

[72]	Inventor	James A. Gauld Greenbrook, N.J.
[21]	Appl. No.	776,010
[22]	Filed	Nov. 15, 1968
[45]	Patented	June 22, 1971
[73]	Assignee	Sun Chemical Corporation New York, N.Y.

[56]

References Cited

UNITED STATES PATENTS

3,415,388	12/1968	Hornlein	214/1 (BS4) X
2,259,728	10/1941	Bridges.....	214/1 (B3) X
3,403,768	10/1968	Tobey	214/1 (R) X

Primary Examiner—Gerald M. Forlenza

Assistant Examiner—George F. Abraham

Attorneys—Gardner J. O'Boyle and James G. O'Boyle

**[54] TRANSFER ASSEMBLY FOR USE WITH
CONTAINER PRINTING MACHINES
9 Claims, 12 Drawing Figs.**

[52] U.S. Cl..... 214/1,
198/22, 198/33

[51] Int. Cl. B65g 47/24

[50] **Field of Search**..... 214/1 BS, 1
R, 1 B; 198/22, 25, 33 R

ABSTRACT: A transfer assembly for continuously removing printed cans from the mandrels of a container printing machine and placing the cans on a drying-oven conveyor positioned laterally of the mandrels, the transfer assembly including a plurality of pneumatically actuated can holders each of which are pivotally mounted on an oscillatory arm, whereby each can holder is pivoted through 180° to thereby remove a printed can from a mandrel and place the can on the drying-oven conveyor.

