April 18, 1939. W. F. HABAS ET AL 2,154,743

APPARATUS AND METHOD FOR CREASING BAGS

Filed Dec. 31, 1937 4 Sheets-Sheet 1

Fig. 1

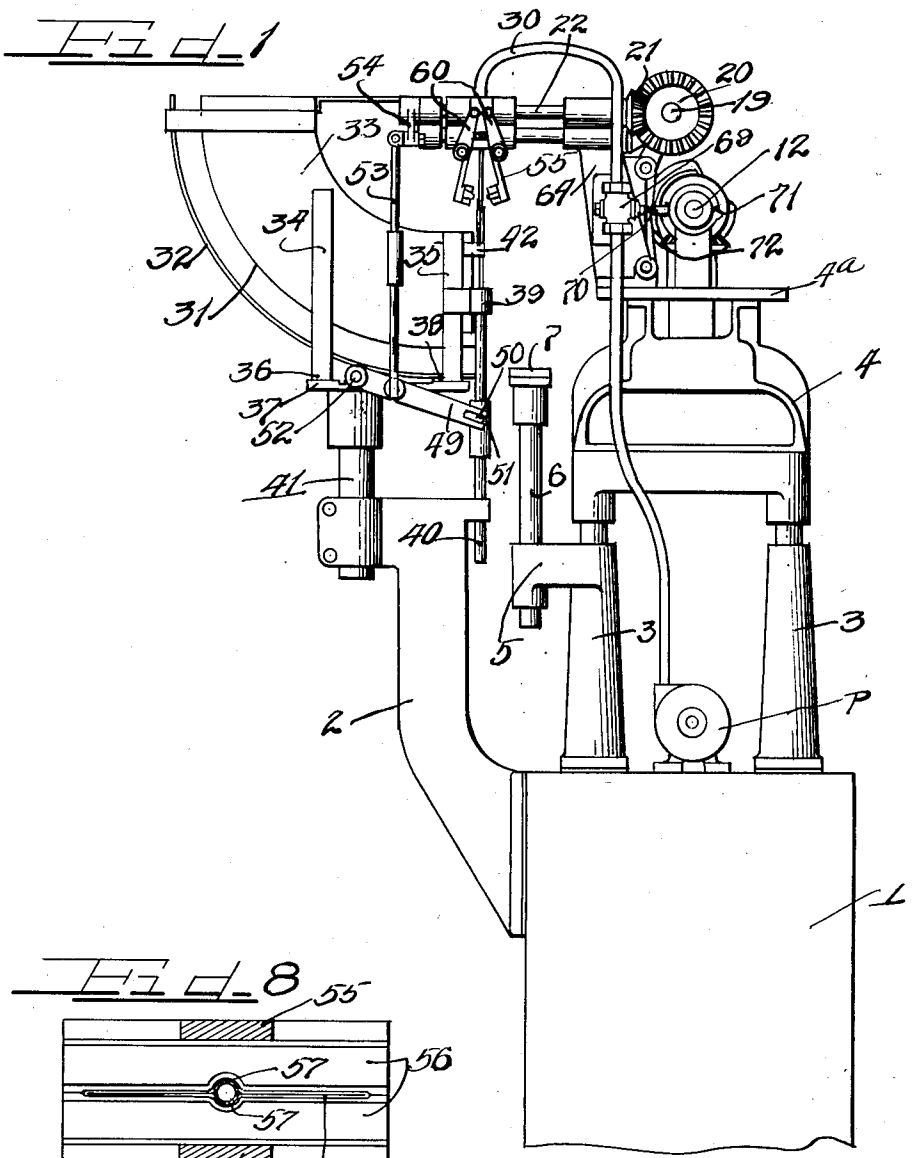


Fig. 8

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Filed Dec. 31, 1937 4 Sheets-Sheet 2

