

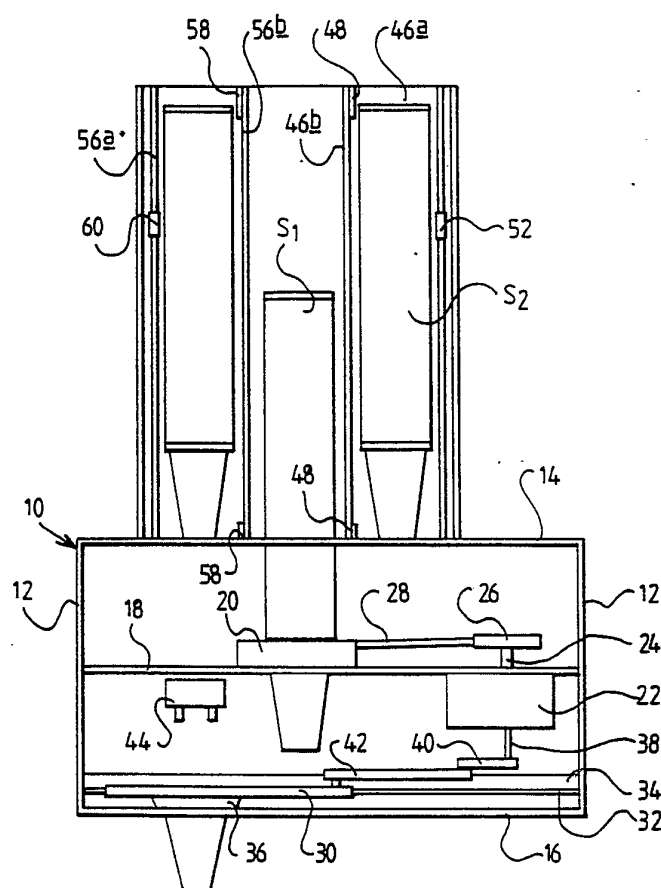


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(21) International Application Number: PCT/GB91/00356 (22) International Filing Date: 6 March 1991 (06.03.91) (30) Priority data: 9005207.7 8 March 1990 (08.03.90) GB (71) Applicant (for all designated States except US): SANKEY VENDING LIMITED [GB/GB]; P.O. Box 25, Dudley Street, Bilston, West Midlands WV14 0LF (GB). (72) Inventors; and (75) Inventors/Applicants (for US only) : ALDERSON, David, Edward, Charles [GB/GB]; 40 Mancroft Road, Tettenhall, Wolverhampton, West Midlands WV6 8RP (GB). JOHNDROW, John, Paul [GB/GB]; 17 Ferndale Road, Essington, Bloxwich, West Midlands WV11 4JG (GB). AUSTIN, David, Brenton [GB/GB]; 22a Regent Road, Tividale, Warley, West Midlands B60 1TL (GB).		(74) Agent: FORRESTER KETLEY & CO.; Chamberlain House, Paradise Place, Birmingham B3 3HP (GB). (81) Designated States: AT (European patent), AU, BE (European patent), CA, CH (European patent), DE (European patent), DK (European patent), ES (European patent), FI, FR (European patent), GB (European patent), GR (European patent), IT (European patent), LU (European patent), NL (European patent), NO, SE (European patent), US. Published <i>With international search report.</i>

(54) Title: DRINKS DISPENSING MACHINE**(57) Abstract**

The machine comprises a cup dispenser (20) operable to dispense cups from a vertical stack of nested cups, cup transferring means (30, 36) movable between a cup-receiving position beneath the dispenser (20) and a drink-receiving position beneath spouts (44) of the machine for dispensing a drink, and moving means (22) for moving the cup transferring means between its positions in synchronisation with the operation of the dispenser (20). A single motor (22) constitutes the moving means and also operates the dispenser (20).



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DRINKS DISPENSING MACHINE

This invention is concerned with a drinks dispensing machine comprising a cup dispenser operable to dispense cups one-at-a-time from the bottom of a vertical stack of nested cups.