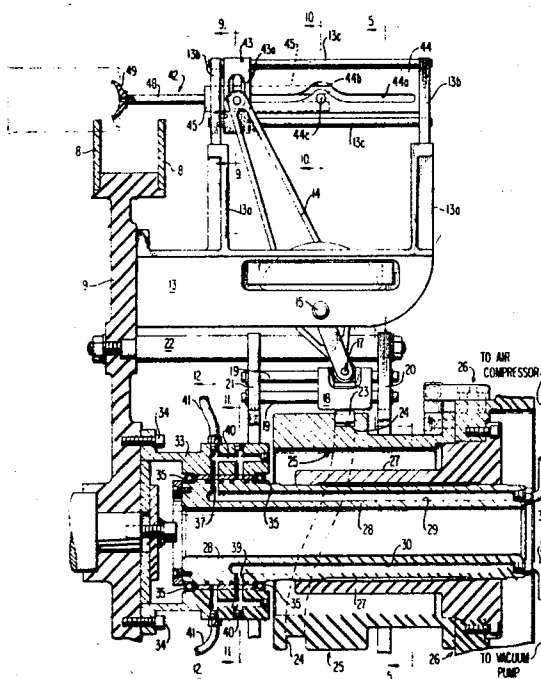


FIG. 1

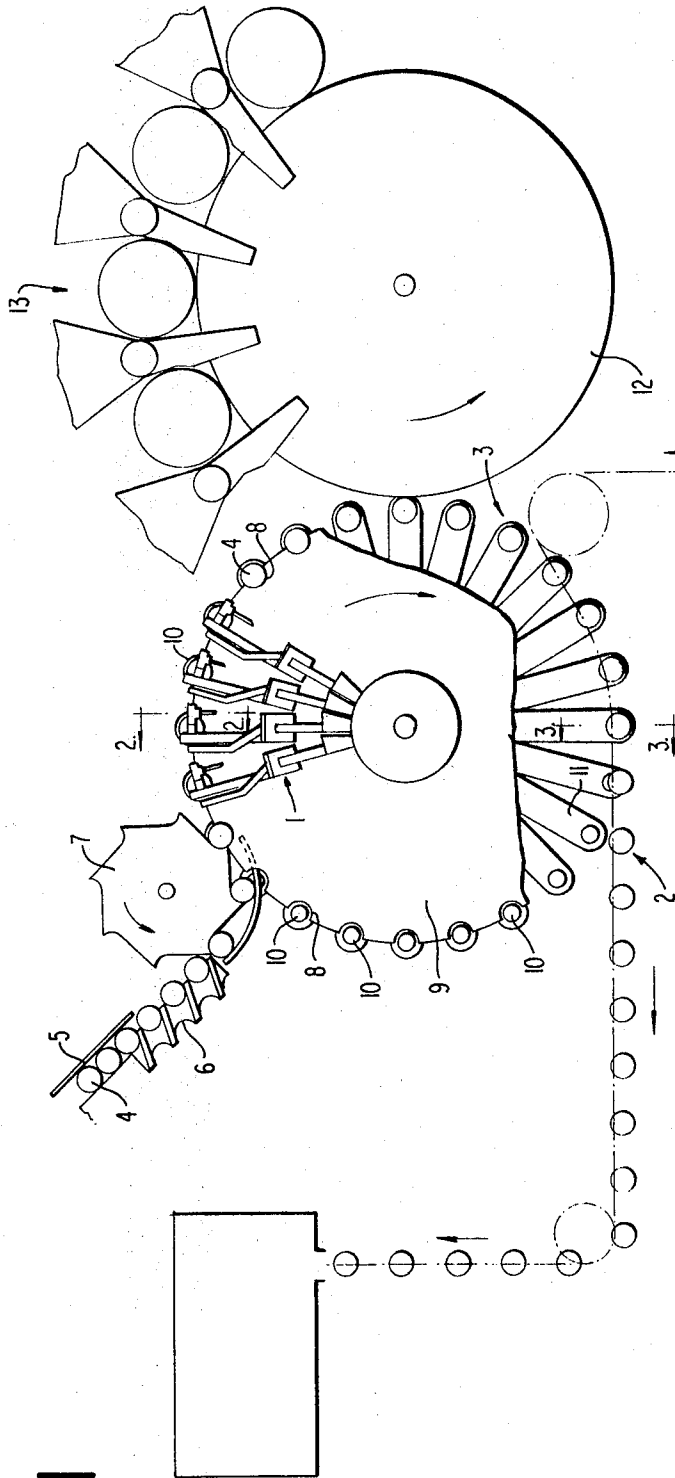


FIG. 3

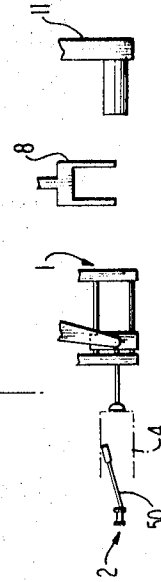
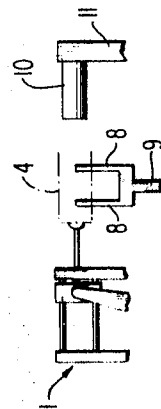