Fig. 2

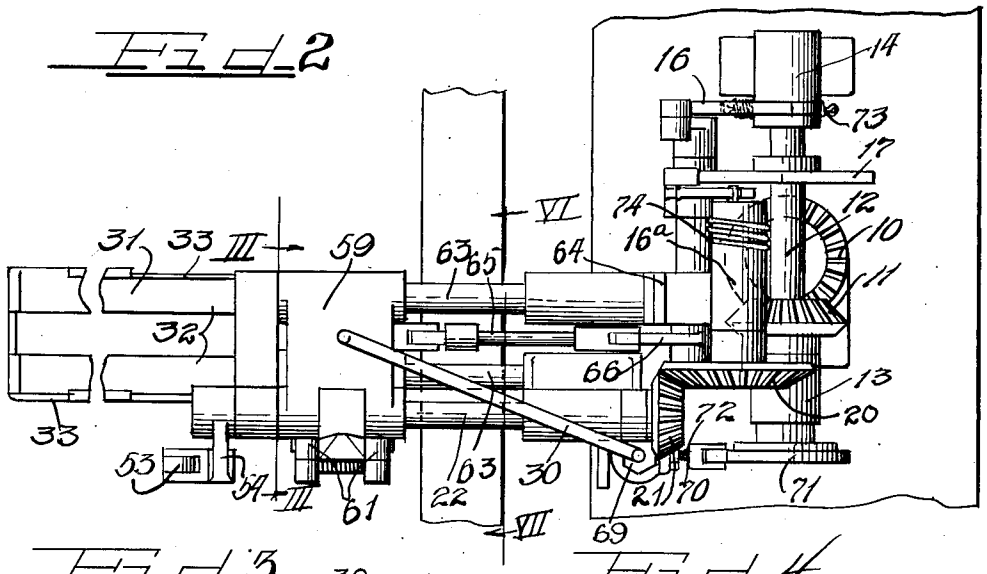


Fig. 3

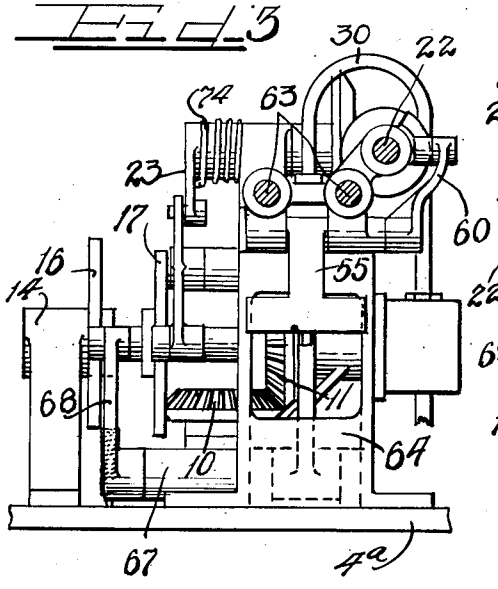
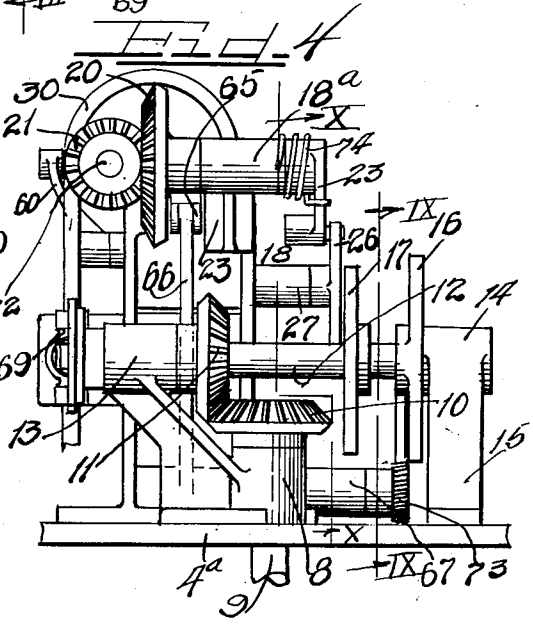


Fig. 4



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APPARATUS AND METHOD FOR CREASING BAGS