In a conventional drinks dispensing machine, cups, each of which has a projecting annular rim and a frusto-conical body portion are stored in the compact form of a stack of nested cups. The cups are dispensed one-at-a-time from the bottom of the stack to be filled with drink. Conventionally, the lowermost cup of the stack is dispensed into a chute which guides the cup along a curved path downwards and sideways to a filling station where the cup comes to rest beneath one or more spouts which are operable to fill the cup with drink. This arrangement has the disadvantage that the chute has to be of considerable height to enable the cup to be moved reliably under the spout. The height required for the chute, therefore, limits the height of the stack of nested cups and thereby limits the capacity of the machine. Where the machine has an automatic mechanism for replenishing the stack of nested cups by adding further stacks to the top of the stack from which cups are dispensed, the height required for the chute also limits the height of the replenishing stacks.

It is an object of the present invention to provide a drinks dispensing machine of the type referred to in which the aforementioned chute is replaced by cup transferring means which does not require as much height as the chute.

The invention provides a drinks dispensing machine comprising a cup dispenser operable to dispense cups one-at-a-time from the bottom of a vertical stack of nested cups, cup transferring means movable between a cup-receiving position and a drink-receiving position thereof, and moving means operable to move the cup transferring means between its cup-receiving and drink-receiving positions in synchronisation with the operation of the cup dispenser, the cup transferring means comprising a pocket arranged, when the transferring means is in its cup-receiving position to receive a cup dispensed by the cup dispenser, and to retain the cup during movement of the transferring means to the drink-receiving position and while a drink is dispensed into the cup at the

drink-receiving position, the cup being removable from the pocket by an operator of the machine.

In a drinks dispensing machine according to the invention, the aforementioned chute is dispensed with so that a considerable saving in height can be achieved. Furthermore, cups are reliably and rapidly transferred to the filling station.

Advantageously, a single motor may operate the cup dispenser and provide said moving means. This arrangement simplifies synchronisation of the operation of the cup dispenser and the cup transferring means.

The pocket may, advantageously, be mounted on a horizontal slide for horizontal movement between its cup-receiving and drink-receiving positions. The pocket may be moved by a crank driven by a rotary motor, the crank providing for the pocket to pause at the cup-receiving position. The pocket may provide a U-shaped lip to support the rim of a cup. In this case, the cup is removed from the pocket by lifting it slightly away from the lip of the pocket and moving the cup through the open top of the U.

It is preferred that the dispensing means comprises a plurality of cams distributed around the stack, each cam being mounted on a gear which is turnable about a vertical axis and being meshed with an annular gear surrounding the stack so that, when the annular gear is turned about the longitudinal axis of the stack, the cams all turn simultaneously, the cams each providing a spiral lip which supports the rim of the lowermost cup in the stack, the action of turning the cams causing the rim of the lowermost cup in the stack to be released so that it falls away from the stack and introducing the lips of the cams beneath the rim of the lowermost but one cup so that the stack remains supported by the cams. This is a known cup dispenser which is reliable in operation.

It is preferred that the machine also comprises stack replenishing means operable to add stacks to the stack from which the cups are dispensed when a predetermined number of cups remain in the stack.

An example of a drinks dispensing machine in accordance with the invention is described hereinafter in detail with reference to the accompanying drawings.

In the drawings:-

Figure 1 is a diagrammatic vertical view of the door of a drinks dispensing machine, showing those mechanisms which are mounted on the door, looking from the inside of the machine and showing cup transferring means of the machine in its drink-receiving position;

Figure 2 is a view similar to Figure 1 but showing the cup transferring means in a cup-receiving position;

Figure 3 is a plan view of the mechanisms shown in Figures 1 and 2, showing a pusher thereof in a first position; and

Figure 4 is a view similar to Figure 3 but showing the pusher in a second position thereof.

Figure 1 shows mechanisms of a drinks dispensing machine to the invention according which are supported on the inside of a front door of the machine. The door supports a rectangular framework 10 which comprises two vertically-extending side walls 12, a horizontally-extending top plate 14 interconnecting upper ends of the side walls 12, a horizontally-extending bottom plate 16 interconnecting the lower ends of the side walls 12, and a horizontally-extending intermediate plate 18.

