A system for filling bottles with pills including a drive wheel formed with an upper generally circular plate (32) and a vertically spaced lower generally circular plate (34). A depth spacer is positioned with recesses (42) and is radially movable toward and away from an axis of rotation of said plates (32, 34). Furthermore, a pair of width plates are positioned to vary the width of each recess (42).
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SYSTEM FOR FILLING BOTTLES WITH PILLS

BACKGROUND OF THE INVENTION

Field of the Invention

The present invention relates to a system for filling bottles with pills and more particularly pertains to enabling bottles of differing sizes to filled with pills with a system for filling bottles with pills.

Description of the Prior Art

The use of fixed bottle holders is known in the prior art. More specifically, fixed bottle holders heretofore devised and utilized for the purpose of holding a singular sized bottle for filling are known to consist basically of familiar, expected and obvious structural configurations, notwithstanding the myriad of designs encompassed by the crowded prior art which have been developed for the fulfillment of countless objectives and requirements.

The system for filling bottles with pills according to the present invention substantially departs from the conventional concepts and designs.
of the prior art, and in doing so provides an apparatus primarily developed for the purpose of enabling bottles of differing sizes to filled with pills. Therefore, it can be appreciated that there exists a continuing need for new and improved system for filling bottles with pills which can be used for enabling bottles of differing sizes to filled with pills. In this regard, the present invention substantially fulfills this need.

SUMMARY OF THE INVENTION

In the view of the foregoing disadvantages inherent in the known types of fixed bottle holders now present in the prior art, the present invention provides an improved system for filling bottles with pills. As such, the general purpose of the present invention, which will be described subsequently in greater detail, is to provide a new and improved system for filling bottles with pills and method which has all the advantages of the prior art and none of the disadvantages.
To attain this, the present invention essentially comprises a linear conveyor assembly adapted to feed bottles along a linear path while being filled with pills. The linear path includes an intermediate region where bottles are moved from the linear path in an unfilled condition along an arcuate path and returned to the linear path in a filled condition. The arcuate path includes a planar support plate for receiving bottoms of the bottles being conveyed. The linear path and arcuate path include side rails adapted to preclude the lateral tipping of the bottles moved along the linear path and the arcuate path. A rotary conveyor assembly is positioned in part over the linear conveyor assembly and partially offset therefrom. The rotary conveyor assembly includes a drive shaft in a vertical orientation with an axis of rotation laterally offset from the linear conveyor assembly. A drive wheel is formed with an upper generally circular plate and a vertically spaced lower generally circular plate with concentric peripheries and axially aligned central apertures extending.
therethrough supported on the drive shaft for
rotation therewith and with a motor for effecting
the concurrent rotation of the drive shaft and the
upper and lower plates. The plates are formed with
six symmetrically located recesses on the
peripheries of the plates for receiving, supporting
and driving bottles therein when moved from the
linear path to the arcuate path and back to the
linear path. A depth spacer is positioned within
each recess. Each depth spacer includes a plate
radially movable toward and away from the axis of
rotation and the peripheries of the plates. Each
depth spacer has a planar rack with gear teeth
extending upwardly therefrom and an associated
pinion gear rotatable about a horizontal axis to
move the depth plate to a pre-selected position
within the recess. A single depth dial with a drive
bevel gear is rotatable about a vertical axis
located between the plates and with a driven bevel
gear rotatable about a horizontal axis operatively
coupled to the drive bevel gear and a plurality of
depth rods having universal joints coupling the
depth rods whereby rotation of the depth dial in one
direction of rotation will rotate the depth rods in
a common direction of rotation. The pinion gears
are located on the depth rods at a central extent
whereby rotation of the depth dial will rotate the
depth rods to rotate the pinion gears and hence the
rack gears for selectively moving the depth plates.
A pair of width plates are positioned on opposite
sides of each recess with interior screw threads
located therethrough and a width rod extending
through each pair of width plates. Each of the
width rods have oppositely angled threads therewith
for moving the width plates toward and away from
each other to vary the width of each recess. A
plurality of universal joints connect the width rods
with an associated single width dial having a bevel
drive gear rotatable about a vertical axis and an
associated bevel driven gear rotatable about a
horizontal axis to rotate the width rods
concurrently. Fixed spacers couple the plates
between the recesses and a pair of pivot plates at
each recess adjacent the peripheries. Each pivot
plate is rotatably coupled to a width plate and
formed with an external surface adapted to fill the
space between the plates. Each pivot plate has an
interior cam follower surface and an associated
fixed cam pin in slidable contact with the interior
cam follower surface whereby linear movement of the
width plates will linearly move the pivot plates
concurrently therewith to allow the interior cam
follower surfaces of the pivot plates to be rotated
inwardly due to contact by the cam pin. A filler
plate having a central aperture is coaxial with and
coupled to the drive shaft for rotation therewith.
The filler plate has peripheral apertures
therethrough axially aligned with the recesses.
Each peripheral aperture has an enlarged funnel
thereabove whereby pills deposited into each funnel
will allow the pills to be dropped into a bottle in
an associated recess during movement along the
arcuate path.

