United States Patent

Vuilleumier et al.

[15] **3,682,052**

[45] **Aug. 8, 1972**

[54] **MECHANISM FOR ERECTING CARTON SLEEVES**

[72] Inventors: **Ralph O. Vuilleumier,** Malvern, Pa.; **Giulid B. Bagnatori,** Wilmington, Del.

[73] Assignee: **Container Corporation of America,** Chicago, Ill.

[22] Filed: **Oct. 21, 1970**

[21] Appl. No.: **82,630**

[52] **U.S. Cl.** ..... **93/53 R**

[51] **Int. Cl.** **B31b 1/76**

[58] **Field of Search** ....93/53 R, 53 M, 53 OR, 53 SD

[56] **References Cited**

UNITED STATES PATENTS

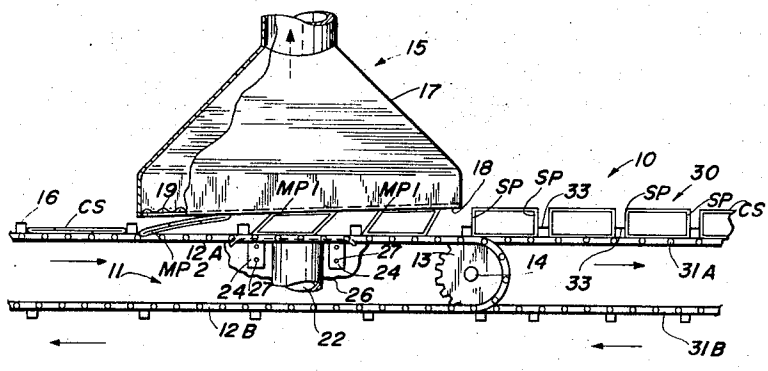
3,056,338	10/1962	Lovett et al.	93/53 SD
3,040,634	6/1962	Galloway	93/53 R

Primary Examiner—Bernard Stickney
Attorney—Carpenter, Ostis & Lindberg

[57] **ABSTRACT**

Mechanism for erecting collapsed and flattened carton sleeves which have become curved out of the plane containing the panels constituting the sleeve. The curved flattened sleeves move along a first conveyor having structure engaging a trailing edge of the flattened sleeve, and a suction device retards a first panel of the sleeve to cause the latter to be partly erected. A second suction device engages an opposite panel of the sleeve and straightens any curve in the second panel of the flattened sleeve. A second conveyor receives the partly erected carton sleeve and completes the erection thereof by trapping the sleeve between means movable with said conveyor and spaced a distance corresponding to the dimension between end walls of the erected sleeve.

