

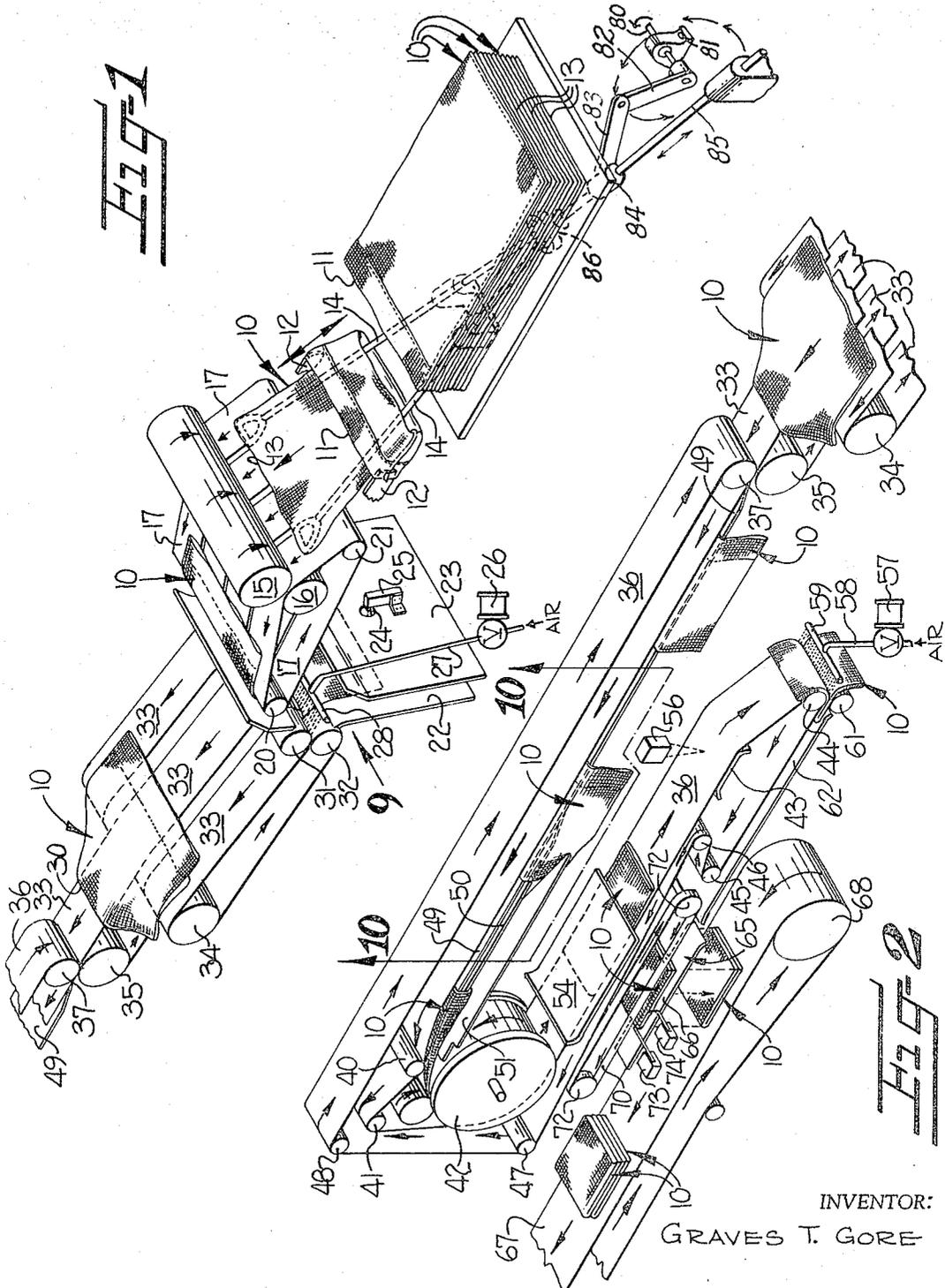
March 21, 1967

G. T. GORE
APPARATUS FOR EVERTING AND FOLDING
PILLOWCASES, BAGS OR THE LIKE

3,310,207

Filed March 11, 1965

2 Sheets-Sheet 1



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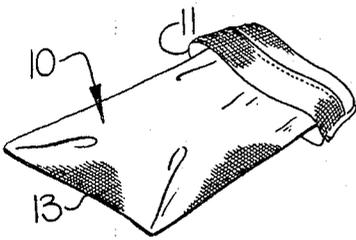