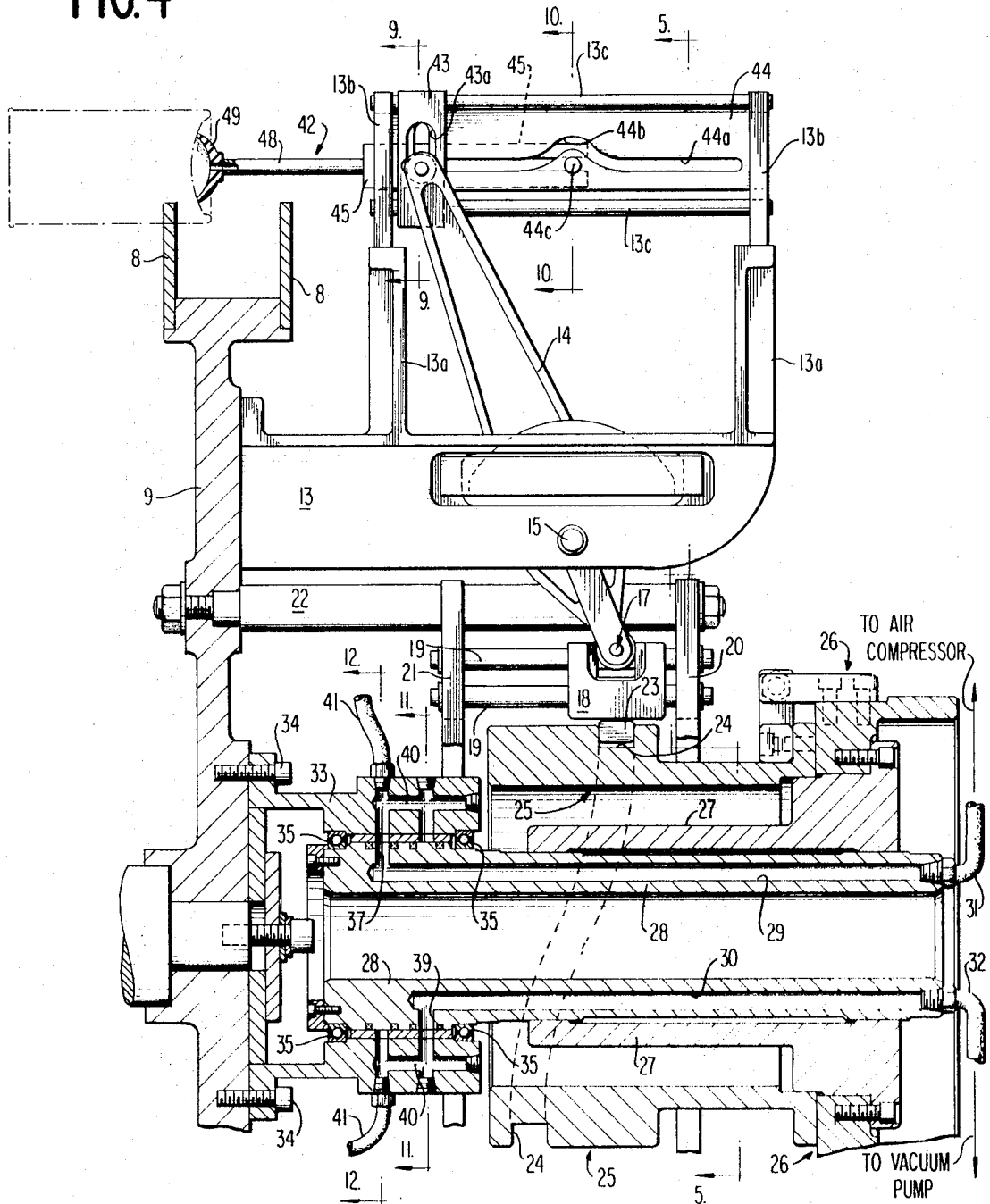
FIG. 2



INVENTOR
JAMES A. GAULD

BY *Harmon J. O'Boyle*
James H. O'Boyle
ATTORNEYS

FIG. 4



TO AIR
COMPRESSOR

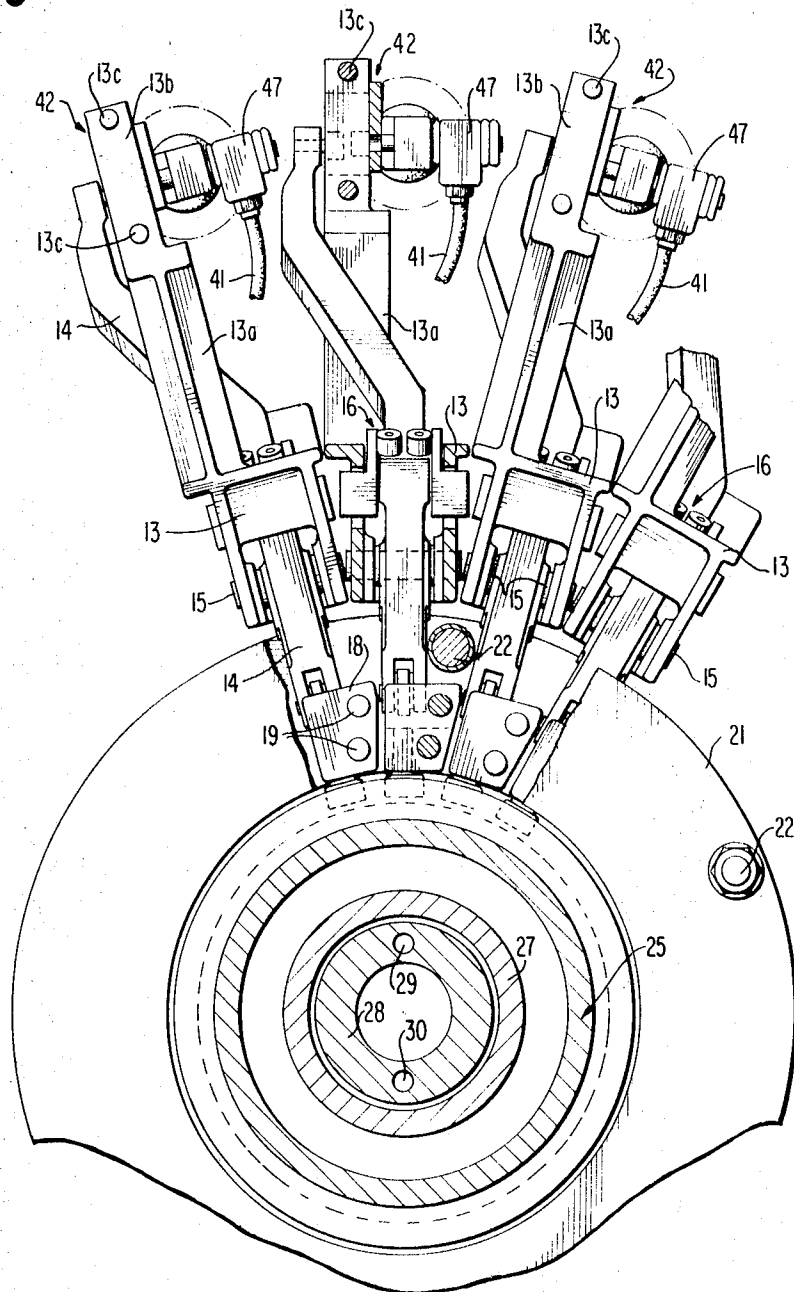
