INFLATED BAG PRINTER AND METHOD

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ABSTRACT

A method and device for imprinting indicia such as price and code data on an inflated bag which involves the steps of first inflating a bag by an air jet, second deflecting a portion of the inflated bag, third printing indicia on a portion of the deflated portion. The apparatus includes an air jet for inflating the bag to a position underlying a marker type face and an anvil movable to contact a portion of the bag and to collapse a portion of the bag while urging a surface portion of the collapsed portion against the marking face.

7 Claims, 4 Drawing Figures
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INFLATED BAG PRINTER AND METHOD

BACKGROUND OF THE INVENTION

1. Field of the Invention

This invention relates to marking devices and more particularly to a device for and method of applying indicia to bags.

2. Prior Art

Devices for applying markings, such as printed indicia, to packages, such as bags, are in widespread use. However, in connection with bags, it has been normal to preprint the bags prior to placing them on the machinery or equipment which will fill them with a product.

The bags are normally stacked adjacent the filling machinery. In such a condition, they are not susceptible to printing because the presence of underlying bags would provide an insufficient support for the application of printed indicia to the top bag. It is for this reason that, heretofore, product receiving bags have normally been printed at the time of manufacture of the bags. However, it is oftentimes desirable to add printed indicia to the bag during the manufacturing process. Where the process includes bagging of perishables such as food it is often desirable to date the bag. Additionally, it may be desired to apply a price to a bag at the time it is filled with product. Since prices fluctuate, it is not practical to do this at the time of manufacture of the bags. Because of the difficulty of applying printing to a stack of bags, and in view of the expense in separating the bags to individually apply printing to them prior to filling them with product, dating and pricing of the bags at the time of filling has been difficult. Further, it is not practical to apply printed indicia to a bag after the bag has been filled with product inasmuch as to attempt to do so will normally damage the product. It would therefore be an advance in the art to provide a method and apparatus for applying printed indicia to a bag at a point in time where it has been at least partially separated from a stack of bags and before it has been filled with product.

SUMMARY OF THE INVENTION

My invention provides such a device and method. Product packaging machinery which use bags, particularly those bags which are formed of polyethylene or the like, often inflate the bag from a stack of deflated bags prior to filling the bag with product. This at least partially separates portions of the bag from the stack of bags. When the bag is inflated, mechanical means are utilized to maintain it in an expanded condition and to move it adjacent to a product filling station. Prior to the time that the mechanical means move the bag, it is possible to imprint onto the bag by forcing a portion of the bag surface into contact with an imprinter. I have found that this can be best done by deflating a portion of the inflated bag to push a surface portion of the bag against an imprinter.

In my illustrated embodiment, I have provided an imprint marker at a point adjacent to portions of a bag inflated from a stack of bags. I have also provided a moveable arm which is triggered after inflation of the bag to move against an inflated portion of the bag to collapse or deflate a portion of the bag and to thrust a surface of the bag against the imprint marker. After the portions of the bag have been pressed against the imprint marker, the arm is removed from contact with the bag whereby the bag is free to be moved by the mechanical means to a filling station. Through the use of the moving arm, I am able to provide a suitable base or anvil which allows the marker to imprint on the bag surface. Additionally, because the bag is first inflated, and because portions of the bag remain inflated during the marking operation, the bag surface will be in a taut condition so that the imprint area will be free of wrinkles.

It is therefore an object of this invention to provide an imprint marker for bags.

It is a further more specific object of this invention to provide an imprint marker for inflated bags.

It is yet another and more specific object of this invention to provide a means of imprinting bags comprising the steps of first inflating a portion of the bag and second deflecting the portion of the bag while thrusting it against an imprint marker.

It is another and more specific object of this invention to provide an apparatus for imprinting an inflated bag which includes a moving member which forces a surface portion of the bag against an imprinting device.

It is yet another object of this invention to provide a method and apparatus for imprinting inflated bags by moving a mechanical support member against the inflated bag to deflect portions thereof and to thrust a surface portion of the bag against an imprint device.