The machine comprises a cup dispenser 20 mounted on the upper surface of the intermediate plate 18 coaxially with a circular hole (not shown) through the intermediate plate 18. The cup dispenser 20 is of the type which comprises a plurality of cams distributed around a vertical stack S1 of nested cups (the details of the dispenser 20 are not shown in the drawings). Each of the cams is mounted on a gear which is turnable about a vertical axis and is meshed with an annular gear surrounding the stack so that when the annular gear is turned about the longitudinal axis of the stack, the cams all turn simultaneously. Each cam provides a spiral lip which supports the rim of the lowermost cup in the stack. The action of turning the cams causes the rim of the lowermost cup in the stack to be released so that the lowermost cup falls away from the stack. The turning action also introduces the lips of the cams beneath the rim of the lowermost but one cup so that the stack remains supported by the cams. Turning the annular gear in the reverse direction lowers the lowermost but one cup to the

position formerly occupied by the lowermost cup ready to be dispensed in the next operation of the dispenser 20. The cup dispenser 20 is operable to dispense cups from the bottom of a vertical stack S1 of nested cups received thereby, the cups being dispensed one-at-a-time. The stack S1 extends through a circular hole (not shown) in the top plate 14 which is vertically aligned with the hole in the intermediate plate 18.

The cup dispenser 20 is operable by operation of an electric motor 22 which is mounted on the underside of the intermediate plate 18. The motor 22 has an upwardly-extending driveshaft 24 which extends through a hole (not shown) in the intermediate plate 18. A crank 26 is mounted on the driveshaft 24 to be turned by the motor 22. The crank 26 is pivotally connected to a link 28 which is also pivotally connected to the annular gear of the dispenser 20. The arrangement is such that one complete turn of the crank 26 causes a back-and-forth movement of the annular gear of the dispenser 20 so that a cup is dispensed.

The drinks dispensing machine also comprises a cup transferring means movable between a cup-receiving position (in which it is shown in Figure 2) and a drink-receiving position thereof (in which it is shown in Figure 1). The cup transferring means comprises a carriage 30 which is slidable between the cup-receiving and drink-receiving positions along a horizontal slideway formed by two facing grooves 32 formed in upstanding edge portions 34 of the plate 16 (the edge portion 34 nearer to the viewer of Figures 1 and 2 has been omitted).

The carriage 30 comprises a pocket 36 which is open at the top to receive a cup and provides a U-shaped lip(not shown) arranged to support the rim of a cup. A cup supported by the pocket 36 can be removed through the open portion of the U which points away from the viewer of Figures 1 and 2.

The motor 22 provides moving means of the machine operable to move the cup transferring means between its cup-receiving position and its drink-receiving position. This movement is in synchronisation with the operation of the cup dispenser 20, the synchronisation being assured as the motor 22 operates both mechanisms. The motor 22 has a further driveshaft 38 extending downwardly therefrom. The driveshaft 38 has a crank 40 mounted thereon which

is pivotally connected to a link 42 which is also pivotally connected to the carriage 30. The arrangement is such that operation of the motor 22 to turn the crank 40 through one revolution also turns the crank 26 through one revolution. This causes the carriage 30 to move out of its drink-receiving position (to the right, viewing Figure 1) into its cup-receiving position (Figure 2) in which the pocket 36 is directly beneath the cup dispenser 20 and in which the pocket 36 pauses because of the crank 40. While the carriage 30 is in its cup-receiving position, the dispenser 20 releases a cup which falls into the pocket 36 in which it is retained as the carriage 30 is moved back to its drink-receiving position as operation of the motor 22 continues. At the drink-receiving position, a drink is dispensed into the cup in the pocket 36 from spouts 44 supported by mechanisms of the machine not supported on the door thereof. For example, coffee may be dispensed from one of the spouts and milk from the other. Thus, the pocket 36 is arranged, when the carriage 30 is in its cup-receiving position, to receive a cup dispensed by the dispenser 20, i.e. the lowermost cup in the stack S1. The pocket 36 is also arranged to retain the cup during movement of the carriage 30 to the drink-receiving position, beneath the spouts 44, and while a drink is dispensed into the cup at the drink-receiving position. The cup containing the drink is removable from the pocket 36 as aforementioned. Between operations of the motor 22, the carriage 36 rests at the drink-receiving position.