TO VACUUM
PUMP

INVENTOR

JAMES A. GAULD

BY *Gardner J. O'Boyle*
James H. O'Boyle
ATTORNEYS

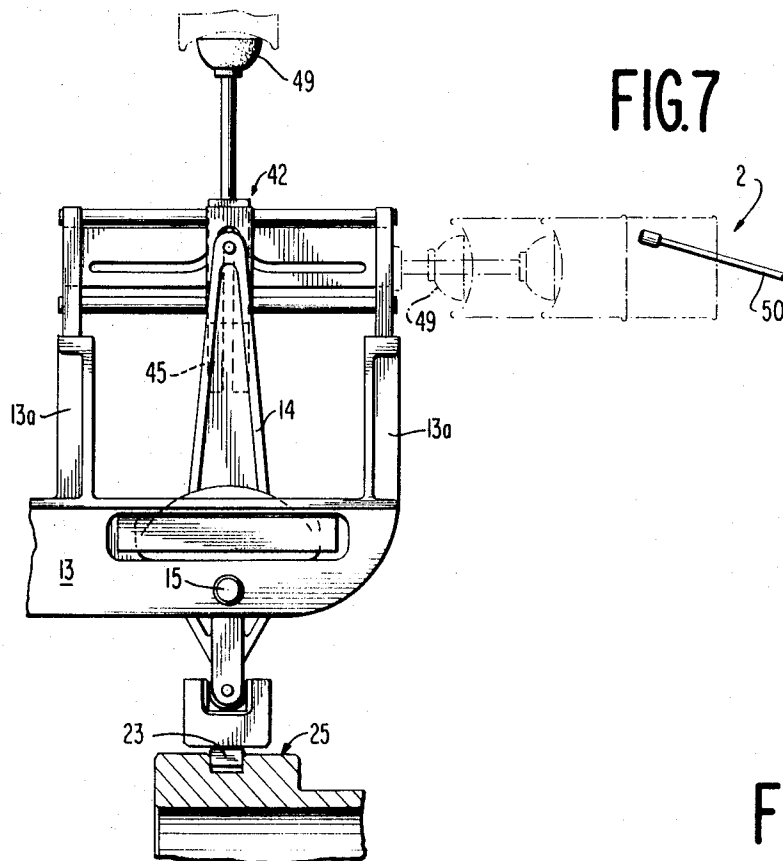
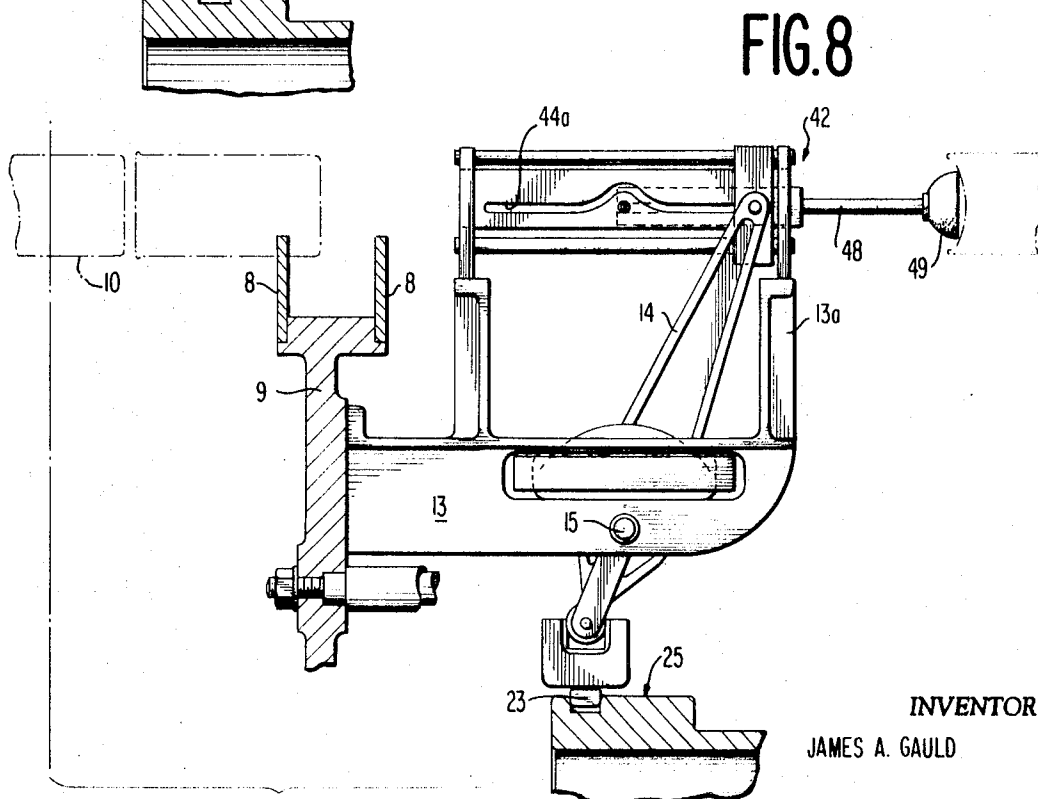
FIG. 5



