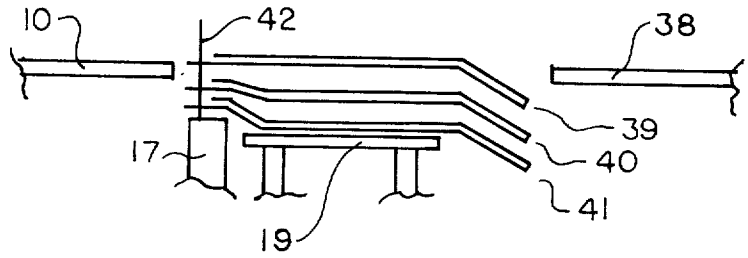


FIG. 4



FIG. 5

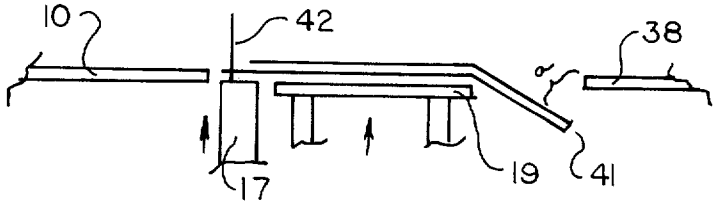


FIG. 6

FIG. 7

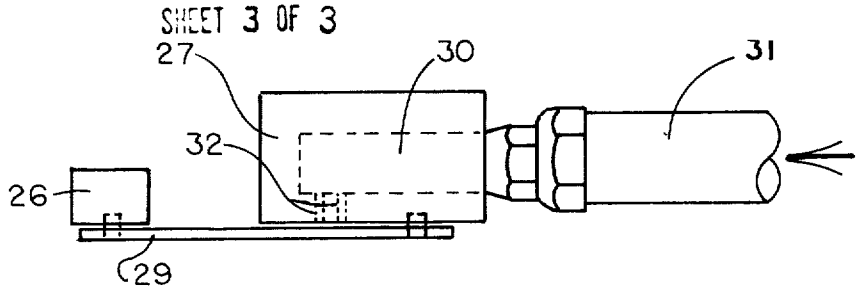


FIG. 8

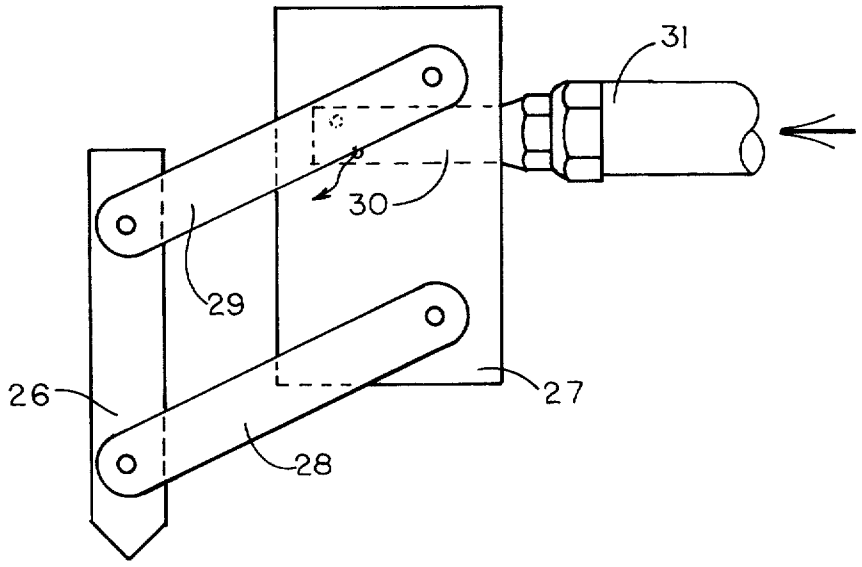
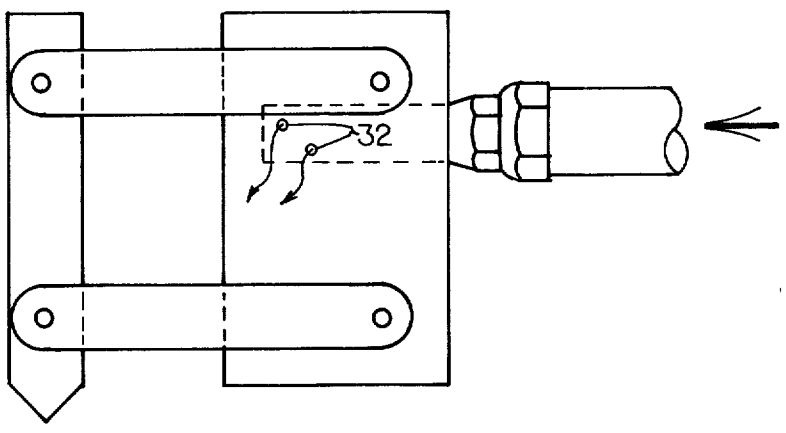