There has thus been outlined, rather
broadly, the more important features of the
invention in order that the detailed description
thereof that follows may be better understood, and
in order that the present contribution to the art
may be better appreciated. There are, of course,
additional features of the invention that will be
described hereinafter and which will form the
subject matter of the claims appended hereto.

In this respect, before explaining at
least one embodiment of the invention in detail, it
is to be understood that the invention is not
limited in its application to the details of
construction and to the arrangements of the
components set forth in the following description or
illustrated in the drawings. The invention is
capable of other embodiments and of being practiced
and carried out in various ways. Also, it is to be
understood that the phraseology and terminology
employed herein are for the purpose of description
and should not be regarded as limiting.

As such, those skilled in the art will
appreciate that the conception, upon which this
disclosure is based, may readily be utilized as a
basis for the designing of other structures, methods
and systems for carrying out the several purposes of
the present invention. It is important, therefore,
that the claims be regarded as including such
equivalent constructions insofar as they do not
depart from the spirit and scope of the present
invention.

It is therefore an object of the present
invention to provide a new and improved system for
filling bottles with pills which has all the
advantages of the prior art fixed bottle holders and
none of the disadvantages.

It is another object of the present
invention to provide a new and improved system for
filling bottles with pills which may be easily and
efficiently manufactured and marketed.

It is a further object of the present
invention to provide a new and improved system for
filling bottles with pills which is of durable and
reliable construction.

An even further object of the present
invention is to provide a new and improved system
for filling bottles with pills which is susceptible
of a low cost of manufacture with regard to both materials and labor, and which accordingly is then susceptible of low prices of sale to the consuming public, thereby making such a system for filling bottles with pills economically available to the buying public.

Even still another object of the present invention is to provide a new and improved system for filling bottles with pills for enabling bottles of differing sizes to filled with pills.

Lastly, it is an object of the present invention to provide a new and improved system for filling containers including a drive wheel formed with an upper generally circular plate and a vertically spaced lower generally circular plate with concentric peripheries and axially aligned central apertures extending therethrough supportable on a drive shaft for rotation therewith. The plates are formed with a plurality of symmetrically located recesses on the peripheries of the plates for receiving containers therein. A depth spacer is positioned within each recess and is radially
movable toward and away from the axis of rotation
and the peripheries of the plates. A pair of width
plates are positioned on opposite sides of each
recess to vary the width of each recess.

These together with other objects of the
invention, along with the various features of
novelty which characterize the invention, are
pointed out with particularity in the claims annexed
to and forming a part of this disclosure. For a
better understanding of the invention, its operating
advantages and the specific objects attained by its
uses, reference should be had to the accompanying
drawings and descriptive matter in which there is
illustrated preferred embodiments of the invention.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention will be better understood
and objects other than those set forth above will
become apparent when consideration is given to the
following detailed description thereof. Such
description makes reference to the annexed drawings
wherein:

Figure 1 is a perspective view of the
preferred embodiment of the system for filling bottles with pills constructed in accordance with the principles of the present invention.

Figure 2 is a plan perspective view of the present invention illustrating the drive wheel separated from the filler plate.

Figure 3 is a top plan view of the drive wheel of the present invention as taken along line 3-3 of Figure 2.

Figure 4 is a side elevation view of the drive wheel of Figure 3.

Figure 5 is an enlarged sectional view of the drive wheel as taken from circle 5 of Figure 3.

Figure 6 is an enlarged sectional view of the pivot plate and the side plate as taken from circle 6 of Figure 5.

Figure 7 is a cross-sectional view as taken along line 7-7 of Figure 5.

Figure 8 is a cross-sectional view as taken along line 8-8 of Figure 5.