INVENTOR

JAMES A. GAULD

BY *Gardner J. O'Boyle*
James H. O'Boyle
 ATTORNEYS



INVENTOR
JAMES A. GAULD

BY *Gardner J. O'Boyle*
James H. O'Boyle
ATTORNEYS

FIG. II

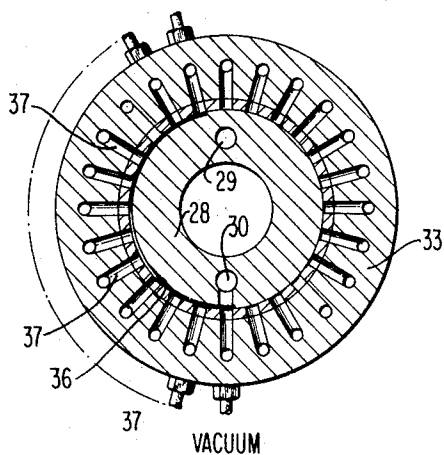


FIG. 12

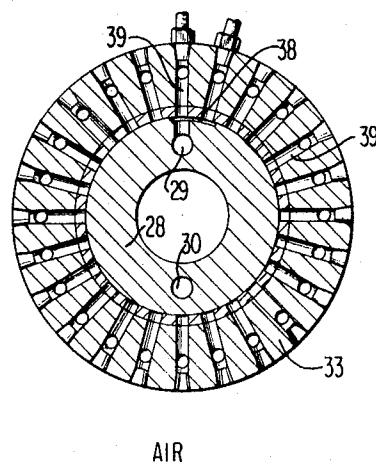


FIG. 9

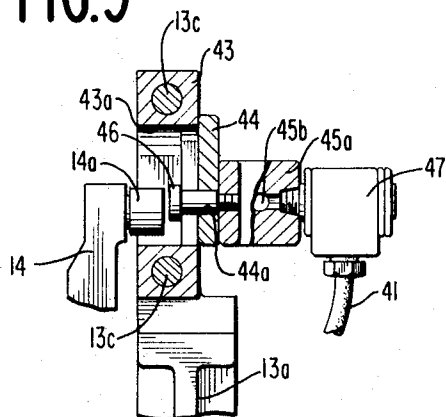


FIG. 10

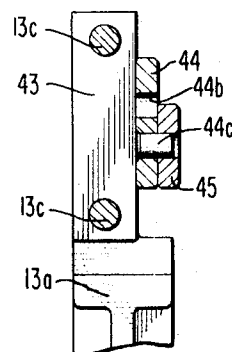
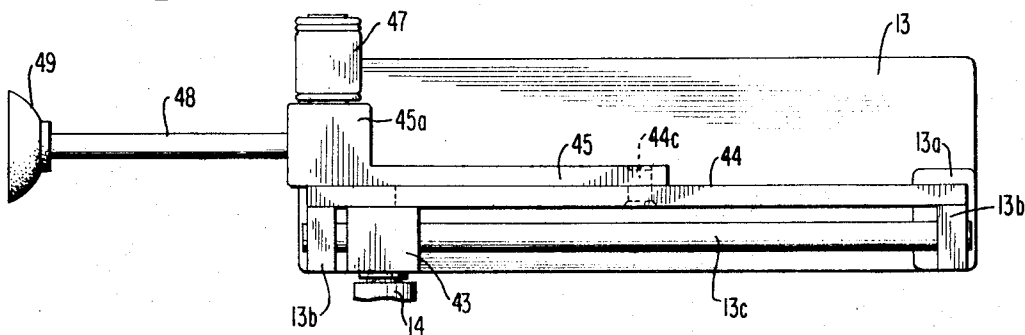


FIG. 6

INVENTOR

JAMES A. GAULD

BY *Harold J. O'Boyle*
James H. O'Boyle
 ATTORNEYS

TRANSFER ASSEMBLY FOR USE WITH CONTAINER PRINTING MACHINES

BACKGROUND OF THE INVENTION

The transfer assembly of the present invention is adapted to be employed with the continuously rotatable mandrel assembly disclosed in copending application Ser. No. 739,049 filed June 21, 1968, and assigned to the same assignee as the instant application, wherein there is described a plurality of can-carrying mandrels constructed and arranged to follow a path parallel to the impression surface of a printing cylinder during the printing cycle, whereby the mandrel assembly may be continuously, rather than intermittently, rotated to thereby increase the number of cans which can be decorated during a given period of time.

