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⑦① Applicant: **THE MEAD CORPORATION, Mead World Headquarters Courthouse Plaza Northeast, Dayton Ohio 45463 (US)**

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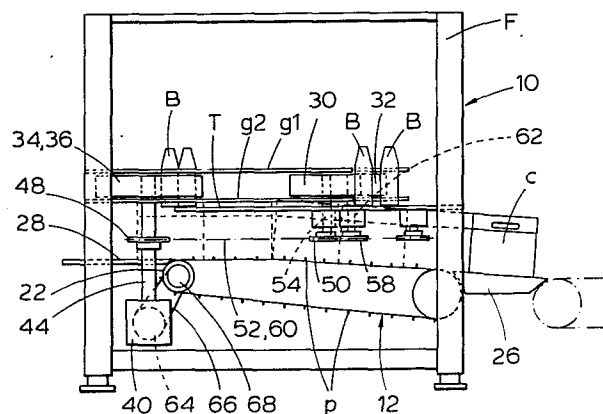
⑦② Inventor: **Müller, Rolf, In den Teilen 38, D-5559 Mehring (DE)**

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⑦④ Representative: **Hepworth, John, J.M. Hepworth & Co. 36 Regent Place, Rugby Warwickshire CV21 2PN (GB)**

⑤④ **Drop-loading packaging machine and method.**

⑤⑦ A drop-loading packaging machine comprises a conveyor (12) for conveying a continuous line of cartons sequentially to a drop-loading position (D) and feed means (30, 32, 34, 36) for feeding a continuous line of containers (B) sequentially to the drop-loading position so that containers are synchronised with and positioned for drop-loading into the cartons. Metering star wheels (30, 32) are provided at an infeed end of the machine for transferring the containers to spacing star wheels (34, 36) at the drop-loading position. The metering and spacing wheels are driven in timed relationship with respect to the carton feed conveyor and the containers are transferred between metering wheels and the spacing wheels solely by transmission of force between successive containers.



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DROP-LOADING PACKAGING MACHINE AND
METHOD

This invention relates to a machine and method for drop-loading primary containers, such as bottles or cans, into an open topped carton, for example, a basket type carrier.

- 5 The invention is particularly concerned with a continuous drop-loading operation in which containers are fed and loaded by a double feed-line arrangement into carrier fed one after the other below the carrier feed path.
- 10 Drop-loading apparatus is known in which a feed line of cartons and containers are brought into close proximity with one another for loading at a drop-loading station and in which the cartons and/or containers are caused to move along inclined feed paths towards the drop-loading station and in
- 15 which the containers are positively conveyed to the drop loading station.

In the present invention the containers are guided pressure-free so that spacing wheels at the drop-loading station can

20 engage a number of containers simultaneously in each container feed line and move them into position for drop-loading.

The invention provides a drop-loading packaging machine comprising conveying means for conveying a continuous line of

25 cartons sequentially to a drop-loading position and feed means for feeding a continuous line of containers sequentially to the drop-loading position so that the containers are synchronised and positioned for drop-loading into the cartons metering means being provided at an infeed end of said

30 machine for transferring said containers to spacing means at

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said drop-loading position, said metering and spacing means being driven in timed relationship with respect to said carton feed means characterised in that containers are transferred between said metering means and said spacing means by transmission of force between successive containers.

A packaging machine embodying the invention will now be described, by way of example, with reference to the accompanying drawings, in which:-

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FIGURE 1 is a schematic side view of a packaging machine according to the invention;

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FIGURE 2 is a schematic plan view of the machine, and

FIGURE 3 is a schematic end view of the machine.

Referring to the drawings, a drop-loading packaging machine 10 having support frame 'F' includes a carton conveyor 12 comprising parallel endless conveyor chains 14 and 16, respectively (FIGURE 3). Chain 14 is entrained about sprockets 18 and 20 and chain 16 is entrained about sprockets 22 and 24. In each case the chain has an upwardly sloping infeed end and a substantially horizontal outfeed end (FIGURE 1). Further, each chain includes a series of spaced projections 'p' which engage in apertures provided in the bases of the cartons 'c' positively to convey the cartons through the machine in order to synchronise the carton feed with the loading of the containers.

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Thus, the cartons 'c' enter the machine from an infeed platform 26 and are conveyed along the inclined infeed path so that the open tops of the cartons are moved into close proximity with the containers for loading. Immediately prior to loading the cartons 'c' are conveyed along the horizontal outfeed reach of the conveyor 12 and are then transferred onto a horizontal loading platform 28 at the outfeed end of conveyor 12.

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Containers, in this case bottles 'B' for loading enter the machine in two feed lines 'L1' and 'L2', respectively, and pressure in the feed lines cause the bottles to feed into the path of rotation of infeed star-wheels 30 and 32, respectively. The infeed star-wheels meter the bottles forwardly and thereby relieve the feed line pressure acting on the bottles so that they move forwardly with minimum pressure being transferred between the bottles. The bottles are guided along their respective feed lines by upper and lower guides 'g1', 'g2' respectively during which time their bases are supported by a static transfer platform 'T'. The bottles are then engaged by loading star wheels 34 and 36 respectively, located above the loading platform 28.

The loading star wheels are each sized to engage three containers from the feed line sequentially at any one time so that the lead container leaves the transfer platform 'T' at 'D' and drops into a carton passing along the loading platform directly below. An elongate slot 38 is formed centrally along the transfer platform 'T' to receive the upstanding handle 'H' of certain basket-style carriers. As best seen in FIGURE 3, the handle 'H' is interposed between the lead bottles in feed lines 'L1' and 'L2' at the drop-loading position. Of course, the bottle transfer and drop-loading must be synchronised accurately with the carton feed so that cartons are correctly positioned for loading as the bottles leave the end of the transfer platform.