Fig-3

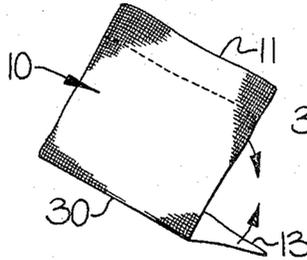


Fig-4

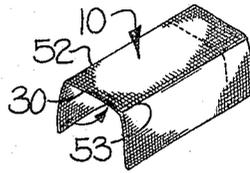


Fig-5

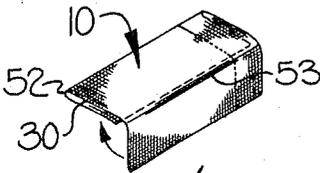


Fig-6

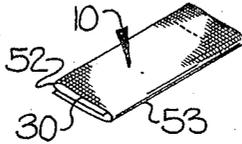


Fig-7

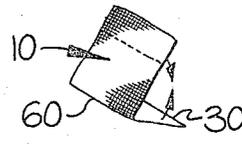


Fig-8

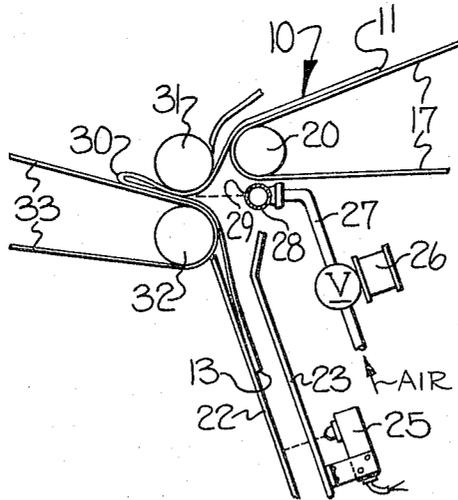


Fig-9

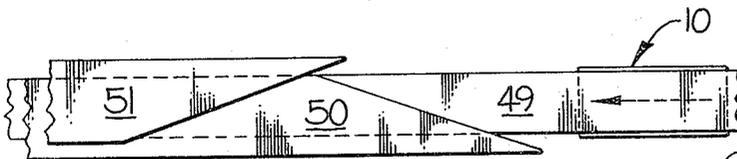


Fig-10

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3,310,207

**APPARATUS FOR EVERTING AND FOLDING
PILLOWCASES, BAGS OR THE LIKE**

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Textile Corporation, a corporation of Delaware
Filed Mar. 11, 1965, Ser. No. 438,898
4 Claims. (Cl. 223—39)

This invention relates to an apparatus and method for
everting and folding pillowcases, bags or the like and
more particularly to an apparatus and method for contin-
uously and automatically everting and folding pillow-
cases, bags or the like.

Heretofore, it has been the usual practice in manufac-
turing operations to fabricate the pillowcases, bags or
the like by cutting and sewing them in a wrong-side-out
position and then later evert and fold them to facilitate
packaging for shipment to the consumers. The steps of
everting and folding the pillowcases, bags or the like
were normally done either manually or semi-automati-
cally with the aid of machines and manual steps by an
operator.

This type of operation is necessarily costly and time
consuming on the manufacturer inasmuch as it involves
the use of many operators or workers to manually or
semi-automatically perform the everting and folding steps
required for packaging.

It is therefore the object of this invention to provide a
continuous and automatic apparatus and method for
everting and folding a pillowcase, bag or the like which
will eliminate the necessity for various manual steps and
the need of a plurality of operators or workers.

In accordance with this invention an apparatus and
method is provided which will take a pillowcase, bag or
the like in a wrong-side-out position and evert the same
by forcing the closed end thereof through the open end
thereof, automatically and continuously convey the thus
everted pillowcase forwardly through a series of folding
operations which will fold the everted pillowcase in the
desired manner to obtain a folded and everted pillow-
case, and then stack the folded everted pillowcases in
stacks of a predetermined number of pillowcases, bags
or the like.

For purposes of illustration and description, this in-
vention will be discussed in terms of a pillowcase only.
However, it is to be understood that the apparatus and
method of this invention is equally applicable to other
types of structures similar to pillowcases, such as bags
or the like.