FIG. 9



BAGGING APPARATUS

BACKGROUND OF THE INVENTION

The present invention relates to a bagging apparatus for use with bags having an extended lower lip. Bagging apparatus to be used in connection with such bags, typically made of a thin plastic material, are well known and are currently in use for bagging a wide variety of products. Probably the most wide use is for the bagging of bakery products such as bread loaves, sliced or unsliced. A bagging machine typical of the prior art is disclosed in U.S. Pat. No. **3,508,379** issued Apr. **28, 1970,** to B. P. Noyes, et al. Typically the bags, in collapsed form, come from the manufacturer in a stack with all of the mouths of the bags having the lower lips extending therefrom at one end of the stack and the lower or closed end of the bags at the opposite end of the stack. The stack of collapsed bags is placed on a bag support means adjacent to a unit supply conveyor with the mouths of the bags facing in an upstream direction so that each mouth can receive a unit being supplied by the unit supply conveyor. A bagging machine will have means for distending the upper bag on the stack in timed relation to the movement of articles to the bagging area such that the unit may be moved into the mouth of the distended bag. The bagged unit will then be moved downstream onto a receiving surface for further processing.

It can be seen that a collapsed bag having a lower extended lip will be of a greater thickness in the main body portion of the bag as in the lip portion since the main body will be comprised of at least two thicknesses of bag material and the lip will be comprised of only one thickness. When such bags are stacked, this obviously results in a stack of non-uniform thickness with the main bag body portion of the stack being twice the thickness of the extended lower lip portion of the stack. When a stack of several of such bags are placed on a flat surface the upper bag of the stack will not be horizontal, but instead will have the lip sagging to a level lower than the main body of the bag. Because of this sagging the smooth operation of a bagging machine is frequently interrupted or a unit passed through unbagged because of improper inflation of a bag. It is to this problem that the present invention is directed.

SUMMARY

It is thus an object of the present invention to provide an improved apparatus for bagging articles in bags having extended lower lips. It is a particular object of the present invention to provide an improved bag support means for supporting a stack of such type of bags to be used in connection with a bagging apparatus. Additional objects will become apparent from the following description of the present invention.

The foregoing and other objects are accomplished by the present invention which in one of its aspects is a bagging apparatus for use with bags each having a mouth with a lower lip extending beyond the upper lip, the thickness of the main body portion of each bag in a collapsed state being at least twice that of the extended lower lip thereof, which apparatus comprises: (a) a horizontally disposed unit supply surface over which units to be bagged are moved downstream to the bagging area; (b) a substantially horizontal receiving surface for receiving bagged units which is at substantially the same level as said unit supply surface means;