The same reference numerals refer to the same parts through the various figures.
DESCRIPTION OF THE PREFERRED EMBODIMENT

With reference now to the drawings, and in particular, to Figures 1 through 8 thereof, the preferred embodiment of the new and improved system for filling bottles with pills embodying the principles and concepts of the present invention and generally designated by the reference number 10 will be described.

Specifically, it will be noted in the various Figures that the device relates to a system for filling bottles with pills for enabling bottles of differing sizes to filled with pills. In its broadest context, the device consists of a linear conveyor assembly, a rotary conveyor assembly, a drive wheel, depth spacers, pairs of width plates, fixed spacers and a filler plate. Such components are individually configured and correlated with respect to each other so as to attain the desired objective.

The linear conveyor assembly, as illustrated in Figure 1, is adapted to feed bottles along a linear path 12 while being filled with
pills. The linear path 12 includes an intermediate region where bottles 14 are moved from the linear path 12 in an unfilled condition along an arcuate path 16 and returned to the linear path 12 in a filled condition. The arcuate path 16 includes a planar support plate 18 for receiving bottoms of the bottles 14 being conveyed. The planar support plate 18 is positioned on the same plane as the linear and arcuate paths. The linear path 12 and arcuate path 16 include side rails 20 adapted to preclude the lateral tipping of the bottles 14 moved along the linear path 12 and the arcuate path 16.

Alternately, other containers could be readily used in the system 10 in replace of bottles and items other than pills could also be used.

The rotary conveyor assembly 24, as best illustrated in Figure 1, is positioned in part over the linear conveyor assembly and partially offset therefrom. The rotary conveyor assembly 24 includes a drive shaft 26 in a vertical orientation with an axis of rotation laterally offset from the linear conveyor assembly.
The drive wheel 30 is formed with an upper generally circular plate 32 and a vertically spaced lower generally circular plate 34 with concentric peripheries 36 and axially aligned central apertures 38 extending therethrough supported on the drive shaft 26 for rotation therewith and with a motor (not illustrated) for effecting the concurrent rotation of the drive shaft 26 and the upper 32 and lower plates 34. The motor is disposed within a housing 40 situated below the drive wheel 30. The housing 40 is illustrated in Figure 1. The plates 32, 34 are formed with six symmetrically located recesses 42 on the peripheries of the plates for receiving, supporting and driving bottles 14 therein when moved from the linear path 12 to the arcuate path 16 and back to the linear path 12. Any number of recesses 42 can be provided so long as their is adequate space therebetween.

A depth spacer 46 is positioned within each recess 42. Each depth spacer 46 includes a plate 48 radially movable toward and away from the axis of rotation and the peripheries 36 of the
plates 32, 34. In the preferred embodiment, two plates 48 are provided. An upper plate 50 is positioned with respect to the upper circular plate 32 disposed over the recess 42 and a lower plate 52 is positioned with respect to the lower circular plate 34 disposed below the recess 42. Note Figure 2. The upper 50 and lower plate 52 are each provided with an inwardly angled leading edge 54. Each depth spacer 46 has a planar rack 56 with gear teeth 58 extending upwardly therefrom and an associated pinion gear 60 rotatable about a horizontal axis to move the plate 48 to a pre-selected position within the recess 42. Note Figures 5 and 7-8. A single depth dial 62 with a drive bevel gear 64 is rotatable about a vertical axis located between the plates 32, 34 and with a driven bevel gear 66 rotatable about a horizontal axis operatively coupled to the drive bevel gear 64 and positioned thereabove and a plurality of depth rods 68 having universal joints 70 coupling the depth rods 68 whereby rotation of the depth dial 62 in one direction of rotation will rotate the depth.
rods 68 in a common direction of rotation. The pinion gears 60 are located on the depth rods 68 at a central extent whereby rotation of the depth dial 62 will rotate the depth rods 68 to rotate the pinion gears 60 and hence the rack gears for selectively moving the plates 48. Alternately, instead of the depth dial 62, the drive bevel gear 64 is positioned below and coupled to the driven bevel gear 66 with the drive bevel gear 64 provided with an opening in a central point thereof to allow the insertion of a tool to facilitate rotation of the drive bevel gear 64. For example, the opening can be hexagonal in shape for coupling with an Allen wrench. Access to the drive bevel gear 64 can be gained through an opening in the lower plate 34 either with or without a movable access door or the like.