Further features of this invention will be understood
from a consideration of the following more detailed de-
scription taken in conjunction with the accompanying
drawings in which:

FIGURE 1 is a perspective view of a portion of the
everting and folding apparatus of this invention;

FIGURE 2 is a perspective view of the other portion
of the everting and folding apparatus of this invention
and is a continuation of the apparatus illustrated in FIG-
URE 1;

FIGURE 3 is a perspective view of a pillowcase il-
lustrating the everting step of the method of this inven-
tion;

FIGURE 4 is a perspective view of a pillowcase il-
lustrating the first folding step of this invention;

FIGURE 5 is a perspective view of a pillowcase il-
lustrating the manner in which the pillowcase is conveyed
following the first folding step;

FIGURE 6 is a perspective view of a pillowcase il-
lustrating the second folding step of this invention;

FIGURE 7 is a perspective view of a pillowcase il-
lustrating the third folding step of this invention;

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FIGURE 8 is a perspective view of a pillowcase illus-
trating the fourth folding step of this invention;

FIGURE 9 is an enlarged side elevational view of a
portion of the apparatus of this invention taken substan-
tially along the line 9 of FIGURE 1 and illustrating the
apparatus for performing the first folding operation; and

FIGURE 10 is a bottom plan view of a portion of the
apparatus of this invention taken substantially along the
line 10—10 of FIGURE 2 and illustrating the folding
swords for forming the second and third folds in the
pillowcase.

As may be seen in the drawings, a stack of pillowcases
10, in a wrong-side-out position to be everted and folded
by the apparatus and method of this invention, is placed
at the entrance to the machine. The open end 11 of a
pillowcase 10 is placed on grippers 12 which are adapted
to move outwardly mechanically or otherwise in any
suitable manner to hold the open end 11 of the pillow-
case 10 in the position shown in FIGURE 1. The pillow-
case 10 is then everted from the wrong-side-out position
to a right-sideout position by forcing the closed end 13
of the pillowcase 10 through the open end 11, while
maintaining the gripping action, by means of plunger
members 14 until the pillowcase 10 is completely everted.
The plunger members 14 are reciprocated in the longi-
tudinal direction of the pillowcases by any suitable mech-
anical mechanism to perform the above described everting
action. As shown in FIGURE 1, the mechanism may
include a driven shaft 80 rotatably mounted in a bearing
81 and rotatably driven by any suitable mechanism (not
shown), a first lever 82 secured at one end thereof to
one end of the shaft 80 for rotation therewith, a second
lever 83 pivoted at one end to the other end of the first
lever 82 to be driven thereby and pivoted at the other
end to a collar 84, and a connecting rod 85 passing
through and secured within the collar 84 and having one
end thereof secured to a connecting member 86 which
in turn receives plunger members 14. As may be seen
by the arrows in FIGURE 1, rotation of the shaft 80
will impart reciprocating movement to the plunger mem-
bers 14 through the above-described interconnecting
parts.

The pillowcase 10 is forced by the plunger members
14 into a feeding and conveying means comprising a pair
of rotating rolls 15 and 16, and endless conveyor belt 17
passing therearound and around rotating rolls 20 and
21. The rolls 15 and 16 may be driven by any suitable
means (not shown) so that the rolls 15, 16, 20 and 21
and the conveyor belt 17 will move in the direction of
the arrows shown in FIGURE 1. Therefore, as the
everted pillowcase 10 is forced between the feed roll 15
and the belt 17, it will be conveyed forward and pulled
from the gripper members 12 to release the gripping ac-
tion thereof and complete the everting operation.

As the everted pillowcase 10 is fed forwardly of the
roll 15, it will pass downwardly around the roll 20 in a
generally vertical path of travel between guide plates 22
and 23, as shown in FIGURES 1 and 9, which cooperate
with the above-described feeding and conveying means to
position the pillowcase for the first folding operation.
The guide plate 23 is provided with an aperture 24 and
has a photoelectric cell 25 mounted on the rear surface
thereof for passing a beam of light through the aperture
24. The photoelectric cell is suitably connected with an
air valve 26 disposed in an air line 27 which is connected
to a second air line 28 having apertures 29 therein. Air is
supplied to the air line 27 from any convenient source of
supply (not shown).

Thus, as the end of the pillowcase 10 crosses the beam
of light from the photoelectric cell 25, the photoelectric
cell will cause the valve 26 to open to allow the flow of

air through the air lines 27 and 28 to force a stream of air through the apertures 29. The photoelectric cell 25 and the air line 29 are so located that the air stream will contact the pillowcase along a first transverse generally medial fold line 30 to cause the pillowcase to fold upon itself therealong.

The air stream causes the pillowcase 10 to be forced between rotating rolls 31 and 32 in the thus folded position. The roll 32 has three endless conveyor belts 33 passing therearound and around a rotating roll 34. The middle belt 33 also passes around an additional rotating roll 35, as shown in FIGURES 1 and 2. The rolls 31 and 32 may be driven by any suitable means (not shown) so that the rolls 31, 32, 34 and 35 and the conveyor belts 33 will move in the direction of the arrows shown in FIGURES 1 and 2.

