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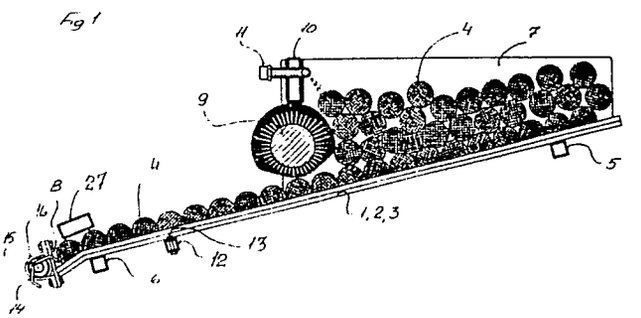
(54) An apparatus for dispensing of spherical objects.

(57) The disclosure relates to an apparatus for dispensing a number of substantially spherical objects (4), for example golf balls, the apparatus including a magazine for the spherical objects (4), the floor of the magazine sloping in relation to the horizontal plane and displaying a number of members (1, 2, 3) extending in the direction of slope and being in parallel with one another, the members forming therebetween a number of paths for a plurality of mutually subsequent objects (4), the paths discharging in a pivotal portion (14) which extends along the edge formed by the lower ends of the members (1, 2, 3) and which is in the form of a channel-shaped beam whose channel is turnable towards the spherical objects on the paths for receiving the spherical objects, and the pivotal shaft (15) of the beam (14) being located in such relation to the ends of the mutually parallel members forming the paths for the objects that, on replenishment pivoting of the beam (14) for turning the channel of the beam (14) towards the spherical objects and receiving the spherical objects, the upper shank of the beam comes into contact with the most proximally located objects (4) and urges these upwardly along the paths before they are released into the channel turned to face them.



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AN APPARATUS FOR DISPENSING SPHERICAL OBJECTS

The present invention relates to an apparatus for dispensing a number of substantially spherical objects, for example golf balls, the apparatus including a magazine for the spherical objects, the floor of the magazine sloping in relation to the horizontal plane and displaying a number of members which extend in the direction of slope and are parallel to one another, forming, therebetween, a number of paths for a plurality of mutually subsequent objects, the paths discharging in a pivotal portion extending along the edge formed by the lower of the ends of the members.

Such apparatuses are often employed as automatic golf ball dispensers on golf courses, these operating in such a manner that the golfer intending to practice driving may withdraw a number of balls from the dispenser against payment in the form of coins or special counters. Such an automatic dispenser is described in Swedish Patent Application No. 8206402-3. This prior art apparatus possesses numerous favourable properties and advantageous constructional features which may, however, be improved to achieve, above all, greater operational reliability and simplicity.

The task forming the basis of the present invention is to realise the desired improvements to prior art apparatuses of the above-disclosed type.

This task is solved according to the present invention in the apparatus disclosed by way of introduction, in that the pivotal portion is in the form of a channel-shaped beam whose channel is turnable towards the spherical objects on the paths, for receiving the objects; and that the pivotal axis of the beam is located in such relation to the ends of the parallel members forming the paths for the objects that, on replenishment pivoting of the beam for turning the channel of the beam towards the spherical objects and receiving the objects, the upper shank of the beam comes into contact with the most proximal objects and urges these upwardly along the paths, before they are released into the channel turned to face them.

In addition to being of extremely simple construction - and thereby of low manufacturing costs - the apparatus according to the present invention is also extremely dependable and reliable. The terms dependable and reliable are here taken to mean operational dependability and reliability in the dispsensing of the correct number of objects.

The apparatus according to the present invention further permits cleaning of the objects, or golf balls, while many prior art automatic dispensing machines of this type require a separate cleaning feature.