Filed Dec. 31, 1937 4 Sheets-Sheet 3

Fig. 5

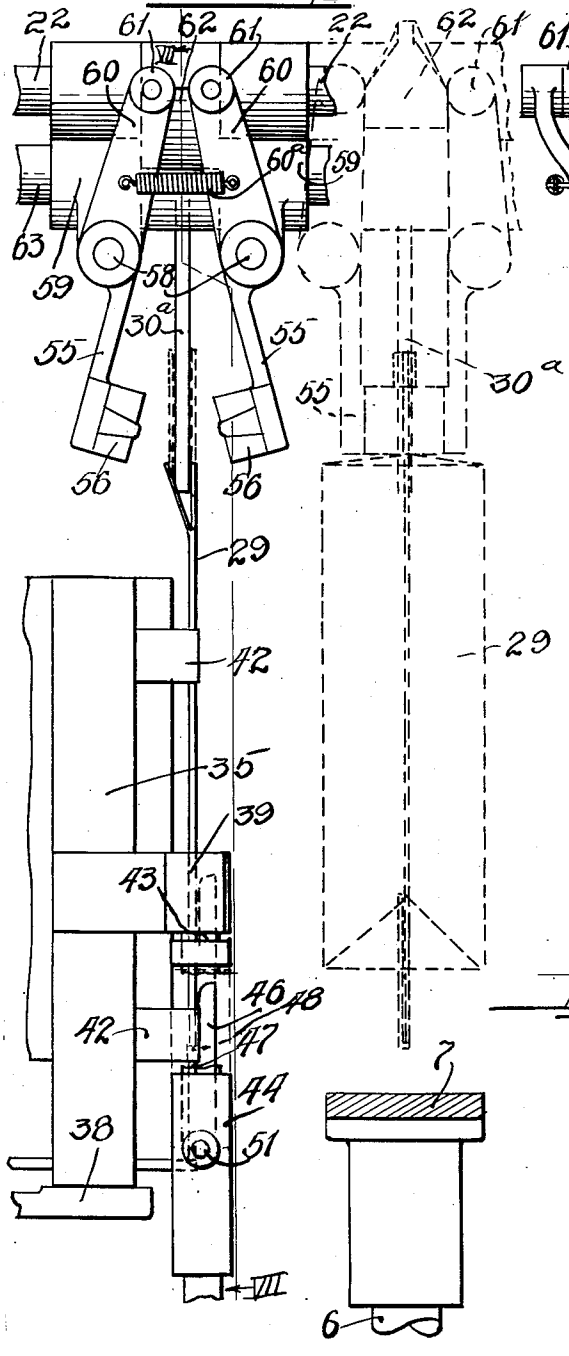


Fig. 6

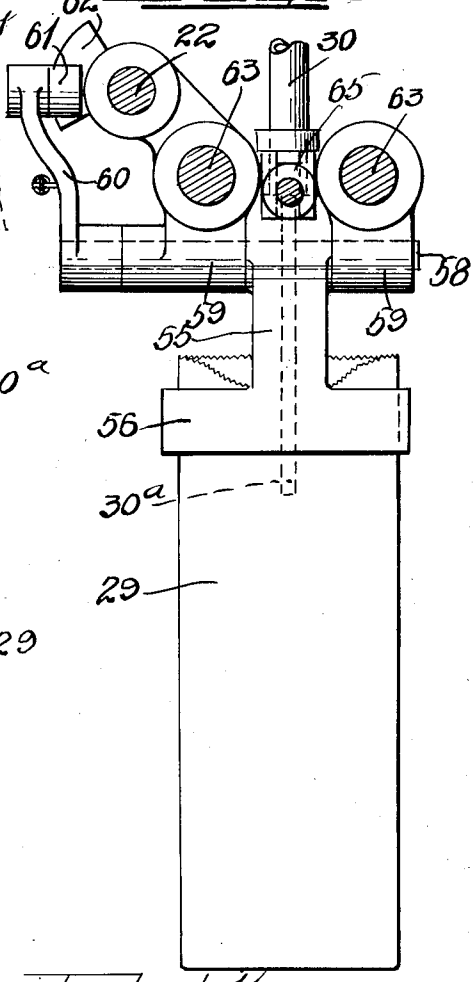
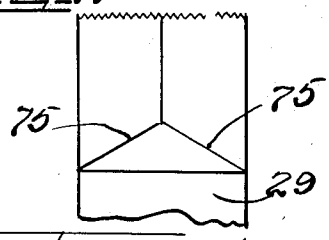