The drinks dispensing machine also comprises stack replenishing means operable to add cups to the stack S1 of nested cups from which the cup dispenser 20 dispenses cups. The stack replenishing means comprises a spring-loaded pusher 46 which is L-shaped in plan view (see Figures 3 and 4) having a first leg 46a and a second leg 46b projecting at right angles to the leg 46a. The pusher 46 is pivotally mounted above the top plate 14 on hinges 48 located at the juncture of the legs 46a and 46b. The pusher 46 is pivotally movable about the hinges 48, by the action of a spring (not shown) which acts between the leg 46a and a panel 50 of the door of the machine. The pusher 46 pivots from a first position in which its leg 46a extends parallel to the plate 50 and its leg 46b projects between the stack S1 and a second stack S2 of nested cups which rests on the upper surface of the top plate 14. The pusher 46 is normally retained in

its first position against the action of the spring by a latch 52 which hooks around the leg 46a. The latch 52 is pivotally mounted on the plate 50 and can be pivoted out of engagement with the leg 46a by operation of a solenoid 54. The solenoid 54 is arranged to be operated when a microswitch (not shown) associated with the cup dispenser 20 indicates that a predetermined small number, e.g. one or two, of cups remain in the stack S1. Operation of the solenoid 54 allows the spring to pivot the pusher 46 through 90 degrees into a second position thereof (shown in Figure 4) in which the leg 46b extends parallel to the plate 50 and the leg 46 occupies the position formerly occupied by the leg 46b. During the movement, the leg 46a pushes the stack S2 across the top surface of the top plate 14 until it falls through the hole in the top plate into the remainder of the stack S1, the stack S2 being prevented from escaping in a direction away from the plate 50 (downwardly in Figures 3 and 4) by a guide surface (not shown) supported by the interior of the machine. Figure 4 shows the pusher 46 in its second position.

The pusher 46 is located to the right of the stack S1 (viewing the drawings) and a further pusher 56 is located to the left of the stack S1 to replenish the stack with a further stack S3 when the microswitch indicates that only one or two cups remain in the stack S2. The pusher 56 and associated mechanisms are mirror images of the pusher 46 and its associated mechanisms, there being a first leg 56a, a second leg 56b, hinges 58, a latch 60 and a solenoid 62 (only the first position of the pusher 56 is shown in the drawings).

Thus, when the stack S1 is nearly exhausted the stack S2 is added thereto and, when the stack S2 is nearly exhausted, the stack S3 is added thereto. Before re-loading the machine with cups, the pushers 46 and 56 are manually returned to their first positions in which they are retained by the latches 52 and 62.

The features disclosed in the foregoing description, or the following claims, or the accompanying drawings, expressed in their specific forms or in terms of a means for performing the disclosed function, or a method or process for attaining the disclosed result, as appropriate, may, separately or in any combination of such features, be utilised for realising the invention in diverse forms thereof.