As a result of the apparatus according to the present invention, there will further be attained considerable advantages in that at least the objects most proximal in turn to being dispensed are set in motion on each replenishment pivoting of the beam, whereby there is ensured a rapid and efficient replenishment of the dispensing beam. This is of particular importance since, for a number of different reasons, there is a risk that the objects may fasten on the paths intended therefor. This risk is particularly imminent when the apparatus is sited outdoors at places in a climate where the outdoor temperature may fall below freezing. In such cases, the apparatus according to the present invention will ensure that the ball is always freed such that it will reliably roll into the channel or cavity of the dispensing beam. Moreover, this roll-in action is ensured partly by the greater slope of the ends of the parallel members, and partly by the employment of square tubing instead of circular tubing for the parallel members.

The present invention will be described in greater detail below with reference to the accompanying Drawings. In the Drawings, Fig. 1 is a cross-section through a magazine floor according to one embodiment of an apparatus according to the present invention and the component parts of the apparatus placed in association with the magazine floor, Fig. 2 is a side elevation of the magazine floor of Fig. 1, and Fig. 3 shows, on a slightly larger scale, an end elevation of two paths intended for golf balls, the paths being formed by the parallel members included in the magazine floor.

While the accompanying Drawings only show a magazine floor with the immediately associated components in an apparatus for dispensing golf balls, it is an obvious and simple matter for a person skilled in the art to apply this magazine floor in an automatic dispensing machine of, for example, the type disclosed in Swedish Patent Application No. 8206402-3, this machine including, in addition to the magazine floor, a replenishment magazine disposed above the magazine floor, a optionally openable and closable lid or roof, walls, and a bottom for the collection of dirt and washing water for conveyance to a drain. There is further provided a discharge funnel, to which may lead one or more discharge gutters or runners arranged in the apparatus.

Referring now to the Drawings, the magazine floor consists of a number of parallel square tubes 1, 2 and 3 disposed in side-by-side relationship and forming therebetween paths for the round or substantially spherical objects which, in the present case, consist of golf balls 4. The square tubes 1, 2 and 3 are anchored to an upper beam 5 and a

lower beam 6. Suitably, the number of square tubes 1, 2 and 3 may be so great as to form 24 paths, whereby two dozen golf balls 4 may be dispensed simultaneously. The outer tubes may consist of similar square tubes to the square tubes 1, 2 and 3, but may, naturally, also consist of suitably bent end wall plates or the like. At the sides, the magazine floor is defined by side beams B which also serve as mounting members for a plurality of other components. One of the major advantages inherent in employing square tubes is that, in comparison with round tubes, they permit a smaller distance between the mutually parallel square tubes in relation to the diameter of the golf balls 4. In this way, the roller path proper for the golf balls 4 will be located a generous distance from the centre of the golf ball 4, which facilitates the downward roll of the golf ball along the paths.

At each end of the magazine floor located most proximal the beam 5, there are disposed side or end wall plates 7 and 8 which are secured on the side beams B. A roller 9 is rotatably journalled at the lower edge of the side plates 7, 8. Between the plates 7, 8 and the roller 9, there is formed a magazine for the golf balls 4. The roller 9 extends across the entire magazine floor and thereby overbridges all of the paths for the golf balls 4 formed by the square tubes 1, 2, 3. In Fig. 1, it is clearly shown that the roller 9 is a brush roller which, on a portion of its periphery, has shorter brush bristles than the remainder of the periphery. The shorter bristles permit passage of the golf balls 4, while the longer bristles force the golf balls back upwardly into the magazine, which entails that the golf balls 4 will, first, be arranged after one another on the paths between the square tubes 1, 2, 3, and secondly be cleaned by the action of the brush. In order to improve this cleaning action, there is disposed, above the roller 9, a pipe 10 which is connected to a water source by the intermediary of a nozzle 11 and which extends throughout the entire length of the roller 9. On that side facing the magazine, the pipe 10 is provided with a number of holes for the discharge of water and spraying of the balls 4 in the magazine. Below the roller 9, but ahead of the beam 6, there is disposed a beam 12 which, on the side facing the square tubes 1, 2, 3, displays a drip bead 13 which prevents or hinders water migration along the underside of the square tubes 1, 2, 3.