A pair of width plates 74 are positioned on opposite sides of each recess 42 with interior screw threads 76 located therethrough and a width rod 78 extending through each pair of width plates 74. The width rods 78 have oppositely angled
threads 80 therewith for moving the width plates 74 toward and away from each other to vary the width of each recess 42. Note Figures 5, 6 and 8. A pair of guide rods 82 are positioned on opposing sides of the width rod 78 to facilitate the moving of the width plates 74. A plurality of universal joints 84 connect the width rods 78 with an associated single width dial 86 having a bevel drive gear 88 rotatable about a vertical axis and an associated bevel driven gear 90 rotatable about a horizontal axis to rotate the width rods 78 concurrently.

The fixed spacers 94 couple the plates 32, 34 between the recesses 42 and a pair of pivot plates 96 at each recess 42 adjacent the peripheries. Each pivot plate 96 is rotatably coupled to a width plate 74 and formed with an external surface 98 adapted to fill the space between the plates. A forward end 100 of the width plates 74 are of a reduced thickness whereby a pivot pin 102 extends through the pivot plate 96 for pivotal coupling with respect to the width plates 74. Each pivot plate 96 has an interior cam
follower surface 104 and an associated fixed cam pin
106 in slidable contact with the interior cam
follower surface 104 whereby linear movement of the
width plates 74 will linearly move the pivot plates
96 concurrently therewith to allow the interior cam
follower surfaces 104 of the pivot plates 96 to be
rotated inwardly due to contact by the cam pin 106.
This will allow the interior end of the pivot plates
96 to contact the bottle 14 similar to a pair of
fingers being pinched together. Note Figures 5 and
6.

The filler plate 110, as illustrated in
Figures 1 and 2, has a central aperture that is
coaxial with and coupled to the drive shaft 26 for
rotation therewith. The filler plate 110 has
peripheral apertures 112 therethrough axially
aligned with the recesses 42. Each peripheral
aperture 112 has an enlarged funnel 114 thereabove
whereby pills deposited into each funnel 114 will
allow the pills to be dropped into a bottle 14 in an
associated recess 42 during movement along the
arcuate path 16.
As to the manner of usage and operation of the present invention, the same should be apparent from the above description. Accordingly, no further discussion relating to the manner of usage and operation will be provided.

With respect to the above description then, it is to be realized that the optimum dimensional relationships for the parts of the invention, to include variations in size, materials, shape, form, function and the manner of operation, assembly and use, are deemed readily apparent and obvious to one skilled in the art, and all equivalent relationships to those illustrated in the drawings and described in the specification are intended to be encompassed by the present invention.

Therefore, the foregoing is considered as illustrative only of the principles of the invention. Further, since numerous modification and changes will readily occur to those skilled in the art, it is not desired to limit the invention to the exact construction and operation shown and described, and accordingly, all suitable
modification and equivalents may be resorted to,
falling within the scope of the invention.
CLAIMS

What is claimed as being new and desired to be protected by LETTERS PATENT of the United States is as follows:

1. A system for filling bottles with pills for enabling bottles of differing sizes to be filled with pills comprising, in combination:
   a linear conveyor assembly adapted to feed bottles along a linear path while being filled with pills, the linear path including an intermediate region where bottles are moved from the linear path in an unfilled condition along an arcuate path and returned to the linear path in a filled condition, the arcuate path including a planar support plate for receiving bottoms of the bottles being conveyed, the linear path and arcuate path including side rails adapted to preclude the lateral tipping of the bottles moved along the linear path and the arcuate path;
   a rotary conveyor assembly positioned in part over the linear conveyor assembly and partially offset therefrom, the rotary conveyor assembly
including a drive shaft in a vertical orientation
with an axis of rotation laterally offset from the
linear conveyor assembly;

    a drive wheel formed with an upper
generally circular plate and a vertically spaced
lower generally circular plate with concentric
peripheries and axially aligned central apertures
extending therethrough supported on the drive shaft
for rotation therewith and with a motor for
effecting the concurrent rotation of the drive shaft
and the upper and lower plates, the plates being
formed with six symmetrically located recesses on
the peripheries of the plates for receiving,
supporting and driving bottles therein when moved
from the linear path to the arcuate path and back to
the linear path;

    a depth spacer positioned within each
recess, each depth spacer including a plate radially
movable toward and away from the axis of rotation
and the peripheries of the plates, each depth spacer
having a planar rack with gear teeth extending
upwardly therefrom and an associated pinion gear
rotatable about a horizontal axis to move the plate
to a pre-selected position within the recess, a
single depth dial with a drive bevel gear rotatable
about a vertical axis located between the plates and
with a driven bevel gear rotatable about a
horizontal axis operatively coupled to the drive
bevel gear and a plurality of depth rods having
universal joints coupling the depth rods whereby
rotation of the depth dial in one direction of
rotation will rotate the depth rods in a common
direction of rotation, the pinion gears being
located on the depth rods at a central extent
whereby rotation of the depth dial will rotate the
depth rods to rotate the pinion gears and hence the
rack gears for selectively moving the depth plates;