CLAIMS

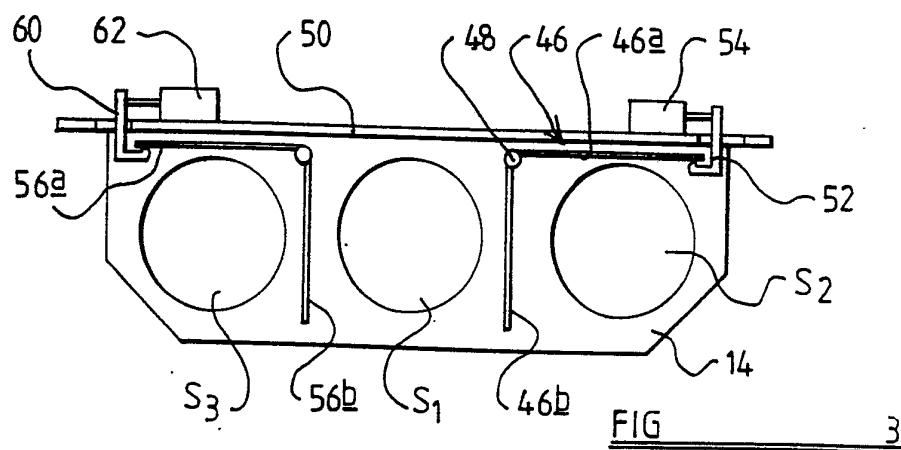
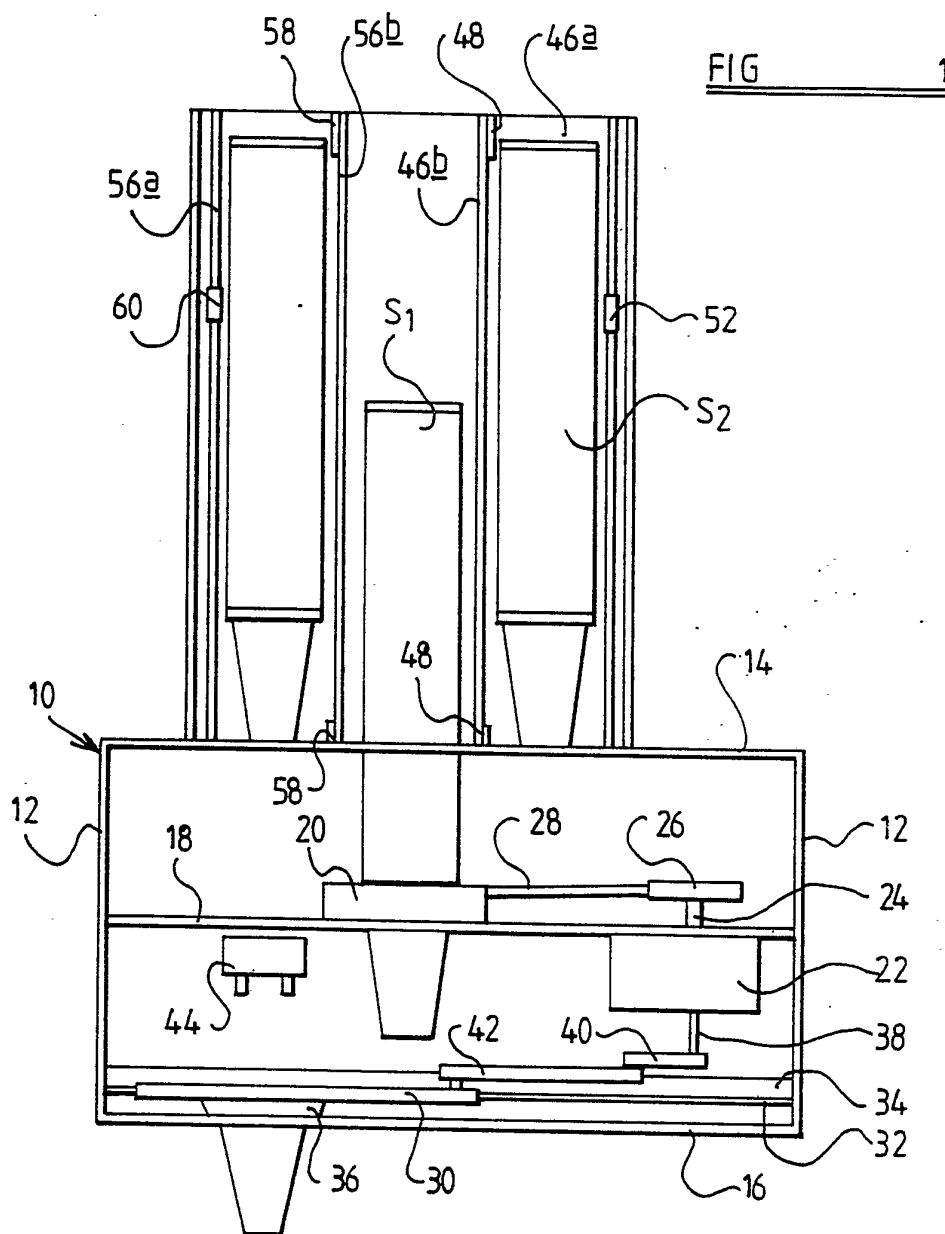
1. A drinks dispensing machine comprising a cup dispenser (20) operable to dispense cups one-at-a-time from the bottom of a vertical stack of nested cups characterised in that moving means (22) is provided to move cup transferring means (30) between a cup-receiving position and a drink-receiving position in synchronisation with the operation of the cup dispenser, the cup transferring means comprising a pocket (36) arranged when the transferring means is in its cup-receiving position to receive a cup dispensed by the cup dispenser, and to retain the cup during movement of the transferring means to the drink-receiving position and while a drink is dispensed into the cup at the drink-receiving position, the cup being removable from the pocket by an operator of the machine.
2. A drinks dispensing machine as claimed in claim 1, further characterised in that a single motor (22) operates the cup dispenser (20) and provides said moving means.
3. A drinks dispensing machine as claimed in either one of claims 1 or 2, further characterised in that the pocket (36) is mounted on a horizontal slide (32) for horizontal movement between its cup-receiving and drink-receiving positions.
4. A drinks dispensing machine as claimed in claim 3, further characterised in that the pocket (36) is moved by a crank (40) driven by a rotary motor (22).
5. A drinks dispensing machine as claimed in any one of the preceding claims, further characterised in that the pocket (36) provides a U-shaped lip to support the rim of a cup.
6. A drinks dispensing machine as claimed in any one of the preceding claims, further characterised in that the cup dispenser (20) comprises a plurality of cams distributed around the stack of cups, each cam being mounted on a gear