After the beam 6, the ends of the square tubes 1, 2 and 3 are bent in order that the final section of the paths will have a greater angle of slope than the section of the paths between the beams 5 and 6. The paths formed by the square 1, 2 and 3 discharge in a pivotal portion or channel-shaped beam 14 which extends along the entire magazine floor and, at its ends, displays stub shafts 15 which are journalled in suitable bearings 16. The one stub shaft 15, which is illustrated in Fig. 2, extends through its bearing 16 for fixed connection to an arm 17. The arm 17 is pivotally connected to one end of a rod 18 whose other end is pivotally connected to a crank 19 which is disposed for simultaneous rotation with the the roller 9. This rotation is effected by means of an electric motor 20 by the intermediary of a suitable gearbox 21. The rod 18 is of such type as to be yieldable on overloading in both directions, which implies that the rod 18 permits both expansion and contraction when a certain loading is exceeded.

The opposing end of the crank 19 in relation to the rod end 18 is designed for actuation of a switch 22 whose switching arm 23 displays a wheel 24 for actuation by means of the end of the crank 19. The switch 22 is coupled, via an electric cable 25, to control equipment, and to an electric cable 26 for power supply of the motor 20. The control equipment is suitably of such type that it energizes the motor 20 on receipt of a coin or counter or the like, whereafter the motor runs and rotates the roller 9 anticlockwise, until such time as the crank 19 discontinues operation of the motor by the intermediary of the switch 22 on passage by the crank and of the wheel 24. Thus, the roller 9 and the crank 19 will rotate through one revolution from their starting positions illustrated in Figs. 1 and 2, and back to the illustrated positions.

In Fig. 1, the channel-shaped beam 14 is shown in greater detail, and it will be immediately apparent that the golf ball 4 located most proximal the beam 14 rests against the upper shank of the beam 14. The length of the arm 17, like the length of the crank 19, is selected such that the beam 14 pivots to the replenishment position with the upper shank above the golf balls 4, and thereafter back to the dispensing and rest position illustrated in Figs. 1 and 2, during one revolution of the roller 9. On commencement of the rotation of the roller 9 and the crank 19, the upper shank of the beam 14 will urge the most proximally located golf ball upwardly along the paths formed by the square tubes 1, 2 and 3. Those golf balls 4 which, for any reason, may possibly have fastened to the tubes 1, 2, 3 will, thus, be released in a highly efficient manner. In order to prevent the golf ball 4 from climbing up on the next golf ball 4, there is provided, above at least the two balls located most proximal the beam 14, a beam 27 which extends between the side beams B and which forms a ceiling above the two golf balls 4 located most proximal the beam 14. As soon as the upper shank of the beam 14 has passed the midline of the golf ball, the golf ball will begin to move into the channel or cavity of the beam 14. As soon as the upper shank of the beam 14 has reached its uppermost position, it will, with

all probability, have been filled with golf balls and will pivot back to the position illustrated in the Drawing for dispensing the balls. The end bending of the square tubes 1, 2, 3 most proximal the beam 14 facilitates roll-in of the balls 4 and considerably speeds up filling of the beam 14.

The control equipment may also be arranged so as to permit one or more revolutions for each coin, counter or the like, but the crank 19 and the switch 22 will always ensure that the roller 9 and the beam 14 are arrested in the same position after each revolution and pivoting, respectively.

The present invention should not be considered as restricted to that described above and shown on the Drawings, many modifications being conceivable without departing from the spirit and scope of the appended Claims.