Heretofore, container decorating machines, having intermittently rotatable mandrel carriers, have employed intermittently rotatable transfer assemblies for transferring a decorated container from the mandrel carrier to a drying-oven conveyor. Thus, when the mandrel carrier is stopped to allow a container to be decorated at the printing station, a preceding decorated container is being simultaneously transferred to the drying-oven conveyor.

With the recent development of high-speed decorating machines of the type disclosed in the above-identified copending application, wherein the mandrel carrier is continuously rotated, it is necessary to provide a transfer assembly for continuously, rather than intermittently, transferring decorated cans from the mandrel carrier to the drying-oven conveyor. While transfer assemblies have been developed for use with continuously rotatable mandrel carriers, the particular can holders employed in these transfer assemblies limit the use thereof for transferring decorated cans from the drying-oven conveyor to the mandrel carrier for transport to the printing stations. In one proposed arrangement, each can holder comprises a pair of cam actuated, coacting gripper members or jaws which are adapted to grip a previously dried decorated outer surface of the can. Obviously, to use such can-gripping members for transferring a can having a decorated outer surface which is still wet would result in the smearing or scratching of the can surface.

To overcome the inherent disadvantages of intermittently operating transfer assemblies and continuously operating transfer assemblies provided with gripping jaw-type can holders, a transfer assembly was devised by the assignee of the instant application, and described in copending application Ser. No. 750,182 filed Aug. 5, 1968, wherein a plurality of can holder carriages are laterally slidable on an endless conveyor positioned between a drying-oven conveyor and a continuously rotating mandrel carrier assembly. Each can holder is in communication with a vacuum/air pressure manifold, whereby each decorated can is drawn from its respective mandrel, carried to the drying-oven conveyor and blown thereon. During the transfer of the cans from the mandrel carrier to the oven-drying conveyor, the can holders engage the bottom of each decorated can to thereby prevent any smearing or scratching of the outer surface of the can.

The transfer assembly of the present invention is related to the transfer assembly described in the above-identified application; however, instead of mounting the can holders on an endless conveyor, the can holders of the present invention are mounted on a plurality of arms pivotally connected to a rotatable feed wheel, one end of each arm having a cam follower adapted to engage a stationary cylindrical cam, the opposite end of each arm having a can holder pivotally mounted thereon, whereby upon rotation of the feed wheel, the cam imparts an oscillatory movement to each arm which, in turn, causes each can holder to pivot through 180° to continuously and sequentially transfer decorated cans from the continuously rotating mandrel carrier assembly to the drying-oven conveyor.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a diagrammatic side elevational view of the transfer assembly illustrating its structural relationship to the mandrel carrier and rotatable disc;

FIG. 2 is a view taken along line 2-2 of FIG. 1;

FIG. 3 is a view taken along line 3-3 of FIG. 1;

FIG. 4 is an enlarged side elevational view, partially in section, of the transfer assembly;

FIG. 5 is an enlarged end elevational view, partially in section, of the transfer assembly shown in FIG. 4;

FIG. 6 is a top plan view of one of the can holders;

FIGS. 7 and 8 are side elevational views illustrating the operation of the transfer assembly in removing a decorated can from a mandrel and placing it on a pin of the drying-oven conveyor; and

FIGS. 9, 10, 11 and 12 are views taken along lines 9-9; 10-10; 11-11 and 12-12, respectively, of FIG. 4.

Referring to the drawings, and more particularly to FIG. 1, the transfer assembly 1 of the present invention is positioned between a drying-oven conveyor 2 and a continuously rotating mandrel carrier assembly 3 of the type disclosed in the aforementioned copending application Ser. No. 739,049 filed June 21, 1968. Undecorated containers 4 are fed down an inclined chute 5 to a worm screw 6 which they are separated and fed to a feed wheel 7. From the feed wheel, each container is deposited on a respective cradle 8 formed on the peripheral edge of a rotatable disc 9, each of the cradles being aligned with a respective mandrel 10 mounted on a carrier 11. Each undecorated container is pushed from its cradle onto the outer end portion of a respective mandrel by means of the transfer assembly of the present invention to be described more fully hereinafter, whereupon a vacuum source draws the container completely onto the mandrel. The container-carrying mandrels, being rotated in a clockwise direction, as indicated by the arrow in FIG. 1, then approach the decorating cycle where the containers are sequentially coated or printed by the cylinder 12 of a conventional printing machine 13. During this portion of the operation, each container-carrying mandrel is caused to follow a path parallel to the surface of the impression blanket of the cylinder 12, while the container is being pressed into engagement with the impression blanket.