which is turnable about a vertical axis and being meshed with an annular gear surrounding said stack so that, when the annular gear is turned about the longitudinal axis of the stack, the cams all turn simultaneously, the cams each providing a spiral lip which supports the rim of the lowermost cup in the stack, the action of turning the cams causing the rim of the lowermost cup in the stack to be released so that it falls away from the stack and introducing the lips of the cams beneath the rim of the lowermost but one cup so that the stack remains supported by the cams.

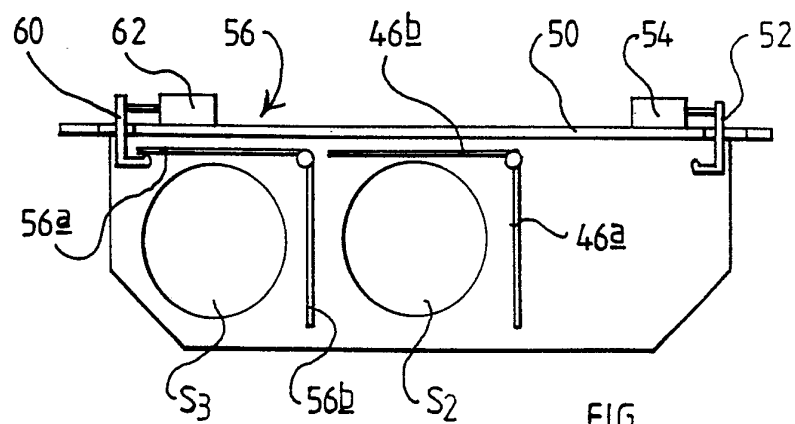
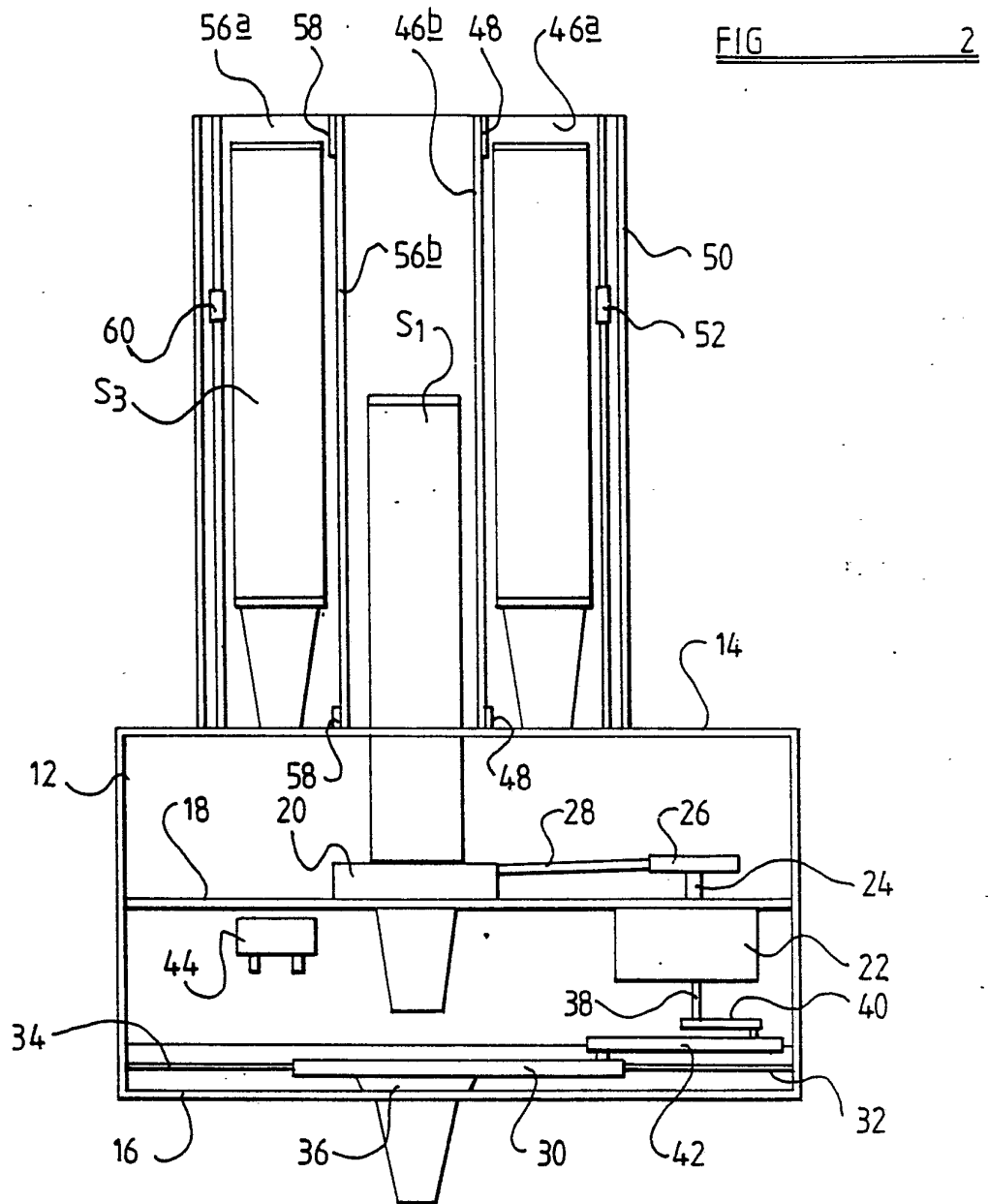
7. A drinks dispensing machine as claimed in any one of the preceding claims, further characterised in that the machine comprises stack replenishing means (46) operable to add cups to the stack of nested cups from which the cup dispenser (20) dispenses cups.

8. A drinks dispensing machine as claimed in claim 7, further characterised in that the stack replenishing means (46) comprises a spring-loaded pusher having mutually perpendicular rotatable first and second legs (46a and 46b) which, upon rotation thereof, operates to push a further stack of nested cups into the position at which a said stack requires replenishment.