Claims

1. An apparatus for dispensing a number of substantially spherical objects (4), for example golf balls, the apparatus including a magazine for the spherical objects (4), the floor of the magazine sloping in relation to the horizontal plane and displaying a number members (1, 2, 3) extending in the direction of slope and being parallel with one another, the members forming therebetween a number of paths for a plurality of mutually subsequent objects (4), the paths discharging in a pivotal portion (14) extending along the edge formed by the lower ends of the members (1, 2, 3), **characterised in that** the pivotal portion (14) is in the form of a channel-shaped beam whose channel is turnable towards the spherical objects on the paths for reception thereof; **and that** the pivotal shaft (15) of the beam (14) is located in such relation to the ends of the mutually parallel members forming paths for the objects that, on replenishment pivoting of the beam (14), for turning the channel of the beam (14) towards the spherical objects and reception thereof, the upper shank of the beam comes into contact with the most proximally located objects (4) and urges these upwardly along the paths before they are released into the channel turned to face them.

2. The apparatus as claimed in claim 1, **characterised in that** the section of the parallel members (1, 2, 3) disposed most proximal the pivotal beam (14) is of greater slope than the remaining section of the parallel members (1, 2, 3).

3. The apparatus as claimed in claim 2, **characterised in that** the length of the section of greater slope is equal to or greater than the radius of one object (4).

4. The apparatus as claimed in claims 1 and 2, **characterised in that** a ceiling (27) is disposed above the objects (4) at at least those path sections of greater slope, and possibly those objects (4) located most proximal thereto.

5. The apparatus as claimed in claim 1, in which a roller (9) extends transversely of the parallel members (1, 2, 3) and is asymmetric for allowing, along one portion of its periphery, the passage of the objects (4) on the paths, and, along one portion of its periphery, for urging the objects (4) back up along the paths, **characterised in that** the roller (9) is coupled to the beam (14) for the reciprocal pivoting of the beam (14) during the rotation of one revolution, the starting position of the roller (9) being with its periphery in the passage position and the beam (14) in its dispensing position.

6. The apparatus as claimed in claim 5, **characterised in that** the circumferential casing of the roller (9) carries brush bristles which, in the object (4) passage portion of the periphery, are shorter than in the remaining portion thereof, which amounts to approximately 3/4 of the entire periphery.

7. The apparatus as claimed in claim 5, **characterised in that** the roller (9) is coupled to a crank (19) which, in its turn, is coupled to the pivotal shaft (15) of the beam (14) by the intermediary of a rod (18) which may possibly be yieldable on over-loading, and an arm (17).