The continued rotation of the mandrel carrier 11 brings the decorated container to a transfer point whereupon the transfer assembly 1 of the present invention removes each decorated can from its respective mandrel and places it on the drying-oven conveyor 2.

Referring to FIGS. 4 and 5, the transfer assembly of the present invention comprises a plurality of support frames 13 secured to the disc 9 and extending axially therefrom. Each support frame has an arm 14 pivotally connected thereto as at 15 and suitable bearings 16 are provided on the support frames to facilitate the pivotal movement of the arm within its respective frame. Each support frame 13 and pivotal arm 14 are associated with a respective cradle 8 carried by the disc 9; thus, in the illustrated embodiment, 24 arms are employed; however, it will be appreciated that the number of arms will depend upon the number of cradles, which, in turn, depend upon the number of mandrels employed.

The lower end of each arm is pivotally connected as at 17 to a carriage 18 slidably mounted on a pair of parallel rods 19, the ends of the rods being mounted within a pair of spaced, annular ring members 20, 21 which, in turn, are secured to the disc 9 through suitable bolts 22.

The carriage 18 is provided with a cam follower 23 adapted to ride in a suitably configured groove 24 formed in a stationary cylindrical cam 25. The cam 25 is held in fixed position through a suitable support frame 26 to which a bushing 27 is also secured for supporting a cylindrical sleeve 28 having a pair of longitudinally extending bores 29 and 30 formed therein. A suitable conduit such as a hose 31 is connected to the end of the bore 29 for supplying compressed air thereto and another hose 32 is connected to the end of bore 30 for

connecting the bore to a vacuum source, not shown. The opposite end of each of the bores 29 and 30 communicate with an annular manifold 33 which is secured to the disc 9 through bolts 34 and therefore is rotatable therewith, the manifold 33 being rotatably mounted on the end of the sleeve 28 through antifriction bearings 35.

Referring to FIG. 11, the longitudinal bore 30 communicates with a circumferential recess 36 formed on the outer surface of the sleeve 28, the recess communicating with a plurality of radial ports 37 formed in the manifold, and as will be seen in FIG. 12, bore 29 is similarly in communication with a circumferential recess 38 formed on the outer surface of the sleeve, recess 38 being of a shorter length than recess 36 and communicating with radial ports 39 formed in the manifold. As will be seen in FIG. 4, each of the radial ports 37 and 39 communicate with manifold passages 40 which in turn are in communication with one end of a hose 41, the opposite end of the hose being connected to a container holder 42 carried on the outer end of the arm 14, and to be described more fully hereinafter.

In the operation of the apparatus thus far described, it will be readily apparent that when disc 9 is rotated, the cam 25 will cause arm 14 to pivot about point 15 thereby imparting an oscillatory movement to arm 14. This movement can be visualized by referring to FIGS. 4, 7 and 8 wherein it will be seen that the arm 14 is moved from a position as shown in FIG. 4, to a position illustrated in FIG. 7 and then to a position shown in FIG. 8. From the position illustrated in FIG. 8, the direction of pivotal movement of the arm 14 is then reversed until it once again assumes the position shown in FIG. 4.

During the rotation of the disc 9 and the oscillatory movement of the arm 14, the manifold 33, secured to the disc 9, is also being rotated relative to the sleeve 29, whereby the hose 41 may be selectively placed into communication with either the source of compressed air or vacuum source.

The details of the container holder 42 are illustrated in FIGS. 4, 5, 6, 9 and 10 and since the container holders carried by the arms 14 are identical, only one holder will be described. Each support frame 13 has a pair of spaced, flanges 13a integrally formed on the upper surface thereof, the flanges having extended plate portions 13b which support a pair of parallel rods 13c. A carriage 43 is slidably mounted on the rods 13c, the slidable movement being imparted thereto through a roller 14a (FIG. 9) connected to the end of the arm 14 and positioned within a slot 43a formed in the carriage. A fixed plate 44 is secured to the plate portions 13b, and as will be seen in FIG. 4, a longitudinally extending slot 44a having an upwardly extending arcuate portion 44b is formed in plate 44. A fixed pivot pin 44c is secured to the plate 44 and positioned beneath the arcuate portion 44b of the slot. The pin 44c slidably receives a bifurcated arm 45 which is secured to the carriage 43 through a bolt 46 (FIG. 9) which extends through the slot 44a and threaded into a head portion 45a formed on the end of the bifurcated arm 45. Suitable passages 45b are formed in the head 45a which communicate with a suitable fitting 47 which is secured to the side of the head and connected to the hose 41. Passages 45b also communicate with a tubular conduit 48 having one end secured to the end of the head 45a, the opposite end of the conduit having a suction cup 49 secured thereto.