17 Claims, 4 Drawing Figures



PATENTED AUG 8 1972

3,682,052

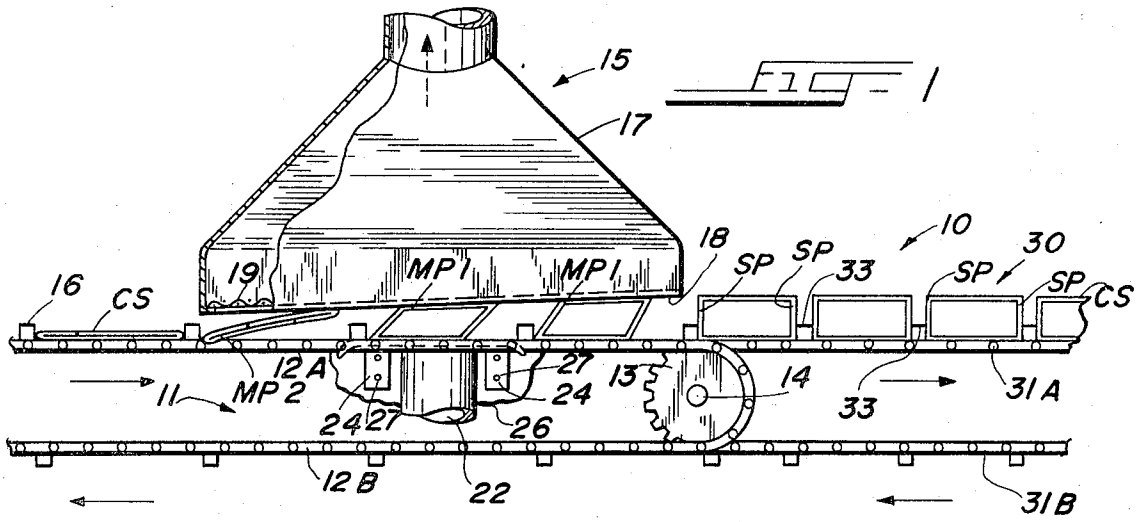


FIG - 1

FIG - 2

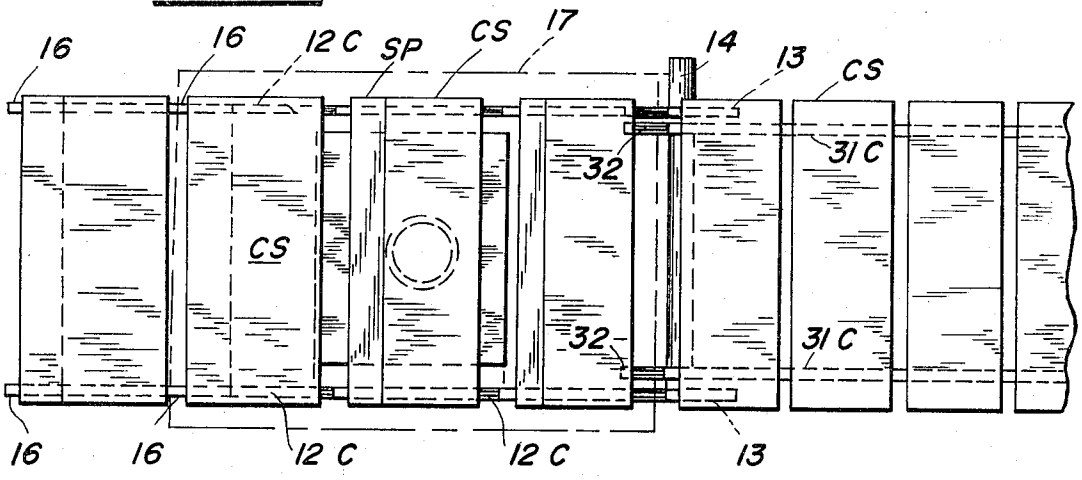


FIG - 4

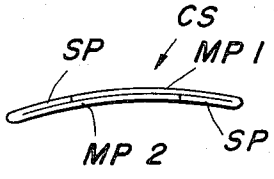
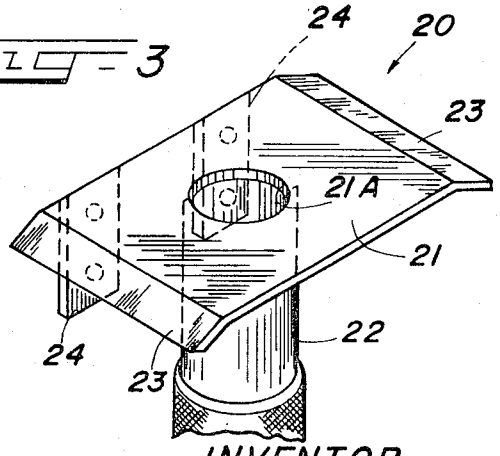


FIG - 3



INVENTOR
RALPH O. VUILLEMEIER
GIULIO B. BAGNATORI

BY Carpenter, Ostis & Lindberg Attys

MECHANISM FOR ERECTING CARTON SLEEVES

THE PRIOR ART

The prior art appears to be best exemplified in the following patents:

Lovett et al.	3,056,338	Oct. 2, 1962	93/53
Lubersky et al.	3,060,654	Oct. 30, 1962	53/29
Stannard et al.	3,217,463	Nov. 16, 1965	53/186
Winters	3,242,827	Mar. 29, 1966	93/53
Farnow	3,292,998	Dec. 27, 1966	93/53

SUMMARY OF THE INVENTION

The apparatus according to the present invention makes it possible readily to erect carton sleeves formed from a carton blank, and which have become curled out of the plane thereof by prolonged storage under varying conditions of temperature and humidity. The apparatus according to the present invention comprehends a first flight conveyor for moving individual carton sleeves past a suction device which serves to partly erect the sleeve. In cases where the sleeves are transported by spaced conveyor chains having lugs thereon, the suction device also has a tendency to bow the carton sleeve making erection difficult. A second suction device is accordingly provided and acts against an opposite side of the carton sleeve to overcome the difficulty in erection occasioned by bowing of the sleeve. The two suction devices cooperate to straighten the carton sleeve, and the so-partly erected sleeve is then moved to a second conveyor having flights with pitch distances at least equal to the width of the parallel panels acted upon by the suction means. The lugs of the second flight conveyor serve to engage the remaining panels of the sleeve, so that the cross-section of the sleeve moving on the second conveyor is exactly rectangular.