The thus folded pillowcase 10 is conveyed forwardly through the machine by the belts 33. Cooperating with the middle belt 33 for conveying the once folded pillowcase forwardly is another endless conveyor belt 36. This conveyor belt 36 passes around roll 37, under a roll 40, over a roll 41, under a roll 42, over a plate 43, around a roll 44, around a roll 45, around a take-up roll 46 biased by any suitable means to produce a suitable tension in the belt 36, around a roll 47, over a roll 48 and back to the roll 37. As may be seen in FIGURE 2 of the drawing, this path of travel of the belt 36 is generally U-shaped. The rolls may be driven by any suitable means (not shown) so that the rolls and the conveyor belt 36 will move in the directions of the arrows shown in FIGURES 1 and 2.

Disposed under the belt 36 adjacent the first roll 37 is a sliding plate 49 upon which the pillowcase 10 is conveyed upon leaving the belt 33. The sliding plate 49 is of a width approximating one-third of the width of the pillowcase so that one-third of the width of the pillowcase from each of the longitudinal edges thereof will hang down in a vertical plane on each side of the plate 49, as shown in FIGURE 5. The pillowcase 10 is conveyed along the sliding plate 49 by the action of belt 36.

Disposed adjacent the belt 36 and somewhat below the sliding plate 49 is a first folding sword 50 and a second folding sword 51. The folding sword 50 is adapted to engage one of the portions of the pillowcase hanging in a vertical plane and fold the same upon itself as the pillowcase passes thereby along a longitudinal fold line 52 located generally one-third of the distance between longitudinal edges of the pillowcase from one of the longitudinal edges thereof. Likewise, the folding sword 51 will engage the other portion of the pillowcase hanging in a vertical plane and fold the same upon itself as the pillowcase passes thereby along a longitudinal fold line 53 located generally one-third of the distance between longitudinal edges from the other of the longitudinal edges thereof.

The thus folded pillowcase will then pass around roll 42 between the roll 42 and the belt 36 and be inverted and conveyed in the opposite direction by the belt 36 on top of the belt 36.

The thus folded pillowcase will pass under an ironing plate 54 disposed on the upper side of the belt 36 and heated by any suitable means (not shown) to press the previously inserted folds in the pillowcase.

The pillowcase 10 will then be conveyed from the pressing plate 54 forwardly by the belt 36 and begin a downward path of travel around the roll 44. A second photoelectric cell 56 is disposed above the belt 36 and the plate 43 between the plate 54 and the roll 44, as may be seen in FIGURE 2. This photoelectric cell is suitably connected to an air valve 57 disposed in an air line 58 which is connected to a second air line 59 having suitable apertures therein to direct a stream of air transversely of the pillowcase 10 as it passes in its downward path of travel around the roll 44. Air is supplied to the air line 58 from any convenient source of supply (not shown).

Thus, as the pillowcase 10 passes the photoelectric cell 56, the air valve 57 will be opened by the photoelectric cell 56 at the proper time to produce a stream of air which will contact the pillowcase 10 along a fourth transverse fold line 60 located generally medially of the previously folded pillowcase to cause the pillowcase to fold upon itself along the fold line 60 and pass between the belt 36 as it passes around roll 44 and a roll 61 disposed below the roll 44 and rotated by any suitable means. A plate 62 is disposed below the belt 36 between the rolls 44 and 45 and extends forwardly of the roll 45 for receiving the pillowcases after passing between the rolls 44 and 61.

The pillowcase has now been folded the desired number of times and is conveyed forwardly sandwiched between the belt 36 and the plate 62 until it reaches a stacking means, generally indicated by the reference numeral 65. The stacking means 65 comprises a pair of pivoting plates 66 (only one of which is shown) which are adapted to pivot downwardly by the action of any suitable mechanism (not shown) to allow the pillowcases to stack on each other on a conveyor belt 67 which passes around a roll 68 and another roll (not shown). A pair of narrow endless belts 70 (only one of which is shown) are mounted for rotation on rolls 71 and 72 driven by any suitable means (not shown) and are disposed above the pivoting plates 66 so as to receive the folded pillowcases 10 from the forwardly extending end of the plate 62 and convey them forwardly on top of the pivoting plates 66. A switch 73 is mounted at the forward end of the plates 66 and is suitably connected to the pivoting plates 66 so that when the folded pillowcases 10 contact the switch 73, as they are conveyed forwardly, the switch 73 will cause the plates 66 to pivot downwardly to drop the folded pillowcases 10 on the conveyor belt 67.