Other objects, features and advantages of the present invention will be readily apparent from the following description of the preferred embodiments thereof taken in conjunction with the accompanying drawings although variations and modifications may be effected without departing from the spirit and scope of the novel concept of the disclosure.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a side plan view with portions broken away to show underlining portions of the imprint marker of my invention positioned adjacent a stack of inflatable bags.

FIG. 2 is an end plan view of the device of FIG. 1 taken along the lines II—II of FIG. 1.

FIG. 3 is a fragmentary view of the device of FIG. 1 illustrating the imprinting step of my invention.

FIG. 4 is an enlarged fragmentary view of the device of FIG. 3 illustrating imprinting of a bag.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

FIG. 1 illustrates an inflated bag marking device 10 including a marking tape supply reel 11, a take up reel 12, a marking head assembly 13, a moving arm assembly 14, and an actuating mechanism 15. The assembly is positioned adjacent a stack of deflated bags 18 which is adapted to imprint on the bags. In the preferred embodiment illustrated, it is assumed that the marking device 10 is positioned for operation adjacent the end of a production line for filling the bags. The bags illustrated are those which are used, for example, as bread wrappers. In such a system, a stack of bags 18 is provided on a support 19, which the bags may overlie adjacent one end 20 thereof. The support carries a fastening means such as a post 21 and the bags may be equipped with a flap 22 which extends beyond the open end 23 of the bags, the flap having opening
therethrough to fit over the post or fastening means 21. The bags are inflated by a stream of air which may for example come from an air nozzle 25. The air is directed towards the stack of bags in such a manner that it will inflate the top bag. After inflation, the production machinery includes holding and transfer devices such as for example a pair of arms which will enter the inflated bag and press against the inside walls of the bag to maintain it in an open position while moving the bag over the produce such as a loaf of bread. It will be understood that the production machinery described, as well as the positioning and holding of the stack of bags and the means of inflating the bags are illustrative of one possible system, but that my invention can be practiced with a wide range of possible systems which utilize bags which are first inflated or opened and which are then filled with produce or product. It should also be appreciated that the position of the marking device 10 with respect to the stack of bags 18 is illustrative only.

This invention contemplates first placing the marking device 10 adjacent the inflation station of the bags. When the bag is inflated, the placement of the marking machine will be such that a portion of the inflated bag will underlie the marking head of the marking device. Thereafter a portion of the bag, in the illustrated embodiment an end portion of the bag, is deflated by movement of a mechanical member into the side wall or end wall of the bag to collapse the bag and to act in the manner of a moving anvil to force a portion of the bag surface towards the marking head. Thereafter the arm is withdrawn and the deflated portion of the bag reinflates. It can be seen that this device can thus succeed in marking bags from a stack of bags without interfering with the production machinery. Since it takes some time for the production machinery to inflate the bag and then to move, in the described embodiment, the mechanical arms into the bag to grip the bag for receipt of product, there will be a time delay between initial inflation of the bag and movement of the bag away from the stack of bags. It is during this time delay that the marking device acts on the bag. Any attempt to mark the bags before inflation will fail because the underlying bags will provide too soft a base and the marker will not properly contact a rigid surface. In addition, when the bags are in their relaxed collapsed state, there can exist wrinkles across the surface of the bag. However, once the bag is inflated, the surface is taut in the manner of an inflated balloon and the moving arm does not act in a way which would create wrinkles in the surface. Thus, the moving arm urges a smooth surface towards the marker head.

In the embodiment described, because the marker operates adjacent the closed end of the bag, it is positioned remote from the open end. Entering production machinery, such as the above-mentioned moveable arms, which will act on the bag, will normally act from the open front end. This again increases the time span in which the marker can act on the bag without affecting the production system.

The marking section of the bag itself can be any of a number of different markers. For example, in the illustrated embodiment, I have shown and will further describe a heated head marker which acts on a plastic tape to transfer portions of the tape surface to the bag for imprinting thereon. Of course, the tape could be an ink tape which would imprint on the bag. In addition, an ink roller system could be utilized which would ink the type head for imprinting in that manner. Of course, although I have described a fixed type, automatically changing type systems could be provided where it is desired to sequentially number the bags at the time of imprinting or where it is desired to place other indicia thereon such as weight of the contents, date and hour of the manufacture, lot number, type of product, etc.