The structure according to the present invention obviates the necessity of providing fingers engageable with the carton panels and movable in operations to erect the carton sleeve. Moreover, the structure according to the present invention obviates the necessity of movable suction devices to provide erection of the carton sleeves, as is shown in certain of the patents of the prior art.

THE DRAWING

FIG. 1 is a schematic elevational view of a mechanism according to the present invention for erecting flattened carton sleeves which are curled out of a plane by reason of varying conditions of temperature and humidity;

FIG. 2 is a plan view of first and second conveyor structures for effecting carton sleeve erection;

FIG. 3 is a perspective view showing a suction device acting against one of the panels of the curved carton sleeve, and cooperating with other suction structure to effect partial carton erection; and

FIG. 4 is a cross-sectional view through a typical carton sleeve which has adopted a curved configuration by reason of varying conditions of temperature and humidity.

SPECIFICATION

The improved mechanism for erecting curved carton sleeves is referred to generally by the reference numeral **10** and includes a first flight conveyor indicated generally by the reference numeral **11**. Said flight conveyor includes a conveying reach **12A** and a return reach **12B**. The two reaches **12A** and **12B** consist of laterally spaced endless sprocket chains **12C**, each of these being trained about laterally spaced sprockets **13** fast to a shaft **14** powered from any suitable source, not shown.

The carton sleeve is seen in FIG. **4** and is denoted by the symbol CS, and is engaged in the apparatus of FIG. **1** along the trailing edge thereof by conveyor lugs **16** carried by the spaced sprocket chains **12C**.

Carton sleeve CS comprises main panels MP1 and MP2 foldably connected to side panels SP in a conventional manner.

Structure is provided for placing suction against main panel MP1 and to slow the speed thereof relative to the speed of the conveying lugs **16**, so as to cause partial erection of the carton sleeve CS. Such first suction structure is denoted generally by the reference numeral **15** and consists of a suction hood **17** connected to a suction source as shown in FIG. **1**. Suction hood **17** has a lower opening **18** closed by a foraminous member **19** spaced above the upper flight **12A** and inclined at a small angle with respect thereto, so that as main panel MP1 is slowed in its speed relative to the flight **12A** space will be provided for the erection of the carton sleeve CS.

According to the present invention, structure is provided which will remove the curl in the opposite main panel MP2, and to this end a second suction structure is provided which engages the lower main panel MP2. The second suction structure is denoted generally by the reference numeral **20** and consists of a plate **21** having a suction opening **21A** in the center thereof. Suction structure **20** is disposed between the sprocket chains **12C** and the suction plate **21** thereof lies in the plane of the upper reach **12A**. In order to provide unimpeded passage of the carton sleeve **12** over suction plate **21** entrance and exit ramps **23** are provided at the leading and trailing ends of the suction plate **21**.

The suction plate **21** is provided with vertical mounting brackets **24** which are secured to a frame member **26** by fastening means **27**.

The suction opening **21A** in the suction plate **21** is connected to a suction manifold **22** in turn connected to the same suction source as to the first suction structure **15** previously described.

The carton sleeves CS are partly erected by the first suction structure described, and the erection of the carton sleeve CS is completed by a second conveyor structure denoted generally by the reference numeral **30** including conveying and return reaches **31A** and **31B**. Conveyor structure **30** includes laterally spaced sprocket chains **31C** trained about laterally spaced sprockets **32** fast on the power shaft **14**. Chains **31C** have support laterally extending carton sleeve engaging lugs **33** which have a pitch distance at least equal to the distance between the side panels SP of the carton sleeve so that the carton sleeves CS are in the fully erected position with a rectangular configuration as seen in FIG. **1**.

We claim:

1. In a mechanism for erecting tubular carton sleeves from a collapsed condition thereof:

a. conveyor means for transporting said collapsed carton sleeves and for transporting erecting carton sleeves;

b. first suction means located to one side of said conveyor means for slidably engaging one panel of a collapsed carton sleeve and partially erecting the same while said carton sleeve is being moved by said conveyor means;

c. second suction means located at an opposite side of said conveyor means for slidably engaging an opposite panel of said carton sleeve to maintain said opposite panel in flattened condition as said carton is being partially erected by said first suction means and is being moved by said conveying means.