The movement imparted to each container holder 42 by its respective arm 14 is illustrated in FIGS. 4, 7 and 8 wherein it will be seen that the oscillatory movement of the arm 14, described hereinabove, imparts a reciprocatory movement to the carriage 43 which, in turn, imparts a reciprocable and pivotal movement to the bifurcated arm 45.

In the operation of the transfer assembly of the present invention, after the undecorated containers 4 have been deposited on a respective cradle 8, with the open end of each container facing a mandrel which becomes aligned with a respective cradle, the container is blown from its cradle, as shown in FIG. 4, onto the mandrel by means of compressed air which is admitted to conduit 48 via hose 41. The continuously

rotatable mandrel assembly then carries the containers through the decorating station which includes the printing cylinder 12. After the decorating step has been completed, each container holder 42, being aligned with the bottom of a container carried by its respective mandrel, draws the container from its mandrel by virtue of suction cup 49, conduit 48 and hose 41 being in communication with the source of vacuum. With the bottom of the container thus tightly gripped by the suction cup, the arm 14 causes the container holder 42 to pivot through substantially 180° thereby aligning the open end of the container with a pin 50 on the drying-oven conveyor 2, whereupon the source of vacuum is cutoff from the suction cup and compressed air is admitted thereto whereby the container is blown onto the pin of the drying-oven conveyor. With the rotation of the disc 9, each container holder 42 is then pivoted back to its original position and the above-described cycle is repeated.

I claim:

1. A transfer assembly for sequentially transferring decorated containers from a mandrel carrier to a drying-oven conveyor comprising a disc, a frame secured to said disc and extending axially therefrom, arm means, means pivotally connecting said arm means to said frame on an axis transverse to the longitudinal axis of said disc, drive means operatively connected to one end of said arm means for pivoting said arm means, carriage means connected to the opposite end of said arm means, guide means slidably receiving said carriage means, container holder means connected to said carriage means, and means pivotally connecting said container holder means to said guide means, whereby when the arm means is pivoted the carriage means slides on said guide means thereby causing the container holder means to pivot through substantially 180°.

2. A transfer assembly according to claim 1 wherein the drive means comprises, means for rotating said disc and cam means connected to the end of said arm means, whereby upon rotation of said disc the cam means causes the arm means to pivot about its pivotal connection on the support means.

3. A transfer assembly according to claim 2 wherein the cam means comprises a stationary cylindrical cam and a cam follower secured to the end of said arm means.

4. A transfer assembly according to claim 1 wherein the guide means includes a plate having a longitudinally extending slot formed therein, said slot having an arcuate portion intermediate the ends thereof, bolt means connecting the container holder means to said carriage means, said bolt means extending transversely through said slot and adapted to slide therein, and a pivot pin connected to said plate within the bight of the arcuate portion of the slot, the container holder means being operatively connected to said pivot pin.

5. A transfer assembly according to claim 4, wherein the container holder means includes a bifurcated arm slidably mounted on said pivot pin.

6. A transfer assembly according to claim 1, wherein the container holder means comprises a head portion, manifold means connected to said head portion, vacuum and compressed air sources being connected to said manifold means, one end of a conduit being connected to said head portion, and a suction cup connected to the opposite end of the conduit.

7. A transfer assembly according to claim 3 wherein manifold means is connected to the disc and adapted to rotate therewith, stationary sleeve means mounted within said manifold means, said sleeve means including passages respectively connected to sources of compressed air and vacuum, said manifold means including passages which are selectively placed in communication with the sleeve passages upon rotation of the manifold means relative to said sleeve, and conduit means connecting the manifold means to the container holder means, whereby the container holder means may be selectively placed in communication with the compressed air source and vacuum source.

5

8. A transfer assembly according to claim 7 wherein the container holder means comprises a head portion, said conduit means being connected to said head portion, and suction cup means connected to said head portion, whereby the suction cup means is selectively placed in communication with the vacuum source for removing a decorated container from

6

the mandrel carrier, and with the source of compressed air for placing the container on the drying-oven conveyor.

9. A transfer assembly according to claim 3 wherein the cylindrical cam is suitably configured to impart an oscillatory movement to the arm during rotation of said disc.

10

15

20

25

30

35

40

45

50

55

60

65

70

75