It will be further understood that although I have illustrated a system which utilizes an air cylinder for actuation of the moveable arm, that other systems can be utilized such as by way of example solenoids or a direct mechanical linkage to operating portions of the production machinery. In addition, where inking systems or the like are used, it will not be necessary to provide the tape rollers 11 and 12 and of course, if it is desired, a sequentially moveable reciprocating marker may be provided in place of the stationary marker illustrated. Further, in some embodiments it may be desirable to place the marking system on the end of the moveable arm and use a stationary anvil. While I have illustrated and will describe a moveable arm which moves through an arc, other systems may have horizontally or vertically moveable arms or may collapse the bag through other mechanisms.

A more particular description of the preferred embodiment is as follows:

My marker includes a base member 20 which functions as a carrier for the remainder of the marking assembly and which will be affixed to a support, not illustrated, which will position the base adjacent the stack of bags 18 and in a position where the inflated bag will have a side or circumferential surface positioned adjacent the marker head assembly 13 which has printing type 31 thereon when the bag is inflated. A guide member 32 which is attached to the base as by means of a carrier 33, may be provided to guide the inflated bag into position adjacent the type 31.

The base 30 has an extended leg 34 thereon which is equipped with supports for the tape supply roller 11 and the tape take up roller 12. In addition an air cylinder 35 is attached to the base and has a power arm 36 extending therefrom. A shuttle carrier block 38 is attached to the base, preferably in an adjustable manner as by the adjustable fasteners 40. The carrier is therefore moveable with respect to the base, as illustrated, in a vertical direction. The carrier 38 has means for attaching a heater block 42 thereto. The heater block carries and surrounds the type carrying marking head assembly 13 and is electrically connected to a power source so that the heater block function to maintain the type 31 in a heated condition.

A shuttle 45 has one end 46 attached to the power arm 36 through a bracket 47. The shuttle extends through the carrier 38 and is supported thereby for horizontal movement. The air cylinder 35 is preferably a double acting cylinder capable of positive horizontal movement of the shuttle in both directions. The free end 49 of the shuttle has a cam opening 50 therein. The base member 30 has an arm 51 attached thereto below the free end of the shuttle and extending outwardly below the cam opening 50 when the shuttle is in its retracted position. A moving arm 14 is pivotally attached to the arm 51 and has a cam roller 53 on one end received in the cam opening 50. The moving arm 14 is angled as at 60 and has an anvil 61 attached to the free
end thereof remote from the cam roller. Thus, movement of the shuttle horizontally will pivot the arm 14 around the pivot connection 55 to the base arm 51. The positioning of the pivot 55 and the length and angle of the arm 14 are such that when pivoted by movement of the shuttle, the anvil will move to the type 31. The anvil carries a pressable pad 63 on a surface thereof which will strike the type 31. The pad 63 is preferably of a resilient material such as viton rubber.

The base also carries tape guide rollers 70 which direct the tape from the supply reel 11 to the take up reel 12 and across the face of the type 31 intermediate the type and the anvil 61 of the moveable arm when the anvil is urged to the type. Additionally, pressure and tape advance rollers 71 control the movement of the tape and may be actuated by a cam opening 72 in the shuttle so that movement of the shuttle will also cause movement of the tape. Linkage systems may be connected between the shuttle and the tape supply and take up reels 11 and 12 can be provided to maintain a positive tension on the tape.

FIG. 3 illustrates the effect of movement of the arm 14 caused by movement of the shuttle 45. The arm will move against the end surface 80 of the inflated bag 81 to collapse the bag forcing it to move ahead of the moving anvil 61. As the bag collapses, the end surface 80 will be brought into contact with the underside of the top surface 83 to force it, against the type 31 and tape 84. Preferably, as is illustrated, the cam opening 50 has a dwell period 58 formed therein so that the arm will move quickly to the type and then press thereagainst for a sufficient period of time for the type to transfer the incision to the bag. Thereafter, the double acting air cylinder 35 will withdraw the shuttle removing the anvil from the bag and allowing the bag to reinflate. The movement of the air cylinder is timed with respect to the production machinery and the inflation of the bag.

