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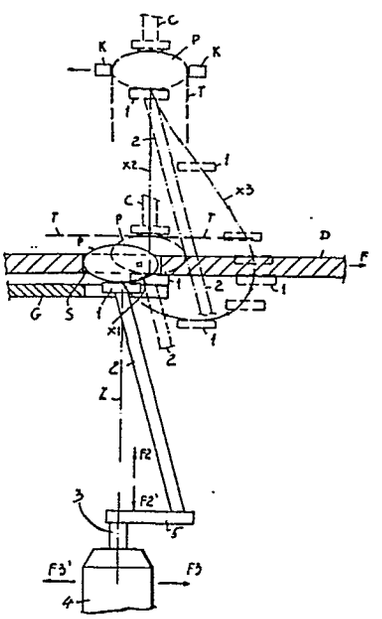
(71) Applicant: **CARLE & MONTANARI S.p.A., Via Groce Coperta 14, I-40128 Bologna (IT)**

(72) Inventor: **Salicini, Sandro, Via Murri 63, I-40137 Bologna (IT)**

(74) Representative: **Porsia, Dino, Dr. et al, c/o Succ. Ing. Fischetti & Weber Via Caffaro 3, I-16124 Genova (IT)**

(54) A feeding apparatus for wrapping machines.

(57) The elevator (E) cyclically passes through the seats (S) of a feeding disc (D), to transfer a caramel (P) and wrapper (T) to the station where said wrapper is to be sealed. The stem (2) of the elevator is inclined so that, during the lifting movement of the elevator, it moves relatively with respect to the seat (S) through which it passes in the same direction (F) of the operational rotation of the feeding disc (D). Thus, the feeding disc may go on operating, not only during the return or lowering stroke (X3), but also during the lifting stroke of the elevator.



EP 0 154 911 A1

CARLE & MONTANARI S.p.A.
Bologna, Italy.

"A Feeding Apparatus for Wrapping Machines"

This invention relates to the automatic machines used for the wrapping of products formed of discrete articles, particularly caramels, in which the feeding apparatus comprises a horizontal, or substantially horizontal, disc which rotates around its axis and is provided with equally--spaced seats at the periphery of on an imaginary circumference having the center at said axis of the disc, said seats being dimensioned and shaped so as to accommodate only one caramel within each of them. Such a feeding apparatus usually comprises an elevator member or elevator which, with a suitable timed sequence, moves upwards through each of said seats, one at a time, and which, in co-operation with a counter-elevator arranged above, lifts said caramels to transfer them to an upper station where said caramels are wrapped in a suitable wrapper. Before a caramel is clamped between said elevator and counter--elevator, a wrapper is automatically laid on said caramel and will be thus held thereon by said counter-elevator. During the lifting movement of the caramel, said wrapper tends to fold down on said caramel and then it is

transferred between upper side-clamping means - which take the place of said elevator and counter-elevator that are timely returned to their initial position to repeat a new cycle - in the best condition to be folded over completely around the caramel and sealed thereon. With this type of machines, the lifting movement of a caramel and its wrapper usually occurs along a straight vertical path of travel, to avoid undesired distortions of the wrapper and to permit both a high-speed operation and a constructional and functional simplification of the clamping and transfer means for a caramel. Although the lowering movement of the elevator may occur in combination with the operative movement of the feeding disc, thus permitting a higher efficiency of the feeding apparatus, the lifting movement of said elevator inevitably implies a stop of the feeding disc in order to avoid any interference between said disc and the stem of said elevator. Inasmuch as the feeding disc cannot be stopped and re-started abruptly, since it would throw into disorder the caramels in their seats in the disc and could even expel them out of their seats, said feeding disc, upon each stop, must be subjected first to a progressive and smooth de-celeration and then to a similar acceleration. The requirements strongly limit the speed, and therefore the productivity, of the rotating disc feeding apparatus referred to above. This invention aims to overcome this disadvantage, i.e. to increase the productivity of the rotating disc feeding apparatus. According to the invention, the stem of the elevator is formed with an inclined configuration with respect to the vertical, whereby during the lifting step thereof through

0154911

a seat of the feeding disc, said stem presents parts having a progressively increasing distance with respect to the vertical axis of the lifting path, so that the displacement from said axis occurs in the same direction, or substantially the same direction, as the movement of the periphery of the feeding disc, as if said stem of the lifter (during its lifting stroke along the vertical) moved with respect to the seat through which it is travelling, in the same direction as the rotation of the feeding disc, so that said disc may go on rotating even during the lifting step of the elevator, with resulting obvious advantages.