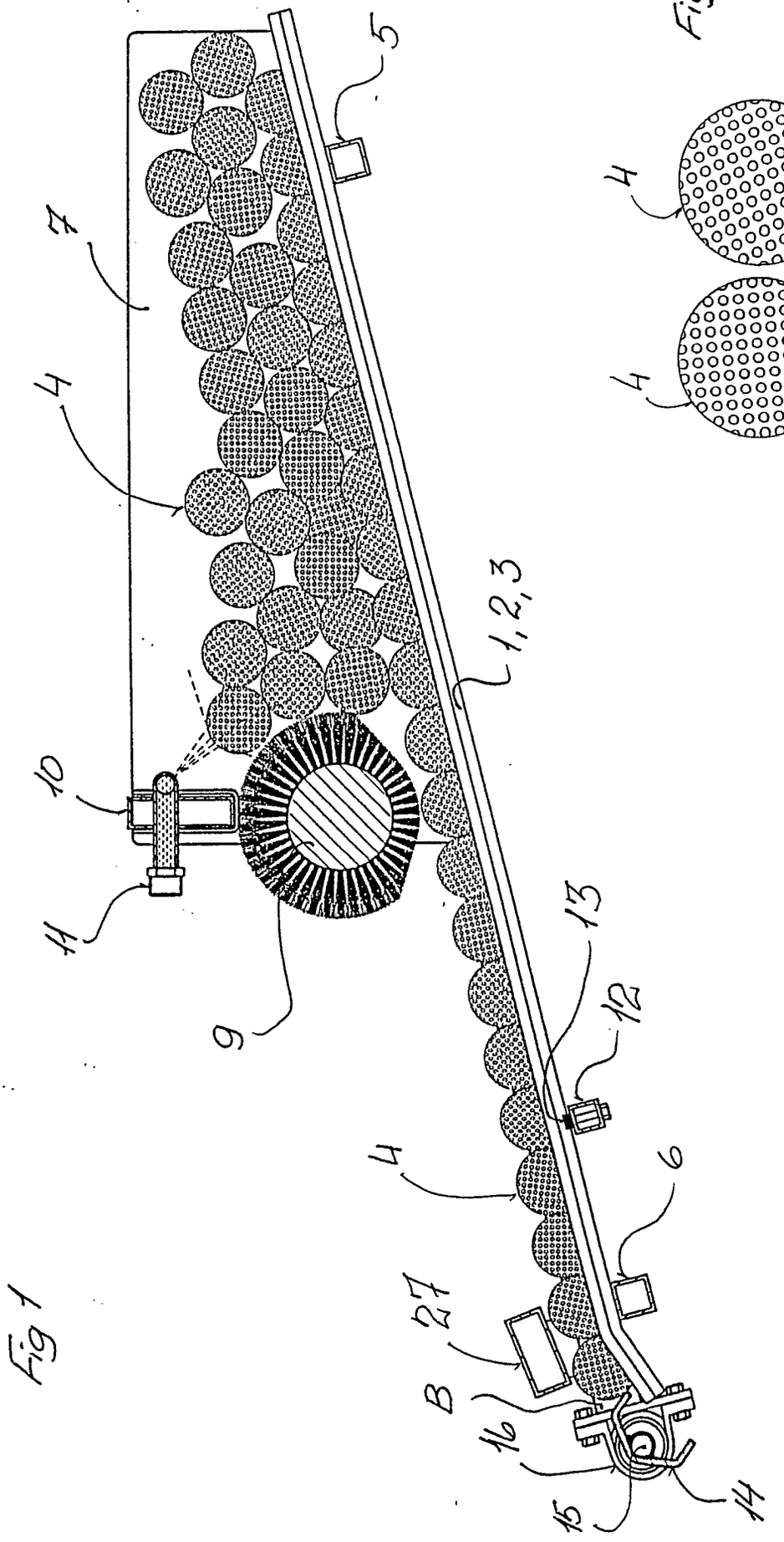

Fig 1

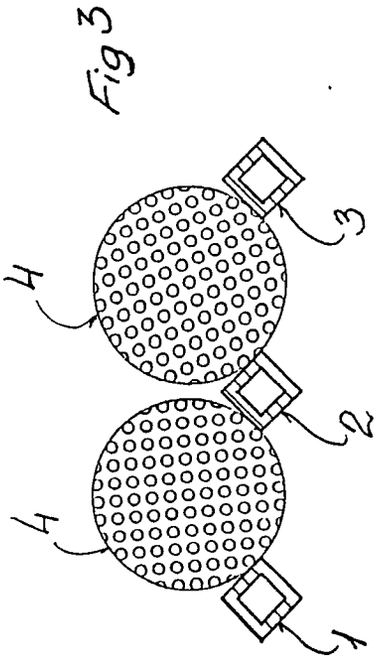

Fig 3

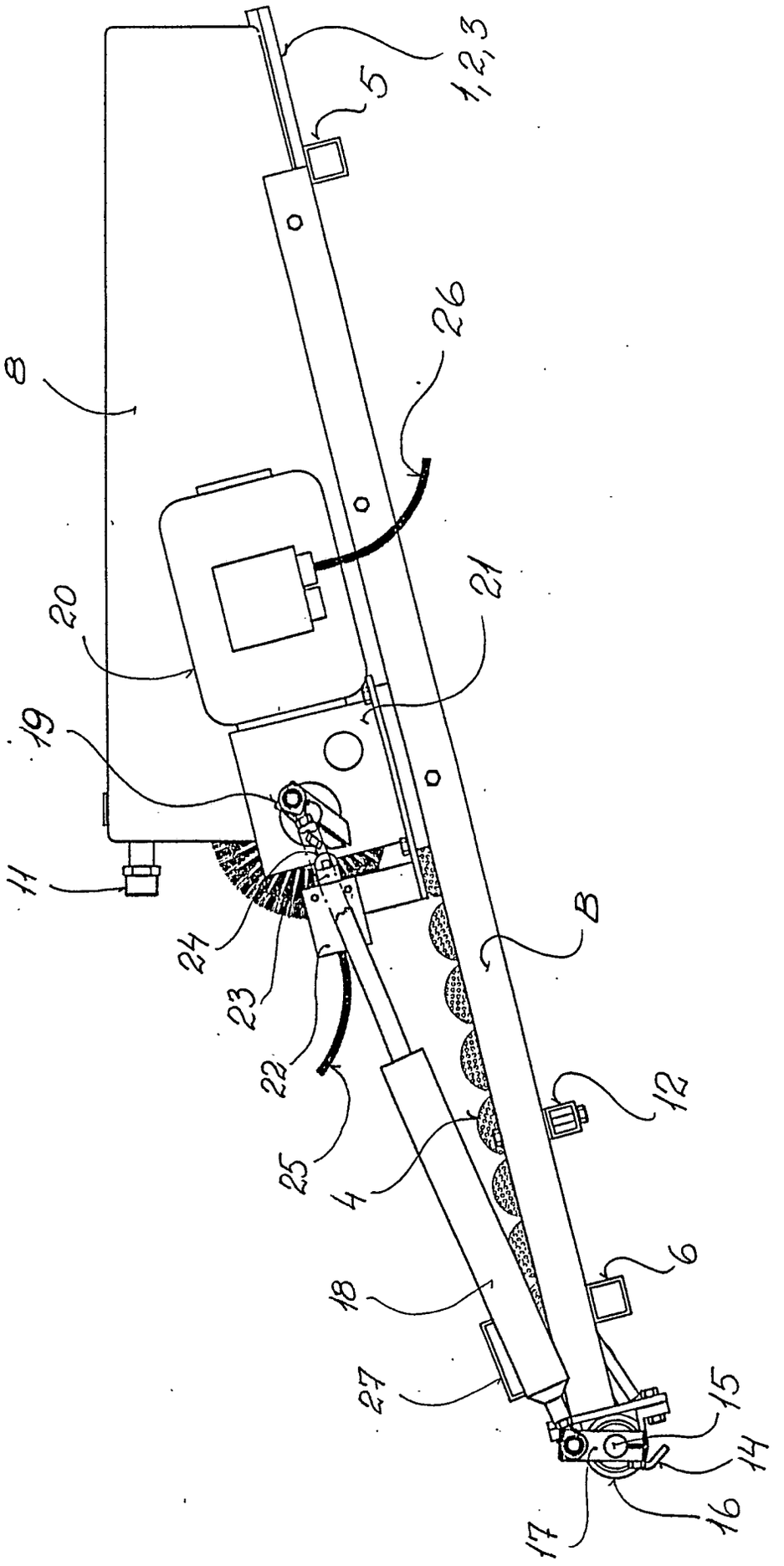

Fig 2

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EUROPEAN SEARCH REPORT

Application Number

EP 88 85 0056

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)
D,Y	GB-A-2 131 404 (J. KNEZ) * Abstract; figures; claims *	1	G 07 F 11/44 G 07 F 11/24
A		4,5,7	
Y	GB-A- 322 088 (D. PETRIE) * Figures 5,6; page 1, lines 28-52 *	1	
A	US-A-3 946 847 (O. BOCK) * Abstract; figures 1-5 *	1-5,7	
A	EP-A-0 167 470 (P. TUCOM)		
A	US-A-4 054 197 (O. BOCK)		
A	DE-A-1 805 800 (T.N.-VERKAUFSAUTOMATEN)		
A	US-A-3 248 008 (E. MEIERJOHAN)		

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

G 07 F
A 63 B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	12-10-1988	DAVID J.Y.H.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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