Fig. 11



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APPARATUS AND METHOD FOR CREASING BAGS

Filed Dec. 31, 1937 4 Sheets-Sheet 4

Fig. 7

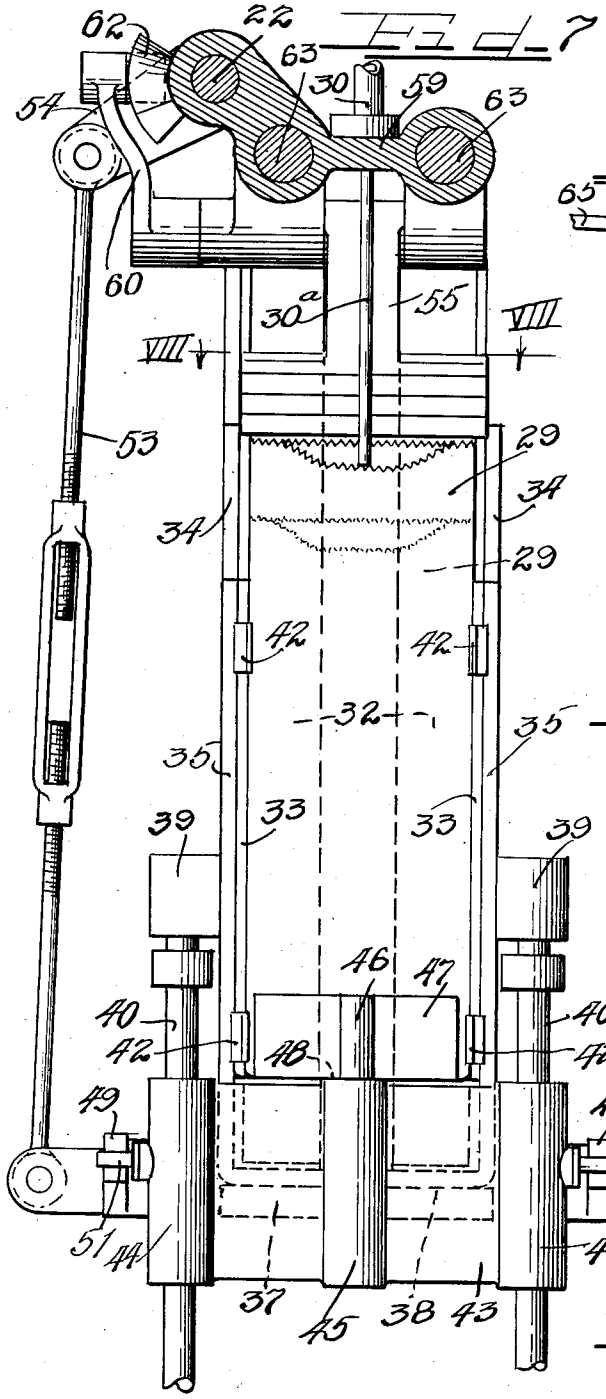


Fig. 9

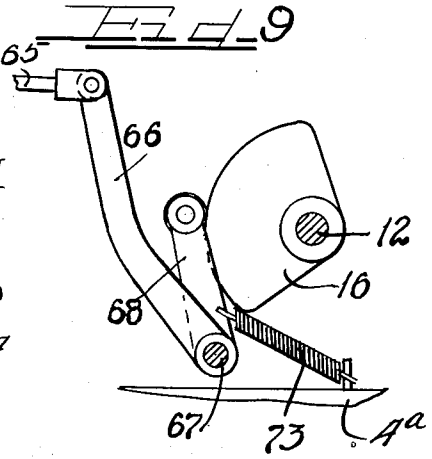
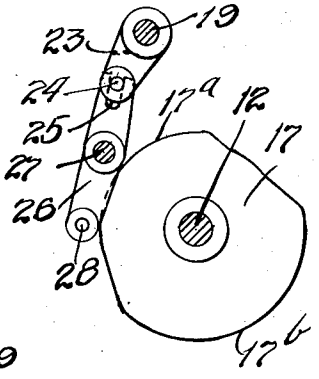