a pair of width plates on opposite sides
of each recess with interior screw threads located
therethrough and a width rod extending through each
pair of width plates, each of the width rods having
oppositely angled threads therewith for moving the
width plates toward and away from each other to vary
the width of each recess, a plurality of universal
joints connecting the width rods with an associated
single width dial having a bevel drive gear
rotatable about a vertical axis and an associated
bevel driven gear rotatable about a horizontal axis
to rotate the width rods concurrently;

fixed spacers coupling the plates between
the recesses and a pair of pivot plates at each
recess adjacent the peripheries, each pivot plate
being rotatably coupled to a width plate and formed
with an external surface adapted to fill the space
between the plates, each pivot plate having an
interior cam follower surface and an associated
fixed cam pin in slidable contact with the interior
cam follower surface whereby linear movement of the
width plates will linearly move the pivot plates
concurrently therewith to allow the interior cam
follower surfaces of the pivot plates to be rotated
inwardly due to contact by the cam pin; and

a filler plate having a central aperture
coaxial with and coupled to the drive shaft for
rotation therewith, the filler plate having
peripheral apertures therethrough axially aligned
with the recesses, each peripheral aperture having
an enlarged funnel thereabove whereby pills
deposited into each funnel will allow the pills to
be dropped into a bottle in an associated recess
during movement along the arcuate path.

2. A system for moving containers of differing
sizes comprising, in combination:
   a drive wheel formed with an upper generally
circular plate and a vertically spaced lower
generally circular plate with concentric peripheries
and axially aligned central apertures extending
therethrough supportable on a drive shaft for
rotation therewith, the plates being formed with a
plurality of symmetrically located recesses on the
peripheries of the plates;
   a depth spacer positioned within each recess
radially movable toward and away from the axis of
rotation and the peripheries of the plates; and
   a pair of width plates on opposite sides of
each recess to vary the width of each recess.
3. The system as set forth in claim 2 and further including a linear conveyor assembly adapted to feed containers along a linear path, the linear path including an intermediate region where bottles are moved from the linear path in an unfilled condition along an arcuate path and returned to the linear path in a filled condition, the arcuate path including a planar support plate for receiving bottoms of the bottles being conveyed, the linear path and arcuate path including side rails adapted to preclude the lateral tipping of the bottles moved along the linear path and the arcuate path.

4. The system as set forth in claim 3 and further including a rotary conveyor assembly positioned in part over the linear conveyor assembly and partially offset therefrom, the rotary conveyor assembly including a drive shaft in a vertical orientation with an axis of rotation laterally offset from the linear conveyor assembly.

5. The system as set forth in claim 4 and
further including a filler plate having a central
aperture coaxial with and coupled to the drive shaft
for rotation therewith, the filler plate having
peripheral apertures therethrough axially aligned
with the recesses, each peripheral aperture having
an enlarged funnel thereabove whereby items
deposited into each funnel will allow the items to
be dropped into a container in an associated recess
during movement along the arcuate path.

6. The system as set forth in claim 2 and
further including fixed spacers coupling the plates
between the recesses and a pair of pivot plates at
each recess adjacent the peripheries, each pivot
plate being rotatably coupled to a width plate and
formed with an external surface adapted to fill the
space between the plates, each pivot plate having an
interior cam follower surface and an associated
fixed cam pin in slidable contact with the interior
cam follower surface whereby linear movement of the
width plates will linearly move the pivot plates
concurrently therewith to allow the interior cam
follower surfaces of the pivot plates to be rotated
inwardly due to contact by the cam pin.

7. The system as set forth in claim 2 wherein
the each depth spacer includes a plate radially
movable toward and away from the axis of rotation
and the peripheries of the plates, each depth spacer
having a planar rack with gear teeth extending
upwardly therefrom and an associated pinion gear
rotatable about a horizontal axis to move the plate
to a pre-selected position within the recess.