By virtue of this improvement, the feeding disc need not be stopped cyclically, but it can be actuated with a continuous and various motion, with minimum acceleration and de-celeration which, anyway, is necessary to facilitate the entry of caramels into said seats in the disc, thus ensuring a higher efficiency of the feeding apparatus.

The features of the apparatus according to this invention, and the advantages resulting therefrom, will be evident from the following description of a preferred embodiment, shown in the Figures of the accompanying sheets of drawings, in which

Figure 1 is an imaginary side elevational view of the elevator according to the invention, seen in the different positions it assumes during a complete operational cycle;

Figure 2 is a top plan view of the elevator and counter--elevator;

Figure 3 is a sectional view of some constructional details of the elevator, on line III-III of Figure 2.

With reference to Figure 1, reference letter D indicates a feeding disc which rotates in the direction of arrow F, and S indicates one of the seats which are formed on the periphery of said disc, said seats lying on an imaginary circumference the center of which coincides with the axis of rotation of said disc. Each seat is shaped and dimensioned so that only one caramel P can be accommodat therein, each caramel being retained in said seat by an underlyinf fixed guide G ending at the point where the elevator shall work. The said elevator shall be positioned in a proper timed sequence under the caramel P and shall be lifted through the seat S to transfer said caramel to the wrapping station. Thereafter the elevator is returned to its lower or rest position to repeat a new cycle. According to the invention, the elevator comprises a head 1 having a surface proportioned to the size of the product P to be handled. Preferably, the stem 2 of the elevator has a reduced section in order to get through the seat S with the maximum possible clearance, and is characterized in that it has an inclined shape so that, with respect to the vertical central axis Z of the head 1, the distance of said stem 2 increases progressively in such a manner that said

0154911

stem and axis diverge downwardly. The imaginary plane comprising the axis Z and the longitudinal axis of the stem 2 is perpendicular to the disc D and is tangent or secant to the imaginary circumference on which said seats S are located. Assuming the disc D rotates in the direction F, the stem 2 of the elevator is positioned ahead of said axis Z. It is to be understood that the stem 2 of the elevator, unlike the form shown in Figure 1, may have any other equivalent form, such as a stepped or a curved form. The stem 2 is associated to any supporting and driving means 3 adapted to impart to said elevator a vertical displacement as indicated by the arrows F2-F2' and a further displacement, first in the direction F3, i.e. the direction of rotation F of the disc D, and then in the opposite direction F3'. A possible embodiment of said supporting and driving means 3 will be described hereinafter.

The elevator described above operates as follows:

When the head 1 of the elevator contacts the product P, said elevator moves in the direction F3 of rotation of the disc D, and at the same speed thereof. At the same time, the elevator is raised as indicated by the arrow F2, and when the largest dimension of the product has cleared the seat S, the displacement in the direction F3 will be discontinued since the head 1 of the elevator is now in axial alignment with the counter-elevator C, which is lowered with a suitable timed sequence to engage the product P with a proper pressure, so as to hold the product suitably positioned on said head 1 and to press thereon the central

portion of a wrapper T which has been positioned by conventional means under said counter-elevator C and over the product to be wrapped. Now, the unit consisting of the elevator and counter-elevator is smoothly moved upwards in the direction of the arrow F2 on a straight and vertical path of travel so as to transfer the product P and wrapper T (now folded over thereon) to a conventional clamp unit K which grasps the assembly P-T laterally and thereafter, when said assembly P-T is released by the elevator and counter-elevator, transfers it to further conventional means which complete the wrapping operation. During the operational steps described above, the elevator has moved along the portions X1 and X2 of the operational stroke shown with dot-and-dash lines in Figure 1.