The conveyor belt 67 is suitably connected with a stepping switch 74 adapted to be contacted by the pillowcases 10 and which will cause forward movement of the belt 67 when the desired number of pillowcases has been received in a stack. As illustrated in FIGURE 2, two pillowcases are desired in each stack; therefore, when the stepping switch 74 has been contacted by two pillowcases, the switch 74 will cause the belt 67 to index the stack forwardly thereon so that another stack may be received on the belt 67.

Thus it may be seen, that an apparatus and method is provided whereby a pillowcase may be everted from a wrong-side-out position to a right-side-out position, folded along predetermined fold lines a desired number of times and stacked in stacks of predetermined numbers for subsequent packaging and shipping by the manufacturer. This apparatus and method eliminates the necessity of a plurality of operators and thereby increases efficiency and reduces the cost in pillowcase manufacturing of this type.

This invention has been described in detail above for purposes of illustration and is not intended to be limited by this description or otherwise except as defined in the appended claims.

What is claimed is:

1. Apparatus for everting and folding a pillowcase, bag or the like comprising means for everting the pillowcase from the wrong-side-out position to a right-side-out position, first conveyor means operatively associated with said everting means to cooperate therewith for everting the pillowcase and for conveying the everted pillowcase from said everting means, and second conveyor and folding means operatively associated with said first conveyor means for cooperating therewith to form a first fold in the pillowcase and for receiving and conveying the thus folded pillowcase from said first conveyor means for additionally folding the pillowcase a desired number of additional times as the pillowcase is conveyed therefrom.

2. Apparatus for everting and folding a pillowcase, bag or the like comprising means for gripping the pillowcase in a wrong-side-out position, means cooperating with

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said gripping means for everting the pillowcase from the wrong-side-out position to a right-side-out position, first conveyor and feeding means mounted adjacent said gripping and everting means for cooperating with said everting means to effect everting of the pillowcase and for conveying the everted pillowcase, therefrom and into position for forming a first fold therein, first folding means mounted adjacent said first conveyor means for cooperating therewith to fold the pillowcase upon itself along a first generally medial transverse fold line, second conveyor means mounted adjacent said first folding means for conveying the pillowcase therefrom in an elongated path of travel, second folding means mounted adjacent said second conveyor means for folding the pillowcase upon itself along a second longitudinal fold line located generally one-third of the distance between longitudinal edges from one of the longitudinal edges thereof, third folding means mounted adjacent said second conveyor means for folding the pillowcase upon itself along a third longitudinal fold line located generally one-third of the distance between longitudinal edges from the other of the longitudinal edges thereof, and fourth folding means mounted adjacent said second conveyor means for folding the pillowcase upon itself along a fourth transverse fold line located generally medially of the previously folded pillowcase.

3. Apparatus for everting and folding a pillowcase, bag or the like as set forth in claim 2, including a stacking means mounted adjacent said conveyor means for receiving therefrom and stacking the folded pillowcases.

4. Apparatus for everting and folding a pillowcase, bag or the like comprising means for gripping the pillowcase in a wrong-side-out position, means cooperating with said gripping means for everting the pillowcase from the wrong-side-out position to the right-side-out position, first conveyor means comprising a pair of feed rolls and a driven endless belt mounted adjacent said gripping and everting means and operatively associated with said everting means for everting the pillowcase and for conveying

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the everted pillowcase therefrom, first folding means comprising an intermittently actuated air stream mounted adjacent said first conveyor means and adapted to cooperate therewith to contact generally the medial portion of the pillowcase as it is conveyed thereby by said first conveyor means to fold the pillowcase upon itself along a generally medial transverse fold line, second conveyor means comprising a driven endless belt mounted adjacent said first folding means for conveying the pillowcase therefrom in an elongated path of travel, second folding means comprising a folding sword mounted adjacent said second conveyor means for folding the pillowcase upon itself as it passes thereby along a second longitudinal fold line located generally one-third of the distance between longitudinal edges from one of the longitudinal edges thereof, third folding means comprising a folding sword mounted adjacent said second conveyor means for folding the pillowcase upon itself as it passes thereby along a third longitudinal fold line located generally one-third of the distance between longitudinal edges from the other of the longitudinal edges thereof, and fourth folding means comprising an intermittently actuated air stream mounted adjacent said second conveyor means and adapted to contact generally the medial portion of the previously folded pillowcase as it travels thereby to fold the pillowcase upon itself along a fourth transverse fold line located generally medially of the previously folded pillowcase.

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