8. The system as set forth in claim 7 wherein a
single depth dial with a drive bevel gear is
rotatable about a vertical axis located between the
plates and with a driven bevel gear rotatable about
a horizontal axis operatively coupled to the drive
bevel gear and a plurality of depth rods having
universal joints coupling the depth rods whereby
rotation of the depth dial in one direction of
rotation will rotate the depth rods in a common
direction of rotation.
9. The system as set forth in claim 8 wherein the pinion gears are located on the depth rods at a central extent whereby rotation of the depth dial will rotate the depth rods to rotate the pinion gears and hence the rack gears for selectively moving the depth plates.

10. The system as set forth in claim 2 wherein the pair of width plates are on opposite sides of each recess with interior screw threads located therethrough and a width rod extending through each pair of width plates, each of the width rods having oppositely angled threads therewith for moving the width plates toward and away from each other to vary the width of each recess.

11. The system as set forth in claim 10 wherein a plurality of universal joints connect the width rods with an associated single width dial having a bevel drive gear rotatable about a vertical axis and an associated bevel driven gear rotatable about a
horizontal axis to rotate the width rods concurrently.

12. A system for filling bottles with pills for enabling bottles of differing sizes to be filled with pills comprising, in combination:
   a rotary conveyor assembly positioned in part over a linear conveyor assembly and partially offset therefrom, the rotary conveyor assembly including a drive shaft in a vertical orientation with an axis of rotation laterally offset from the linear conveyor assembly;
   a drive wheel formed with an upper generally circular plate and a vertically spaced lower generally circular plate with concentric peripheries and axially aligned central apertures extending therethrough supported on the drive shaft for rotation therewith and with a motor for effecting the concurrent rotation of the drive shaft and the upper and lower plates, the plates being formed with a plurality of symmetrically located recesses on the peripheries of the plates for receiving, supporting
and driving bottles therein when moved along the
linear conveyor assembly;

   a depth spacer positioned within each recess,
each depth spacer including a plate radially movable
toward and away from the axis of rotation and the
peripheries of the plates, each depth spacer having
a planar rack with gear teeth extending upwardly
therefrom and an associated pinion gear rotatable
about a horizontal axis to move the depth plate to a
pre-selected position within the recess, a single
depth dial with a drive bevel gear rotatable about a
vertical axis located between the plates and with a
driven bevel gear rotatable about a horizontal axis
operatively coupled to the drive bevel gear and a
plurality of depth rods having universal joints
coupling the depth rods whereby rotation of the
depth dial in one direction of rotation will rotate
the depth rods in a common direction of rotation,
the pinion gears being located on the depth rods at
a central extent whereby rotation of the depth dial
will rotate the depth rods to rotate the pinion
gears and hence the rack gears for selectively

31
moving the depth plates;

a pair of width plates on opposite sides of each recess with interior screw threads located therethrough and a width rod extending through each pair of width plates, each of the width rods having oppositely angled threads therewith for moving the width plates toward and away from each other to vary the width of each recess, a plurality of universal joints connecting the width rods with an associated single width dial having a bevel drive gear rotatable about a vertical axis and an associated bevel driven gear rotatable about a horizontal axis to rotate the width rods concurrently; and

fixed spacers coupling the plates between the recesses and a pair of pivot plates at each recess adjacent the peripheries, each pivot plate being rotatably coupled to a width plate and formed with an external surface adapted to fill the space between the plates, each pivot plate having an interior cam follower surface and an associated fixed cam pin in slidable contact with the interior cam follower surface whereby linear movement of the
width plates will linearly move the pivot plates
concurrently therewith to allow the interior cam
follower surfaces of the pivot plates to be rotated
inwardly due to contact by the cam pin.
INTERNATIONAL SEARCH REPORT

A. CLASSIFICATION OF SUBJECT MATTER
IPC(6): B65B 1/04, 3/04
US CL: 141/145,18,144
According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED
Minimum documentation searched (classification system followed by classification symbols)
U.S.: 141/145,18,144,129,152,177,391

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched
none

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)
none

C. DOCUMENTS CONSIDERED TO BE RELEVANT

<table>
<thead>
<tr>
<th>Category*</th>
<th>Citation of document, with indication, where appropriate, of the relevant passages</th>
<th>Relevant to claim No.</th>
</tr>
</thead>
<tbody>
<tr>
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<td>US 4,051,878 A (OHMEIS ET AL) 04 OCTOBER 1977, SEE ENTIRE DOCUMENT.</td>
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</tr>
</tbody>
</table>

Further documents are listed in the continuation of Box C. See patent family annex.

Date of the actual completion of the international search: 29 MAY 1998
Date of mailing of the international search report: 17 JUL 1998

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