(c) a split-level, bag support means for holding a stack of bags with their length in a generally horizontal position, said bag support means being located downstream of and immediately adjacent to said unit supply surface and upstream of said receiving surface means, the upper surface of said bag support means having a horizontally disposed upstream bag lip support surface adapted to firmly hold and support the extended lower lip portions of a said stack of bags and a horizontally disposed downstream bag body support surface which is adapted to support the main body of a said stack of bags, the length of said bag lip support surface being not substantially greater than the length of the extended lower lip of a bag, said bag lip support surface and said bag body support surface being movable vertically with respect to said unit supply surface and with respect to each other, means connecting said bag lip support surface to said bag body support surface such that said bag lip support surface and said bag body support surface are at substantially the same level when substantially at the level of said unit supply surface and such that a vertical movement of said bag lip support surface results in a vertical movement in a like direction but of a greater magnitude of said bag body support surface, the magnitude of vertical movement of said bag body support surface bearing to the magnitude of vertical movement of said bag body support surface in the same ratio that the thickness of the thickest section of the main body portion of a bag, in a collapsed state and excluding any gusset at the lower end thereof, bears to the thickness of the extended lower lip of a bag; (d) detecting means for detecting the level of the uppermost nondistended bag of a said stack of bags disposed on said bag support means; (e) means for moving said bag lip support surface and said bag body support surface of said bag support means vertically in response to said detecting means so as to maintain the uppermost nondistended bag of a said stack of bags substantially at the level of said unit supply table; (f) means to distend the mouth of the upper bag of a said stack of bags located on said bag support means so that that upper bag may receive a unit to be bagged; (g) means to move a unit to be bagged downstream over said unit supply surface and generally horizontally into the bag whose mouth is so distended and for continuing movement thereafter in the same general downstream direction to move such bag containing such unit away from said bag support means and onto said receiving surface.

The terms "upstream" and "downstream" as used in the claims and specification have reference to the direction of movement of units to be bagged.

BRIEF DESCRIPTION OF THE FIGURES

FIG. 1 is a fragmentary elevation view of a bagging apparatus with bag support means in a lowered position.

FIG. 2 is an overhead view of a portion of the bagging apparatus shown in FIG. 1.

FIG. 3 is an elevation view of a portion of the bagging apparatus shown in FIG. 1 with the bag support means in a raised position.

FIGS. 4, 5 and 6 are fragmentary elevation views illustrating the posture of a stack of bags on a bag support means at various positions.

FIGS. 7, 8 and 9 illustrate a sensing device useful in a bagging apparatus, FIGS. 8 and 9 being elevation views and FIG. 7 being an overhead view of FIG. 8.

In the Figures, like numbers are used to designate like members.

The drawings form a part of this specification illustrating the best mode devised for accomplishing the purposes of the invention. To those skilled in the art changes and alterations will come to mind in adapting the invention to use in connection with various types of articles. All such as fall within the spirit and scope of the claims by reason of equivalency of structure or function are intended to be covered herein.

DETAILED DESCRIPTION OF THE INVENTION

Referring to FIGS. 1 and 2 for a more detailed description of a bagging apparatus of the present invention, there is illustrated portions of a bagging apparatus constructed in accordance with the present invention for use with bags having a main body portion which is twice the thickness of the extended lower lip, although the bags may have a gusset at the closed end thereof such that the gusset portion is four times the thickness of the extended lip portion. The apparatus comprises a horizontally disposed unit supply surface **10** over which units to be bagged are moved by means of pusher members **11** which are suitably attached to and moved with a flexible, endless chain **12** in an endless guided path of travel. Each pusher member has a broad face which engages the unit or units to be bagged. Chain **12** is driven by sprocket **13** and other sprockets not illustrated which themselves would be driven by power source which also is not illustrated since such does not constitute a part of the present invention.

In order to supply bags is a split-level bag support means located downstream of and immediately adjacent to unit supply surface **10,** the bag support means having a base plate **14** supported by uprights **15** and **16,** and also having a bag lip support member **17** the upper surface of which is adapted to support and firmly hold the extended lower lips of a stack of bags and which may be referred to as bag lip support surface **18.** The length of the bag lip support surface **18,** that is the distance from the upstream edge thereof to the downstream edge thereof, should be substantially the length of the extended lower lip of the bag. The bag support means also has a bag body support plate **19** the upper surface of which is a bag body support surface **20** adapted to support the main body of a stack of bags.