Fig. 10



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UNITED STATES PATENT OFFICE

2,154,743

APPARATUS AND METHOD FOR CREASING BAGS

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Application December 31, 1937, Serial No. 182,654

16 Claims. (Cl. 93—6)

This invention relates to an apparatus and method for creasing the ends of bags.

It is well known that before a filled paper bag can be folded at its neck portion it is necessary to tuck in the end walls and/or crease or score the same so that as the empty neck portion is folded, the end portions will fold inwardly instead of outwardly and the folds will occur upon properly defined lines.

In the past, various devices have been used for tucking in and/or creasing the upper end walls of a paper bag among which may be mentioned cooperating dies, or levers.

It is an object of this invention to avoid the use of mechanical means for creasing the end walls of a paper bag and using pneumatic means for expanding the bag and causing the end walls to crease along proper and converging lines so that the neck portion of the bag can be properly folded thereafter.

The invention more particularly includes means for passing air into an empty bag and expanding the same while the mouth of the bag is held in clamped position against the egress of the air.

The invention comprises the novel structure, method and combination of parts hereinafter described and more particularly pointed out and defined in the appended claims.

In the accompanying drawings which illustrate a preferred form of this invention and in which similar reference numerals refer to similar features in the different views,

Fig. 1 is an elevational view of a bag creasing unit involving this invention.

Fig. 2 is a top plan view of Fig. 1.

Fig. 3 is a sectional view taken substantially upon the line III—III of Fig. 2 looking in the direction of the arrows and showing parts in elevation.

Fig. 4 is a front elevational view of Fig. 2.

Fig. 5 is an enlarged fragmentary elevational view of a part of the unit illustrating certain steps in the operation of the unit in applying air within a paper bag, and showing in dotted lines an expanded paper bag.

Fig. 6 is an enlarged sectional view taken substantially upon the line VI—VI of Fig. 2, looking in the direction of the arrows.

Fig. 7 is an enlarged view taken substantially upon the line VII—VII of Fig. 5 looking in the direction of the arrows and showing parts in elevation and parts in section.

Fig. 8 is an enlarged sectional view taken substantially upon the line VIII—VIII of Fig. 7 looking in the direction of the arrows.

Fig. 9 is an enlarged sectional view taken substantially upon the line IX—IX of Fig. 4, looking in the direction of the arrows.

Fig. 10 is an enlarged sectional view taken substantially upon the line X—X of Fig. 4 looking in the direction of the arrows.

Fig. 11 is a fragmentary elevational view of an end of a paper bag illustrating the manner in which it is creased according to this invention.

In referring now to the drawings, which, it will be understood, illustrate the chosen embodiment of this invention, the numeral 1 indicates a supporting base or pedestal having a bracket 2 extending from one side. Suitable standards 3 rise from the base and carry a casting 4 at their upper ends for sustaining the operating mechanism of the machine. One of the standards 3 carries an arm 5 that supports a vertically extending rod 6 having a bag platform or runway 7 at its upper end.

Upon the casting 4, there is a platform 4a that carries a vertical bearing 8 (Fig. 4) in which a driving shaft 9 is journalled. A bevel gear 10 is secured to the upper end of said shaft. The bevel gear 10 meshes with and drives a bevel gear 11 secured upon a horizontal shaft 12 that is journalled in a bearing 13 integral with the bearing 8 and in a bearing 14 carried by a standard 15 rising from the platform. Upon the shaft 12 are secured the spaced cams 16 and 17 to which reference will be made later.

Spaced inwardly from the standard 15 there is another standard 18 rising from the base 4a and which has a bearing 18a in which a shaft 19 (Fig. 1) is journalled. A bevel gear 20 is secured upon the shaft 19 and this bevel gear meshes with and drives a bevel pinion 21 secured upon a shaft 22.