To this end, both the loading star wheels are driven from one and the same main drive source (not shown) via gear boxes 40 and 42 from which drive is transmitted to the star wheels 34 and 36 by means of vertical drive shafts 44 and 46 respectively.

A chain and sprocket set incorporating sprockets 48 and 50 and endless chain 52 transfer the rotational drive from shaft 44 to infeed star wheels 30 via vertical shaft 54. Likewise, a chain and sprocket set incorporating sprockets 56 and 58

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and endless chain 60 transfer the rotational drive from shaft 46 to infeed star wheel 32 via vertical shaft 62.

5 The drive to conveyor 12 is provided from gear box 40 via take-off sprocket 64, endless chain 66 and transfer sprocket 68 which drives sprockets 22 and 18 on a common drive shaft. Hence movement of cartons along conveyor 12 is proportional to bottle feed movement along transfer platform 'T'.

10 The invention provides an extremely compact machine in which containers to be loaded are moved through the machine between the infeed star wheels and loading star wheels with minimum line pressure. This permits a simple arrangement in which the loading position, the container transfer platform and
15 the carton drop-loading platform are horizontal.

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CLAIMS

1. A drop-loading packaging machine (10) comprising conveying means (12) for conveying continuous line of cartons sequentially to a drop-loading position and feed means (30,32 ;34,36) for feeding a continuous line of containers sequentially to the drop-loading position so that containers are synchronized and positioned for drop-loading into the containers, metering means (30,32) being provided at an infeed end of the machine for transferring said containers to spacing means (34,36) at said drop-loading position, said metering and spacing means being driven in timed relationship with respect to said carton feed means, characterised in that said containers are transferred between said metering means and said spacing means by transmission of force between successive containers.
2. A drop-loading packaging machine according to claim 1, further characterised in that a static platform is provided between said metering means and said spacing means on which said containers are supported during transfer between said metering means and said spacing means.
3. A drop-loading packaging machine according to claim 1 or claim 2, further characterised in that a plurality of feed paths are provided for feeding said containers to said drop loading position at which position said feed paths converge.
4. A drop-loading packaging machine according to claim 3, further characterised in that each feed path is defined by fixed guides extending between said metering means and said spacing means.
5. A drop-loading packaging machine according to any of

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claims 2 to 4, further characterised in that said conveying means has an upwardly sloping infeed end and a substantially horizontal outfeed end relative to said static platform so that said cartons are moved into close proximity with said
5 containers for loading at the drop loading position.

6. A drop-loading packaging machine according to any of the preceding claims, further characterised in that a loading platform is provided at said drop loading position onto which
10 cartons are transferred from said conveying means.

7. A drop-loading packaging machine according to claim 3, further characterised in that said metering means comprises a rotatable star wheels in each of said feed paths and in that
15 said spacing means comprises a pair of cooperating star wheels at said drop-loading position.

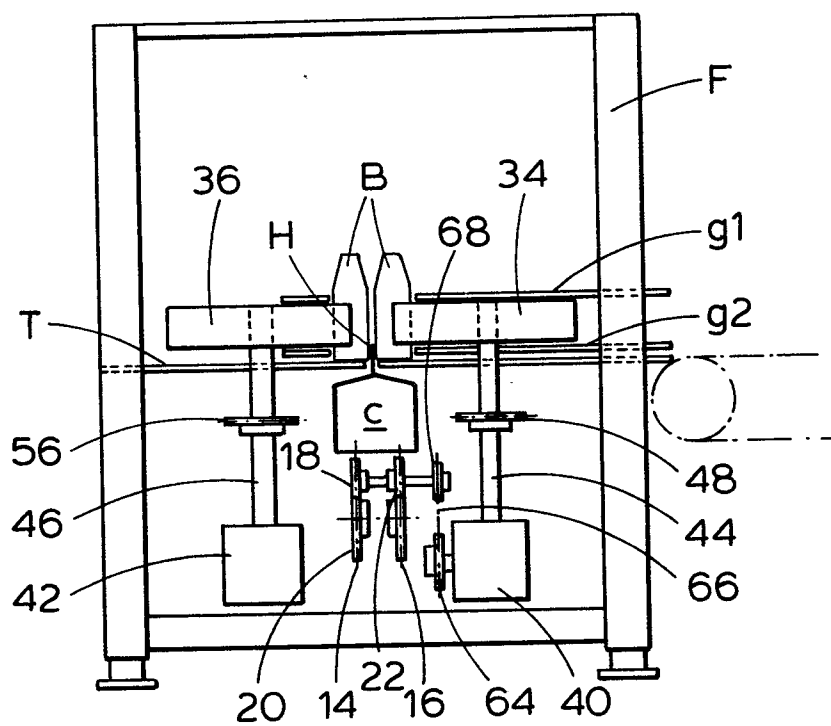


Fig. 3

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European Patent
Office

EUROPEAN SEARCH REPORT

Application number

EP 85 30 2441

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A	FR-A-2 127 794 (JUKOGYO) * Page 6, line 16 - page 9, line 9; figures 2A-6 *	1, 3, 4, 5, 6	B 65 B 21/16 B 65 B 21/06
A	US-A-3 585 782 (HEINZ) * Column 2, lines 3-47; figure 1 *	1	
A	US-A-2 953 883 (GENTRY) * Column 4, lines 22-57; figure 10 *	1, 2, 7	
			TECHNICAL FIELDS SEARCHED (Int. Cl.4)
			B 65 B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 15-07-1985	Examiner CLAEYS H.C.M.
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document</p>			