Bag lip support member **17** is guided in its vertical movement so as to have a straight up and down motion by means of vertical guide rods **21** located on either edge thereof, such vertical guide rods **21** being firmly attached to and perpendicular to base plate **14.** Bag body support plate **19** is supported above base plate **14** by means of four lever arms **22** which are pivotally attached at their upper ends to support plate **19** and at their lower ends to base plate **14.** FIG. **1** shows the bag support means in a lowered position to receive a stack of bags from which the upper bag will repeatedly and successively be distended, filled and then removed such that the stack becomes thinner and thinner. It may be seen that in this lowered position, bag body support surface **20** is lower than bag lip support surface **18,** surface **20** being about twice as low with respect to unit supply surface **10** as bag lip support surface **18.** In operation, bag lip support surface **18** should be a distance lower than unit supply surface **10** which is about equal to the thickness of the lip portion of the stack of bags, with bag body support surface **20** lower than unit supply surface **10** a distance which is about equal to the thickness of the main body portion of the stack of bags. This will result in the upper bag on the stack being substantially horizontal and on a level with unit supply surface **10.**

Bag support surface **19** may be raised by an air cylinder **23** which is pivotally connected at its lower end to a bracket on upright **16,** extends upwardly through an opening in base plate **14** to be pivotally connected at the outer end of the plunger to a rod **24.** The rod **24** is coaxial with the points of connection and rotation of downstream lever arms **22** and bag lip support plate **19.** Extensions of the plunger of air cylinder **23** will cause bag body support plate **19** to move vertically, and, due to the presence of lever arms **22,** bag body support plate **19** will also move downstreamwardly while moving vertically. Bag body support plate **19** is connected to bag lip support member **17** by means of horizontal side bar **25** which slideably extends through a horizontal guide hole in member **17** and is pivotally attached to the outer ends of rods **26,** such rods **26** being transverse of the direction of movement of the units across the unit supply table. One of rods **26** is pivotally attached to and extends through the upstream set of lever arms **22** and one of such rods **26** is pivotally attached to and extends through the center of the downstream set of lever arms **22.** Raising of bag body support plate **19** causes lever arms **22** to assume a more vertical position and in turn causes side bar **25** to be elevated and moved downstreamwardly while remaining horizontal. The elevation of side bar **25** in turn causes bag lip support member **17** to be raised. Since side bar **25** is attached at the center of lever arms **22,** the increase in elevation in member **17** will be one half that of support plate **19.** Changing the point of attachment of side bar **25** to lever arms **22** from the center of such lever arms would change the rate of elevation change of member **17** with respect to the rate of elevation change of support plate **19.**

In the apparatus illustrated in FIG. **1,** since bag body support surface **20** is twice as low with respect to unit supply surface **10** as bag lip support surface **18,** then the elevation of surface **20** approaches and becomes substantially equal to that of surface **18** when the elevation of surface **18** reaches that of unit supply surface **10.**

In practice, bag body support surface **20** will be raised in response to a detecting rod **26** which will constantly rest on and monitor the level of the upper nondistended bag of a stack of bags, such support surface **20** being raised so that the level of the upper nondistended bag is substantially at the level of unit supply surface **10.** Detecting rod **26** and air chamber member **27** appurtenant thereto are illustrated in more detail in FIGS. **7, 8** and **9.** Detecting rod **26** and air chamber member **27** are connected by means of lever arms **28** and **29** which are pivotally attached to rod **26** and member **27,** with the inside surfaces of such lever arms being flush with the outer surface of air chamber member **27.** Air chamber member **27** will be placed in a fixed, non-moveable position such that the movement of detecting rod **26** is limited. In normal operating position with a stack of bags on the bag support means, the position of air chamber member **27** will be fixed such that when lever arms **28** and **29** are horizontal as in FIG. **9,** the lower pointed end of detecting rod **26** will be substantially at the same elevation as unit supply

surface **10.** Detecting rod **26** will be placed to the side of the center line of flow so that it rests on the outer edge of the stack of bags such that it will not interfere with the inflation of a bag, and, will allow a bag which is being inflated to slip from underneath the lower end thereof such that the lower end of detecting rod **26** remains on the upper nondistended bag.