By considering the stem 2 of the elevator at the beginning and at the end of the lifting stroke X2, it will be realized from this Figure that, even if the head 1 of the elevator has moved vertically, the portion of the stem 2 which passes through the seat S of the feeding disc, due to the particula inclination of said stem, has moved in the same direction F of the disc D. In this manner the feeding disc can continue its movement even during the entire lifting stroke of the transfer unit consisting of the elevator and counter--elevator with a resulting higher operating efficiency of the whole feeding apparatus, due also to the elimination of the abrupt accelerations and de-celerations of the feeding disc. At the end of the lifting stroke X2, while the counter -elevator C continues its upward movement to perform an over-travel and while the assembly product P and wrapper T is grasped by the clamp unit K and is transferred to the

0154911

wrapping means, the elevator is simultaneously moved in the directions of the arrows F2' and F3 firstly, and F2' and F3' subsequently, so that the head 1 of the elevator is moved, as a resultant, along the portion X3 of the diagram of Figure 1, while the disc D continues moving in the direction F, and is returned to the originary position for a new cycle under a new product P which has been transferred in the meantime by the feeding disc D to the wrapping station. The return movement of the elevator entails no particular problem inasmuch as the elevator is now devoid of the product and, therefore, it may be subjected to rapid accelerations and de-celerations.

At the same time, the counter-elevator C is lowered to repeat a new similar cycle. An outline of the counter-elevator can be seen in Figure 2, and since this member is only lifted and lowered along the vertical axis W in a conventional manner, a detailed description thereof will be omitted. It will also be appreciated in Figure 2 that according to a possible embodiment of the invention the elevator E effects first a stroke to follow the feeding disc and then a stroke in the opposite direction by traveling on an arc of circumference having its center on a vertical rod 4 supporting at its upper end an arm 5 mounting the stem 2 of said elevator. With reference also to Figure 3, it will be noted that the rod 4 is supported, so as to rotatable and axially movable, by a fixed structure 6 provided with bearings 7-7'. The rod 4 is moved axially by a bell-crank lever 8, and is connected thereto by a suitable pivotal joint 9, said lever being pivoted at 10

to the frame 11 and being pivotably connected to a fork--member 12 which is reciprocated by a cam 13 through cam--followers 14. The fork-member 12 is guided to move longitudinally by a mounting block 15 rotatably mounted on the cam-shaft 16. This cam-shaft also mounts a drum-shaped cam 17 co-operating with a cam-follower 18 provided at the bottom end of a vertical guide 19 swingably supported in by a shaft 20 which is parallel to the rod 4 and is supported on stationary portions of the frame 11. A sliding member 21 is slidable in the guide 19, and pivotably connec thereto at 22, parallelly to the shaft 20, there is an arm 23 which is secured at 24 to an intermediate portion of the rod 4. This arrangement causes the rotational movement of the rod 4 while permitting said rod to move axially. It is to be understood that the elevator may be moved by utilizing means which can be different from that described above, and that many constructional changes and modificatio may be made, without departing from the scope of the invent as set forth above, as illustrated and as claimed hereinaft

0154911

C L A I M S

1. A feeding apparatus for automatic machines for the wrapping of products (P) consisting of discrete articles, particularly caramels, comprising a horizontal disc (D) rotatable around its axis and provided at its periphery with seats (S) equally spaced from each other and lying on an imaginary circumference having its center at said axis of rotation, said seats (S) being dimensioned and shaped so as to accommodate each only one product (P), said product being retained therein by an underlying stationary guide (G), said apparatus also comprising an elevator (E) which operates at a point where said stationary guide (G) terminates and which, with a suitably timed relation, lifts the product (P) located thereabove by passing through the seat (S) in which the product is accommodated, this operation occurring in a suitably timed sequence with the operation of a counter-elevator (C) which holds said product on the elevator and holds over said product a wrapper (T) which has been suitably fed thereto, characterized in that the elevator presents a stem (2) which is inclined with respect to the vertical whereby while the elevator is raised vertically said stem (2) presents a relative movement, at the zone of and with respect to the seat (S) through which it passes, in the same direction as the direction of rotation of the feeding disc (D), so that the said disc (D) may continue rotating not only during the successive return or lowering stroke of the elevator, during which it is also moved in the

0154911

direction of rotation of the disc (D), but also during the lifting stroke of said elevator.