The shaft 19 carries a crank arm 23 at its outer end as best shown in Fig. 10. The crank arm carries a pin 24 that extends into a slot 25 in one end of a lever 26 which is pivoted intermediate its ends on a stud 27 projecting from the standard 18. The unnotched end of the lever 26 carries a roller 28 that is in engagement with the cam 17 on shaft 12.

It will be noted that cam 17 has a raised portion 17a and a second raised portion 17b that are adapted to coact with the roller 28 for imparting two rocking movements to shaft 19 through the lever 26 and crank arm 23. The movement imparted by the raised portion 17a will impart a sufficient rotation to shaft 22 to elevate a bag 29 for engaging the mouth of the bag with the air pipe 30 as shown in Fig. 5 as will later more fully appear.

In referring now to Figs. 1 and 2, it will be observed that a bag magazine 31 is suitably supported upon the frame work of the machine. This magazine comprises two curved and spaced bottom plates 32 and side plates 33 which are secured to the standards 34—35. The standards 34 constitute side arms of a U-shaped bracket 36 secured to and supported upon a plate 37, and

the standards 35 constitute the arms of a U-shaped bracket 38 likewise secured to the plate 37 in spaced relation to the bracket 36. The sides 35 of the bracket 38 are welded or secured to bearings 39 (Fig. 7) rigid on the upright rods 40 which are secured to the forementioned bracket 2. The plate 37 is supported upon supports 41 also extending from the bracket 2.

In order to retain the bags in upright position within the magazine 31, the side arms or bars 35 of bracket 38 are provided with suitable clips 42 (Fig. 7) that form lips extending toward each other that are adapted for engaging the side edges of the foremost bag in the magazine.

The foremost bag in the magazine is adapted to be elevated for engaging its mouth with the air pipe 30 as shown in full lines in Fig. 5. The bag elevating mechanism consists of a slide 43 (Fig. 7) which has bearings 44 slidably mounted upon the rods 40. A stud 45 is carried by the slide 43 and this stud has a reduced portion 46 above the slide. A plate 47 is secured upon the reduced portion 46 of the stud 45 and this plate extends in parallel relation with the slide. Upon the rear side of the plate 47 there is a shoulder 48 that can pass between the plates 32. This shoulder 48 is merely a narrow ledge designed to engage only the bottom of the foremost bag 29 for elevating the same when the slide 43 is elevated.

The slide 43 is pivotally connected to a pair of levers 49 which are provided with slots 50 in their ends for engaging pivot pins 51 on the sides of the slide 43 as shown in Figs. 1 and 7. The levers 49 are connected for conjoint movement. To this end, they are secured at their rear ends to a rod 52 which is suitably journalled upon the plate 37. An adjustable link 53 is pivotally connected to one of the levers 49 at its lower end. The upper end of the link is pivotally connected to a crank arm 54 rigidly secured upon the end of the shaft 22.

When the arc 17*a* of the aforementioned cam 17 engages the lever 26, the shaft 19 will be rocked for imparting a partial rotation to shaft 22 for elevating the slide 43 to the position shown in full lines Fig. 7, in which position the mouth of the bag will be partially telescoped over the air pipe 30. As the cam 17 continues to rotate, the arc 17*b* will engage the lever 26 and swing crank 23 further to the right for again rotating shaft 19 and rotating shaft 22 further for elevating the slide 43 and the bag 29 to the position shown in dotted lines in Fig. 5. A spring 74 connected to crank arm 23 will act to return shaft 22 to its original position.

When the bag is completely elevated, a pair of lever arms 55 are brought together for tightly clamping in an air tight manner the mouth of the bag against the air pipe 30 to preclude the exit of air through the mouth of the bag. To this end, the lower ends of the lever arms carry rubber or flexible pads 56 which are formed with confronting grooves 57 (Fig. 8) to receive the air pipe 30. These lever arms 55 are secured at their upper ends to shafts 58 journalled in a carriage 59 to which reference will later be made. The outer ends of the shafts 58 have rigidly secured thereto crank arms 60 which carry rollers 61 at their free ends.