A chamber **30** within air chamber member **27** receives a supply of air from line **31,** chamber **30** being in open communication with the exterior of the surface of air chamber member **27** by means of two holes **32.** When the upper nondistended bag of a stack of bags is at the desired level of that of unit supply surface **10,** then the lower pointed end of detecting rod **26** which rests on the upper nondistended bag will also be at that level and lever arms **28** and **29** will be horizontal as in FIG. **9.** With lever arm **29** horizontal, both of holes **32** will be uncovered allowing most of the supplied through line **33** (from an air supply source not shown) to bleed off through holes **32** instead of passing to air cylinder **23;** and, therefore, air cylinder **23** will not be caused to elevate support plate **19.** As bags are used, the lower end of detecting rod **26** will be lowered and thus cover up a portion of holes **32,** the amount covered up depending on how far lever **29** is lowered. This lowering of lever **29** will result in more air passing to air cylinder **23** and a raising of support plate **19** and the bags thereon until the lower end of rod **26** is elevated to such a position that lever **29** is horizontal and does not cover any of holes **32.** With holes **32** again uncovered, air cylinder **23** will cease to elevate support plate **19.** Although only two holes **32** are illustrated on air chamber member **27,** in actual practice there could be as many holes as desired with a finer degree of control being obtained with several holes of small diameter.

The upper bag of a stack of bags on the bag support means will be distended by means of air nozzles **35** and **36.** Nozzles of this type are well known in the industry and the details of such will not be gone into herein. Initally, the upper bag of a stack of bags in a collapsed state will be partially opened by short, high pressure, blasts of air from air nozzles **36,** which are placed so as to direct the air down onto the upper surface of the extended lower lip of the upper bag. This serves to raise the upper lip and to partially open the mouth of the bag. With the bag partially open, a relatively large volume of air at low pressure will then be directed into the bag by nozzles **35** so as to fully distend and hold open the bag until it receives the unit or units to be bagged. In order to prevent the blasts of air from nozzles **35** and **36** from blowing the bag off the bag support means, some means must be provided in connection with bag lip support surface **18** so as to firmly hold the bags. In most industrial applications, especially when using thin plastic bags, this is accomplished by use of a wicket which extends through a set of prepunched holes on both edges of the bag lips and into wicket receiving holes **37** and bag lip support surface **18.** Although the bag material will be strong enough to hold the bag against movement by the blasts of air, pusher members **11** will exert enough force to tear away from the wicket the bag containing a unit and move the bagged unit downstreamwardly onto receiving surface **38.** Receiving surface **38** should be at substantially the same height or elevation as unit supply surface **10.** Receiving surface **38** is shown as a simple table but could be a belt conveyor or the like, and, receiving surface **38** may be a part of a "bagging machine" or an entirely separate and disconnected piece of equipment such as a conveyor.

By reference to FIGS. **4** and **5** a better understanding of how the apparatus of FIG. **1** operates with bags **39,** 40 and **41** thereon, the bags shown in such Figures being exaggerated in size and fanciful in appearance for illustration purposes. A stack of bags having an extended lower lip and stacked on a bag support means as illustrated in FIG. **1** will assume the approximate posture shown in FIG. **4,** the lips of the bags being held by wicket **42.** As bags are removed so that the stack becomes thinner, bag lip support member **17** will move straight up and bag body support plate **19** will move both upwardly and downstreamwardly as indicated by the arrows in FIG. **5.** When there remains only one bag of the stack, then member **17** and plate **19** will be substantially at the same level and be at a level such that the last bag is held in a substantially horizontal posture at the level of unit supply surface **10.** It will also be noted that the gap between the receiving surface **38** and the upper bag of the stack remains substantially the same regardless of the number of bags in the stack due to the movement downstreamwardly of bag lip support plate **19** while being raised.