It should be noted that the anvil 61 contacts a surface of the bag which is not opposite the surface to be printed. In the illustrated embodiment the anvil 61 contacts the end or bottom wall 80 of the bag while imprinting by the type head 31 on the surface 83 of the bag. In this instance the end surface 80 is normal to the surface to be imprinted. However, if the marking device 10 were to be rotated 90° from that illustrated, then the anvil 61 would contact a side wall of the bag while effectively forcing an adjacent side wall into contact with the marking head. If the bag is a rectangular cross section then the two side walls would be adjacent but at a right angle to each other. However if the cross section of the bag is other than rectangular, such as for example, circular, the non-opposed relationship of the surface contacted by the anvil to the surface urged against the type head can be described as having the surfaces contacted respectively by the anvil and by the type head spaced apart less than 180°. The phrase “adjacent non-opposed surfaces” is used to describe all of the above discussed contacts and to emphasize that the anvil does not contact the opposite side of the bag from the side to be imprinted thereby allowing the marking device to be used adjacent the stack of bags without contacting or interfering with the un-inflated bags in the stack.

It can therefore be seen from the above that my invention provides a method and apparatus for imprinting bags, particularly for imprinting bags which have been inflated. The printing is accomplished by deflating a portion of the bag to force a surface thereof against a type head with the bag entrapped between the type head and an anvil. The anvil is a moving anvil which causes deflation of a portion of the bag.

Although the teachings of my invention have herein been discussed with reference to specific theories and embodiments, it is to be understood that these are by way of illustration only and that others may wish to utilize my invention in different designs or applications. I claim as my invention:

1. A method of imprinting bags by forcing a surface portion thereof against a marking device which comprises the steps of positioning a deflated bag adjacent a marking device, inflating at least a portion of the bag by means of an air jet, deflating a portion of the inflated portion of the bag, moving a surface of the bag adjacent the deflated portion against the marking device, marking the surface by the device and withdrawing the surface from the marking device.

2. The method of marking a bag by a marking device which comprises the steps of positioning a bag adjacent a marking device, inflating a portion of the bag by means of an air jet, with first and second wall portions of the bag spaced apart from one another, moving a first wall portion of the bag towards the second wall portion thereof while collapsing a portion of the inflated bag, entrapping the second wall portion between the marking device and the first wall portion, urging the first wall portion against the second wall portion to urge the second wall portion against the marking device, imprinting the second wall portion by the marking device, and withdrawing the first wall portion from urged contact with the second wall portion.

3. The method of claim 2 including the additional step of re-inflating the deflated portion of the bag after withdrawal of the first wall portion.

4. An apparatus for imprinting bags which comprises an imprint marker device having a marking head, an anvil, said anvil attached to the end of a moving member, means for moving the member to move the anvil towards and away from the marking head, means for positioning a bottom wall of a bag inflated by an air jet from a stack of deflated bags between the anvil and the marking head, the means for moving, moving the anvil against the bottom wall to collapse a portion of the inflated bag to press a first surface portion thereof against the marking head the first surface being adjacent, non-opposed to the bottom wall and means for withdrawing the anvil from contact with the bag.

5. A device for imprinting bags which comprises a marking device with a marking type, the marking device positioned adjacent a stack of deflated bags, means for inflating the bags one at a time, means for maintaining a first surface of the inflated bag adjacent the marking device, a movable arm, an anvil member at the end of the movable arm, means for moving the arm and anvil for moving the anvil against a second surface of the inflated bag, to collapse a portion of the inflated bag to urge a portion of said first surface thereof against the marking type, means for withdrawing the movable arm and anvil, and means for positively re-inflating the collapsed portion of the bag.

6. A method of marking inflated bags which comprises the sequential steps of: (a) positioning a stack of deflated bags adjacent a marking device having a movable arm thereon, (b) inflating the top bag of the stack.
7. A method of imprinting bags by a marker device which comprises the steps of positioning a deflated bag adjacent the marker device, inflating the bag by directing an air jet into an opening of the bag, deflating a portion of the bag while maintaining the air jet into the opening of the bag, forcing a surface of the bag adjacent the deflated portion against the marker device, marking the surface by the device, and re-inflating the collapsed portion of the bag by the maintained air jet after marking.