Upon the forementioned shaft 22, there is a cam 62 which is of substantially wedge shape for engaging between the rollers 61 for swinging the crank arms 60 in opposite directions, an operation which will rock shafts 58 in opposite direction and force the lever arms 55 together for tightly clamping the neck of the bag against the air pipe 30 and tightly closing the mouth of the bag. A spring 60*a* contracts the arms 60.

After the bag is clamped against the air pipe 30 it is shifted to the position shown in dotted lines in Fig. 5, in which position it is directly over the support or runway 7. For this purpose, the carriage 59 is slidable upon shaft 22 and also upon two supporting rods 63 which extend from the top of a standard 64 rising from the base 4*a*.

In order to slide or shift the carriage 59, it is connected to a link 65 (Figs. 2 and 9) which in turn is connected to an arm 66 secured upon a shaft 67 to which a lever arm 68 is secured that is in operative relation with the cam 16 upon shaft 12. A spring 73 connected to the arm 68 and the frame of the machine becomes effective at a predetermined time for rocking shaft 67 and causing the shifting of the carriage 59 to the right as shown in dotted lines in Fig. 5. The cam 16 returns the parts to their original position.

When the bag is in its clamped position and has been shifted as above described, a valve within the housing 69 (Fig. 1) is actuated for opening the air pipe 30 for admitting air into the bag. The valve stem 70 extending from the valve within the housing 69 is adapted to be actuated by a cam 71 on the inner end of the shaft 12, a spring 72 surrounding the valve stem is designed to close the valve as is common in such valve constructions.

The valve housing 69 may be connected to an air pump P or any suitable source of air under pressure. It will be noted that the air pipe 30 embodies a flexible section between the valve housing 69 and the bearing 59 and a rigid portion in the form of a metal tube 30*a* that extends through the bearing 59 and therebelow for entering the bag.

When the empty bags are placed in the magazine, they are folded flat with the upper end portions folded inwardly. When the neck of a bag is clamped about the air pipe as shown in dotted lines in Fig. 5, and air is blown into the bag through pipe 30*a*, the bag will expand as shown in Fig. 6, and creases 75 (Fig. 11) will be formed in the ends of the bag due to the pressure exerted against the clamped portion. The creases at each end of the bag will converge as shown in Fig. 11 and will define the lines upon which the bag will be folded. The machine is automatic in its operation in that it will first elevate an empty bag from the magazine and guide it to the air pipe and engage the pipe in the mouth of the bag. The clamping members 55 will then be operated to clamp the neck of the bag about the air pipe. The carriage 59 will then be shifted to the right over the runway 7 so that it will be free from the magazine and can be readily expanded by air pressure for creasing the end walls. As pressure is exerted against the clamped neck of the bag and the ends expand, the creases 75 will be formed.

The method herein involved simply consists in holding or clamping the mouth of a paper bag in an air tight manner, a thing which can be done by the hands or fingers, and blowing air through an unclamped portion of the mouth of the bag to expand the bag and crease the end walls thereof.

From the foregoing, it will be apparent that a novel form of means and method have been provided for creasing the end walls of paper bags so that the same can be properly folded.

We are aware that many changes may be made and numerous details of construction may be varied through a wide range without departing from the principles of this invention, and we, therefore, do not purpose limiting the patent granted hereon otherwise than is necessitated by the prior art.

We claim as our invention:

1. In an apparatus for creasing the end walls of a bag, an air pipe, a bag magazine, means for elevating the foremost bag in said magazine and telescoping the same over said air pipe, means for clamping the mouth of said bag about said pipe, means for laterally shifting the clamped bag and means for automatically controlling the flow of air through said pipe.

2. In an apparatus for creasing the end walls of a bag, an air pipe for supplying air interiorly of the bag for expanding the same, and means for clamping the mouth of the bag against said pipe and closing the said mouth of the bag against the escape of air during the expanding of said bag.