It is within the scope of the present invention to construct the bag support means where both the bag lip support member **17** and the bag body support plate **19** both move only in a straight up and down motion, however, such is not preferred. Although a 2:1 straight up and down movement of plate **19** relative to a straight up and down movement of member **17** will serve to keep the upper nondistended bag horizontally disposed, the gap between receiving surface **38** and the stack of bags will grow wider as the stack becomes thinner. FIG. **6** illustrates the situation which will occur if the bag body support plate **19** is moved only vertically as bags are removed, and, as may be seen the gap between receiving surface **38** and the bags (indicated as distance *a*) increases as bags are removed.

The apparatus of the present invention should be constructed so that the lower or closed end of the bags will not be supported but will lie in a gap between the downstream edge of support surface **20** and the upstream edge of receiving surface **38,** and such that when distended the closed end will flip up onto and be supported by receiving surface **38.** In order to accomplish this the horizontal distance from the upstream edge of bag lip support surface **18** to a line perpendicular to the upstream edge of receiving surface **10,** that is distance *b* on FIG. **3,** should be less than the overall length of a bag (including extended lip); and, the overall length of bag body support surface **20** should be substantially less than the length of the main body portion of the bags. The reason for having distance *b* less than the overall length of a bag is so that the closed end of a distended bag will rest on and be supported by receiving surface **38,** the position which will be occupied by a distended bag **43** being generally illustrated in FIG. **3.** When a nondistended bag is inflated the lower end flips up onto receiving surface **38** as shown in FIG. **3** and therefore may be easily moved onto the receiving surface when desired. Many bags have a gusset at the lower end thereof such that the lower end of each bag is actually four thicknesses of material and this is another reason for not having a lower end supported by bag body support surface **20.** In most instances about

5 to 20 percent of the length of the body of a distended bag should rest on the receiving surface 38. When the receiving surface is a moving surface such as a belt conveyor, if too much of the bag is resting thereon then the bag may be prematurely carried downstreamwardly due to movement of the receiving surface.

The foregoing explanation with reference to the drawings is not to be taken as limiting the scope of the present invention as various changes and substitutions may be made without departing from the invention. For example, although unit supply surface 10 is shown as a simple table it could be a belt conveyor or the like, and/or could contain various accessories, such as guide rails, etc. Other means could be utilized than overhead pusher members 11 for causing movement of unbagged and bagged articles. Instead of only one type of system to accomplish movement of articles, there could be one type of system in one area and another type of system in another area.

The manner in which the bag supporting means is constructed in order to accomplish the 2:1 movement of the bag body support surface relative to the bag lip support surface and the directional movement of each may obviously be varied from that illustrated. For an apparatus as in FIG. 6, where both elements move only vertically, the lever arrangement of the apparatus of FIG. 1 is not necessary, and, in such instances a rack and gear arrangement with a 2:1 gear ratio will suffice. The rack portion may be fixed to and move with the bag body support plate and the meshing gear could be connected with the bag lip support member.

The foregoing explanation is also directed to an apparatus for use with bags wherein the thickest part of the main body portion (in a collapsed state and excluding any gusset on the closed end) is twice the thickness of the extended lower lip portion. However, the apparatus may be easily modified to handle bags wherein the thickest part of the main body portion (excluding any gusset at the closed end) is more than twice the thickness of the extended lower lip. For example, some bags in a collapsed state are prepared with gussets along each side of the bag (and which may or may not have gussets at the closed end), in which case the main body portion is four times the thickness of the extended lower lip portion. In order to accommodate such bags, the apparatus of the Figures may be modified such that the magnitude of vertical movement of bag body support plate 19 bears to the magnitude of vertical movement of bag lip support member 17 in the same ratio that the thickness of the main body of a bag bears to the thickness of the extended lower lip. In other words, where a bag having side gussets is being used, there would be a 4:1 vertical movement of bag body support plate 19 relative to bag lip support member 17.