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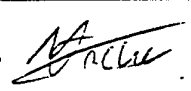
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INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 91/00356

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all) ⁶		
According to International Patent Classification (IPC) or to both National Classification and IPC:		
Int.Cl. 5 G07F13/10		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
Int.Cl. 5	G07F	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸		
III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹		
Category ¹⁰	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
X	EP,A,0339946 (GENERAL FOODS LTD) 02 November 1989 see column 6, lines 41 - 60	1, 3
Y	---	2
X	EP,A,0303881 (WITTENBORG) 22 February 1989 see column 3, line 38 - column 4, line 56	1
X	GB,A,2042482 (VGL INDUSTRIES LTD) 24 September 1980 see abstract see page 2, lines 105 - 110	1, 3
A	---	2, 4, 5
A	EP,A,0084695 (GENERAL FOODS LTD) 03 August 1983 see abstract	1, 4
Y	see pages 6 - 7 ---	2
	--- -/--	
¹⁰ Special categories of cited documents : "A" document defining the general state of the art which is not considered to be of particular relevance "E" earlier document but published on or after the international filing date "I" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified) "O" document referring to an oral disclosure, use, exhibition or other means "P" document published prior to the international filing date but later than the priority date claimed "T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention "X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step "Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art. "&" document member of the same patent family		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
06 JUNE 1991	19 JUN 1991	
International Searching Authority	Signature of Authorized Officer	
EUROPEAN PATENT OFFICE	TACCOEN J-F.P.L. 	

III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
Category °	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.
A	FR,A,2200568 (MARS LTD) 19 April 1974 see page 6, lines 17 - 18 ---	5
A	US,A,3119519 (CARPENTER) 28 January 1964 see column 3, lines 46 - 50 ---	5
A	EP,A,0097593 (MUNIER) 04 January 1984 see abstract ---	5
A	US,A,4840291 (MERLIN) 20 June 1989 see the whole document ---	6

ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO.

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
EP-A-0339946	02-11-89	US-A- 4978032	18-12-90
EP-A-0303881	22-02-89	JP-A- 1086912	31-03-89
		US-A- 4934257	19-06-90
GB-A-2042482	24-09-80	EP-A- 0014591	20-08-80
EP-A-0084695	03-08-83	None	
FR-A-2200568	19-04-74	GB-A- 1449818	15-09-76
		AT-B- 340181	25-11-77
		AU-B- 497258	07-12-78
		AU-A- 6026773	13-03-75
		BE-A- 804769	02-01-74
		CA-A- 1006131	01-03-77
		CH-A- 581361	29-10-76
		DE-A, C 2346929	04-04-74
		DE-A- 2346324	21-03-74
		FR-A, B 2200567	19-04-74
		FR-A, B 2475258	07-08-81
		JP-C- 1207206	11-05-84
		JP-A- 54059621	14-05-79
		JP-B- 58037199	15-08-83
		JP-C- 1207207	11-05-84
		JP-A- 54059622	14-05-79
		JP-B- 58037198	15-08-83
		JP-C- 1238803	13-11-84
		JP-A- 54059996	15-05-79
		JP-B- 59004760	31-01-84
		JP-C- 1250422	14-02-85
		JP-A- 54059997	15-05-79
		JP-B- 59022279	25-05-84
		JP-A- 49101055	25-09-74
		JP-C- 1204950	11-05-84
		JP-A- 49070768	09-07-74
		JP-B- 57054129	16-11-82
		LU-A- 68413	14-12-73
		LU-A- 68445	26-11-73
		NL-A- 7312482	19-03-74
		NL-A- 7312595	22-03-74

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
FR-A-2200568		SE-B- 386994 US-A- 3951303	23-08-76 20-04-76
US-A-3119519		None	
EP-A-0097593	04-01-84	FR-A- 2528814 AU-A- 1701183 WO-A- 8400230 JP-T- 59501129	23-12-83 26-01-84 19-01-84 28-06-84
US-A-4840291	20-06-89	None	