2. A mechanism according to claim 1 wherein said conveyor means includes a flight conveyor having a first portion having means thereon for engaging a trailing edge of a collapsed carton sleeve, and a second portion having second means spaced thereon for engaging opposed ends of said partly erected sleeve to trap said carton sleeve therebetween and complete the erection thereof.

3. A mechanism according to claim 1 wherein said first suction means includes means for slowing the speed of said one panel of said tubular carton sleeve relative to the speed of an opposite panel thereof.

4. In a mechanism for erecting tubular carton sleeves from a collapsed condition thereof:

a. conveyor means for transporting said collapsed carton sleeves and for transporting erected carton sleeves;

b. first suction means located to one side of said conveyor means for slidably engaging one panel of a collapsed carton sleeve and partially erecting the same while said carton sleeve is being moved by said conveyor means;

c. second suction means located at an opposite side of said conveyor means for slidably engaging an opposite panel of said carton sleeve to maintain said opposite panel in flattened condition as said carton is being partially erected by said first suction means and is being moved by said conveying means;

d. said first suction means being operable to slow the speed of said one panel relative to the speed of the opposite panel;

e. said first suction means being positioned in diverging relationship to the conveyor means.

5. A mechanism according to claim 2 wherein said suction means includes means for slowing the speed of said one panel of said tubular carton sleeve relative to said flight conveyor.

6. A mechanism according to claim 5 wherein said suction means includes a foraminous member engageable with said one panel.

7. A mechanism according to claim 6 wherein said foraminous member is positioned in divergent relationship to said conveyor means.

8. In a mechanism for erecting flattened carton sleeves comprised of opposed and foldably connected side and main panels which are curved out of a plane containing the panels comprising said sleeve:

a. first conveyor means having carton sleeve engaging means engageable with an edge of an individual carton sleeve;

b. first suction means for slidably engaging one of said panels of said sleeve and slowing the speed of said panel relative to said first conveyor means to partially erect said flattened sleeve;

c. second suction means spaced from said first suction means and slidably engageable with the opposite one of said panels of said carton sleeve as the latter is movable with said first conveyor means and operable to straighten any curve in said opposite one of said panels;

d. second conveyor means for receiving a carton sleeve which has been partly erected at said first conveyor means by said first and second suction means and for completing the erection thereof.

9. Carton erecting mechanism according to claim 8 wherein said first suction means includes a foraminous member positioned in diverging relationship relative to said first conveyor means to provide space for erection of said carton sleeve as said first conveyor means moves past said first suction means and said foraminous member.

10. Carton erecting mechanism according to claim 8 wherein said second conveying means is provided with members movable therewith having a pitch distance therebetween corresponding substantially to the width of one of said panels and engageable with other of said panels extending from said one panel to complete the erection of said carton sleeve.

11. Carton erecting mechanism according to claim 8 wherein said first conveying means comprises an endless flight conveyor having carton sleeve engaging means thereon.

12. Carton erecting mechanism according to claim 11 wherein said means have pitch distances therebetween, each pitch distance being equal at least to the width of a flattened carton sleeve.

13. In a mechanism for erecting flattened carton sleeves comprised of opposed side and main panels which are curved out of a plane containing the panels comprising said sleeve:

a. first conveyor means having carton sleeve engaging means engageable with an edge of an individual carton sleeve;

b. first suction means including means slidably engageable with a first panel of said sleeve and slowing the speed of said first panel relative to said first conveyor means to partially erect said sleeve;

c. second suction means spaced from said first suction means and slidably engageable with a panel opposed to said first panel as the carton sleeve is movable with said first conveyor means to straighten any curve in said first panel and the panel opposed thereto;

d. second conveyor means for receiving a carton sleeve which has been partly erected at said first conveyor means by said first and second suction means and for completing the erection thereof.

14. Carton erecting mechanism according to claim 13 wherein said first suction means is positioned in diverging relationship relative to said first conveyor means to provide space for erection of said carton sleeve as said first conveyor means moves past said first suction means.

15. Carton erecting mechanism according to claim 13 wherein said second conveying means is provided with members movable therewith having a pitch distance therebetween corresponding substantially to the width of said first panel and engageable with panels extending from said first panel to complete the erection of said carton sleeve.

16. Carton erecting mechanism according to claim 13 wherein said first conveying means comprises an endless flight conveyor having carton sleeve engaging means thereon.

17. Carton erecting mechanism according to claim 16 wherein said carton sleeve engaging means have a pitch distance therebetween equal at least to the width of a flattened carton sleeve.

* * * * *