Other modifications of the bag support means that come to mind include the use of guide or support rails on either side of a stack of bags and the use of a bag body support plate 19 which is adjustable both as to length and width. Instead of having only one bag support means for a particular unit supply surface, two parallel bag support means may be provided with means for sliding either one of the two into the path of travel of the units to be bagged. Use of parallel bag support means would allow one of them to be filled and serviced while the other was being used in the bagging operation without the necessity of shutting down in order to replace a depleted stack of bags.

Various types of detecting means are available which could perform the job of detecting rod 26 including both electronic and mechanical sensors. Likewise an electric motor or the like could be used instead of an air cylinder for raising and lowering the bag support means. The particular bag distending devices utilized will vary according to the type of bags and articles being bagged and frequently mechanical jaws which hold a bag open will be useful in addition to air pressure means. The use of mechanical jaws in addition to air pressure means is preferred when using bags of thin plastic material. In some instances instead of using air pressure to open a bag, a suction device may be used which will come down on the upper half of a bag and pull it upward so as to open the mouth of the bag.

The embodiments of the invention in which an exclusive property or privilege is claimed are defined as follows:

1. A bagging apparatus for use with bags each having a mouth with a lower lip extending beyond the upper lip, the thickness of the main body portion of each bag in a collapsed state being at least twice that of the extended lower lip thereof, which apparatus comprises:

a. a horizontally disposed unit supply surface over which units to be bagged are moved downstream to the bagging area;

b. a substantially horizontal receiving surface for receiving bagged units which is at substantially the same level as said unit supply surface means;

c. a split-level, bag support means for holding a stack of bags with their length in a generally horizontal position, said bag support means being located downstream of and immediately adjacent to said unit supply surface and upstream of said receiving surface means, the upper surface of said bag support means having a horizontally disposed upstream bag lip support surface adapted to firmly hold and support the extended lower lip portions of a said stack of bags and a horizontally disposed downstream bag body support surface which is adapted to support the main body of a said stack of bags, the length of said bag lip support surface being not substantially greater than the length of the extended lower lip of a bag, said bag lip support surface and said bag body support surface being movable vertically with respect to said unit supply surface and with respect to each other, means connecting said bag lip support surface to said bag body support surface such that said bag lip support surface and said bag body support surface are at substantially the same level when substantially at the level of said unit supply surface and such that a vertical movement of said bag lip support surface results in a vertical movement in a like direction but of a greater magnitude of said bag body support surface, the magnitude of vertical movement of said bag body support surface bearing to the magnitude of vertical movement of said bag body support surface in the same ratio that the thickness of the thickest section of the main body portion of a bag, in a collapsed state and excluding any gusset at the lower end thereof, bears to the thickness of the extended lower lip of a bag;

d. detecting means for detecting the level of the uppermost nondistended bag of a said stack of bags disposed on said bag support means;

e. means for moving said bag lip support surface and said bag body support surface of said bag support means vertically in response to said detecting means so as to maintain the uppermost nondistended bag of a said stack of bags substantially at the level of said unit supply table;

f. means to distend the mouth of the upper bag of a said stack of bags located on said bag support means so that that upper bag may receive a unit to be bagged;

g. means to move a unit to be bagged downstream over said unit supply surface and generally horizontally into the bag whose mouth is so distended and for continuing movement thereafter in the same general downstream direction to move such bag containing such unit away from said bag support means and onto said receiving surface.

2. The bagging apparatus of claim **1** wherein the length of said bag body support surface is substantially less than the length of the main body of a said bag and the downstream edge of said bag body support surface is spaced apart from said receiving surface means such that the closed ends of a said stack of bags will not be supported by said bag body support surface but will lie in the gap between said receiving surface and the downstream edge of said bag body support surface.