3. In an apparatus for creasing the end walls of a bag, a bag magazine, a carriage, an air pipe carried by said carriage, means for elevating a bag and telescoping its mouth portion over said air pipe, a pair of clamping members pivoted upon said carriage, means for simultaneously actuating said clamping members for clamping the mouth portion of said bag against said pipe, means for shifting said carriage and means for controlling the flow of air through said pipe.

4. In an apparatus of the class described, an air pipe, a bag magazine, means for conveying a bag from said magazine and telescoping the same upon said pipe, means for clamping the mouth of said bag against said pipe in an air tight manner, and means for controlling the flow of air through said pipe.

5. In an apparatus of the class described, an air supply pipe, a bag magazine, means for conveying a bag from said magazine and telescoping the same upon said pipe, clamping members, and means for simultaneously actuating said clamping members against the sides of the mouth of said bag in an air tight manner, and means for transmitting air into said bag.

6. In an apparatus of the class described, an air pipe, a bag magazine, means for conveying a bag in stages from said magazine and telescoping the same upon said pipe, clamping members and means for simultaneously actuating said clamping members for clamping the mouth of said bag against said pipe in an air tight manner, and means for transmitting a blast of air through said pipe.

7. In an apparatus of the class described, a bag magazine adapted for containing bags in upright position, means for elevating a bag from said magazine, means for tightly clamping the mouth of the bag in elevated position, means for laterally shifting the bag, and means for blasting air into the bag for expanding and creasing the same.

8. The method of creasing the end walls of a paper bag which consists in pinching the mouth of the bag in an air tight manner but leaving a small opening therein and blowing air into said opening for expanding the bag for forming end creases therein.

9. The method of creasing the end walls of a paper bag which consists in closing the mouth of the bag but leaving an air inlet passage and blowing air into said inlet passage to expand the bag for creasing the end walls.

10. The method of creasing the end walls of an initially collapsed bag which comprises clamping the bag at its mouth end between parallel surfaces, disposing other surfaces at substantially right angles and adjacent to the parallel surfaces, and then pneumatically forcing the adjacent unclamped portion of the bag against the said other surfaces for creasing the end walls.

11. The method of creasing the end walls of an initially collapsed bag which comprises pinching the end walls of the bag to close its mouth, and then while maintaining said walls pinched applying a pressure internally of the bag to forcibly deflect the wall portions adjacent the pinched portions to form creases therein.

12. The method of opening and creasing an initially substantially flat collapsed bag which comprises pinching the adjacent end wall portions of the bag together to close its mouth, and then while maintaining these wall portions together pneumatically expanding the bag for forming creases in said end walls for maintaining the bag distended when the end walls are released.

13. The method of opening a collapsed bag having opposed inwardly folded sides disposed between parallel opposed sides, which comprises applying pressure against the latter sides at the open end of the bag to force them together, and then while holding said sides together pneumatically expand the bag to force the inwardly folded sides outwardly and form creases at the upper end of the bag for maintaining the bag distended, when the applied pressures are withdrawn.

14. In an apparatus of the character described, a magazine adapted to contain a plurality of collapsed bags, a tubular member, means for relatively moving the foremost bag of the magazine and the member in a path for bringing them into telescoped relation, means for closing the mouth of the bag around said member, means for moving the closed bag away from said path, and means including said member for supplying air to the interior of the bag.

15. In an apparatus of the character described, a collapsed bag, a tubular member, mechanism for relatively moving the bag and member into telescoped relation, means for closing the mouth of the bag about said member and supporting the bag in depending position, means for laterally moving the closed bag, means for controlling an air supply to said member, and means for releasing said first means, whereby the bag may descend under its weight to a delivery position.

16. In an apparatus of the character described, a magazine adapted to contain a plurality of collapsed bags, an elevator for raising the foremost bag of the magazine and telescoping it on the tubular member, a movable support including means for releasingly gripping the open end of the bag, means for moving said support to carry the bag away from said elevator, and means including said member for transmitting a blast of air to the interior of the bag, said first means when released enabling the bag to gravitate to a delivery position spaced from said elevator.

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