3. The bagging apparatus of claim **2** wherein the distance, measured horizontally, from the upstream edge of said bag lip support surface to an imaginary line perpendicular to the upstream end of said receiving surface is less than the total length of a said bag and is such that the closed end of the upper bag of a said stack of bags which has been distended rests on said receiving surface.

4. The bagging apparatus of claim **3** wherein said bag lip support surface moves only in a straight up and down vertical motion and wherein said bag body support surface moves vertically and downstreamwardly when being raised and vertically and upstreamwardly when being lowered.

5. The apparatus of claim **2** for use with bags each having a main body portion which, in a collapsed state and excluding any gusset at the closed end thereof, is twice the thickness of the extended lower lip portion thereof, and, wherein the vertical distance moved by said bag body support surface is twice the magnitude as that of said bag lip support surface.

6. The apparatus of claim **3** for use with bags each having a main body portion which, in a collapsed state and excluding any gusset at the closed end thereof, is twice the thickness of the extended lower lip portion thereof, and, wherein the vertical distance moved by said bag body support surface is twice the magnitude as that of said bag lip support surface.

7. The apparatus of claim **4** for use with bags each having a main body portion which, in a collapsed state and excluding any gusset at the closed end thereof, is twice the thickness of the extended lower lip portion thereof, and, wherein the vertical distance moved by said bag body support surface is twice the magnitude as that of said bag lip support surface.

8. A split-level, bag support apparatus for use with bags each having a mouth with a lower lip extending beyond the upper lip, the thickness of the main body portion of each bag in a collapsed state being at least twice that of the extended lower lip thereof, and for holding a stack of bags with their length in a generally horizontal position, said bag support apparatus being adapted to be located downstream of and immediately adjacent to a unit supply surface, said bag support apparatus comprising:

a. a horizontally disposed upstream bag lip support surface adapted to firmly hold and support the extended lower lip portions of a said stack of bags and a horizontally disposed downstream bag body support surface which is adapted to support the main body of a said stack of bags, the length of said bag lip support surface being not substantially greater than the length of the extended lower lip of a bag, said bag lip support surface and said bag body support surface being movable vertically with respect to a said unit supply surface and with respect to each other, means connecting said bag lip support surface to said bag body support surface such that said bag lip support surface and said bag body support surface are at substantially the same level when substantially at the level of a said unit supply surface and such that a vertical movement of said bag lip support surface results in a vertical movement in a like direction but of a greater magnitude of said bag body support surface, the magnitude of vertical movement of said bag body support surface bearing to the magnitude of vertical movement of said bag body support surface in the same ratio that the thickness of the thickest section of the main body portion of a bag, in a collapsed state and excluding any gusset at the lower end thereof, bears to the thickness of the extended lower lip of a bag;

b. detecting means for detecting the level of the uppermost nondistended bag of a said stack of bags disposed on said bag support apparatus; and

c. means for moving said bag lip support surface and said bag body support surface vertically in response to said detecting means so as to maintain the uppermost nondistended bag of a said stack of bags substantially at the level of a said unit supply table.

9. The bag support apparatus of claim **8** wherein the length of said bag body support surface is substantially less than the length of the main body of a said bag such that the closed ends of a said stack of bags will not be supported by said bag body support surface.

10. The bag support apparatus of claim **8** wherein said bag lip support surface moves only in a straight up and down vertical motion and wherein said bag body support surface moves vertically and downstreamwardly when being raised and vertically and upstreamwardly when being lowered.

11. The apparatus of claim **8** for use with bags each having a main body portion which, in a collapsed state and excluding any gusset at the closed end thereof, is twice the thickness of the extended lower lip portion thereof, and, wherein the vertical distance moved by said bag body support surface is twice the magnitude as that of said bag lip support surface.

12. The apparatus of claim **11** for use with bags each having a main body portion which, in a collapsed state and excluding any gusset at the closed end thereof, is twice the thickness of the extended lower lip portion thereof, and, wherein the vertical distance moved by said bag body support surface is twice the magnitude as that of said bag lip support surface.

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