2. A feeding apparatus according to the claim 1, characterized in that the stem (2) of the elevator is mounted, suitably inclined with respect to the vertical, at the end of an arm (5) which is secured in a cantilevered manner at the upper end of a vertical rod (4) which is reciprocated axially by a lever-and-cam mechanism (8-13) in order to lift and lower said elevator, and which is at correct times rotated and reciprocated by another lever-and-cam mechanism (23-19-17) in order to move said elevator first in the direction of rotation (F) of the feeding disc (D) and then in the opposite direction.

3. A feeding apparatus according to claim 1, characterized by the fact that the inclined stem (2) of the elevator presents a configuration which can be straight, stepped or curvilinear.

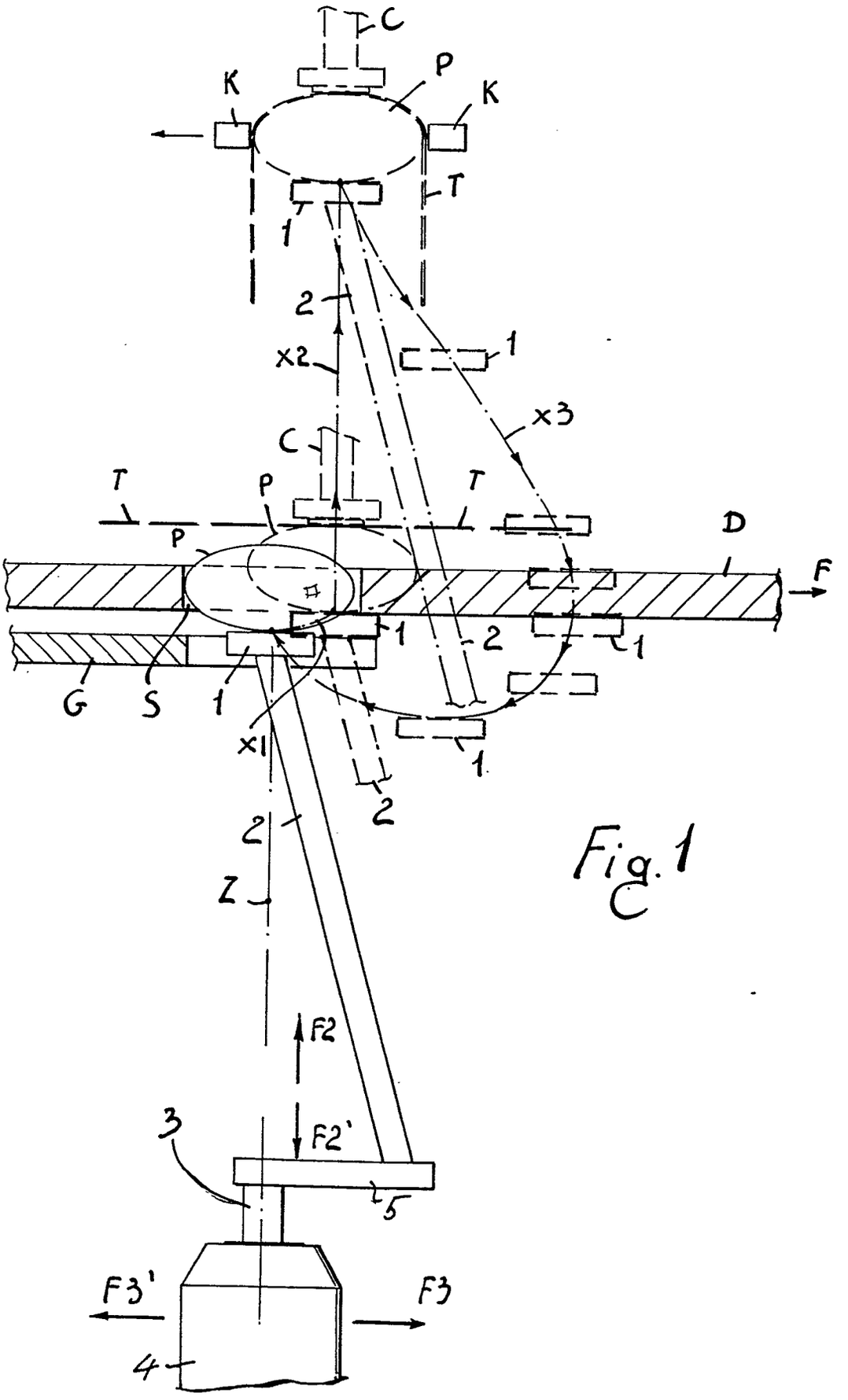


Fig. 1
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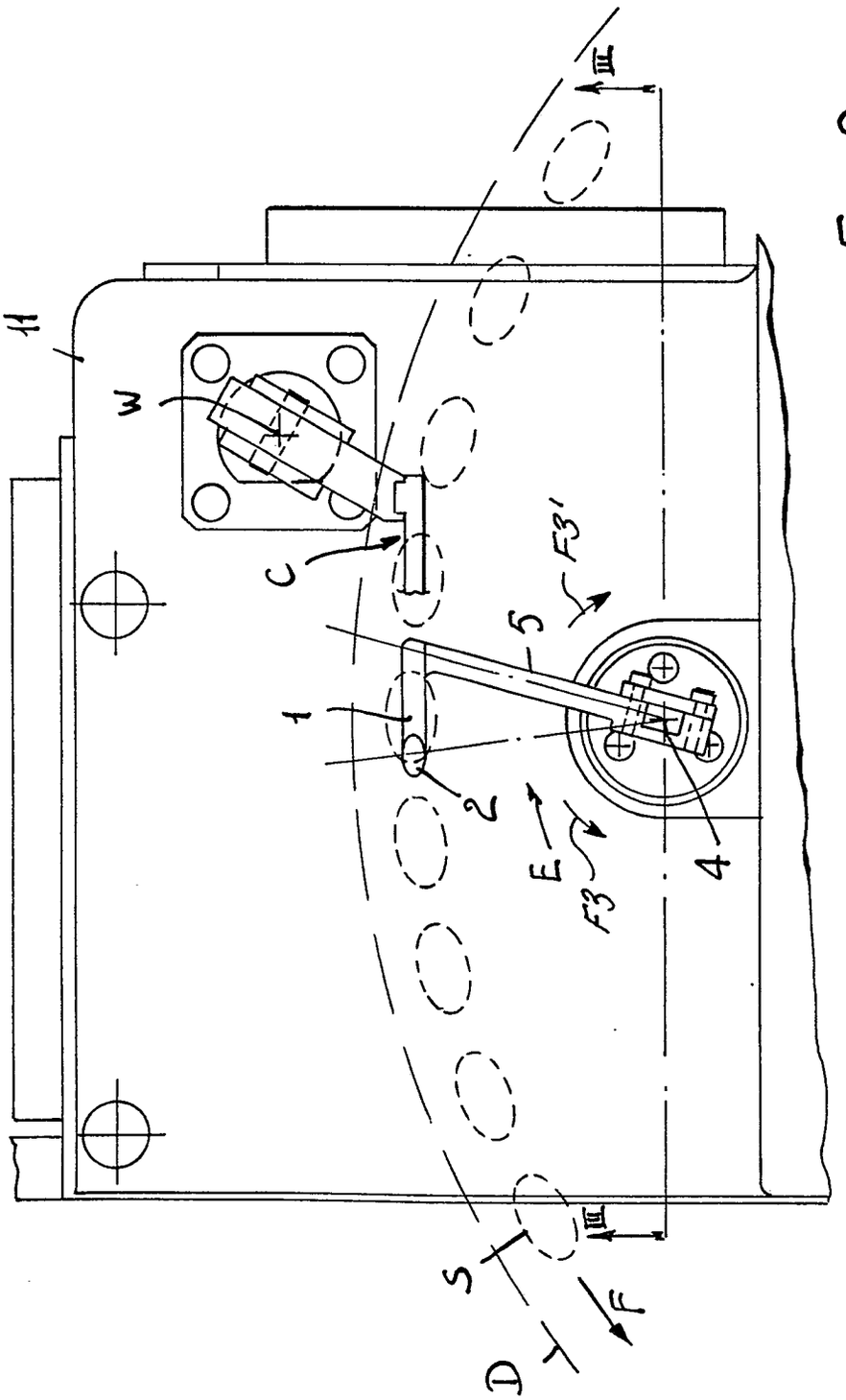

Fig.2

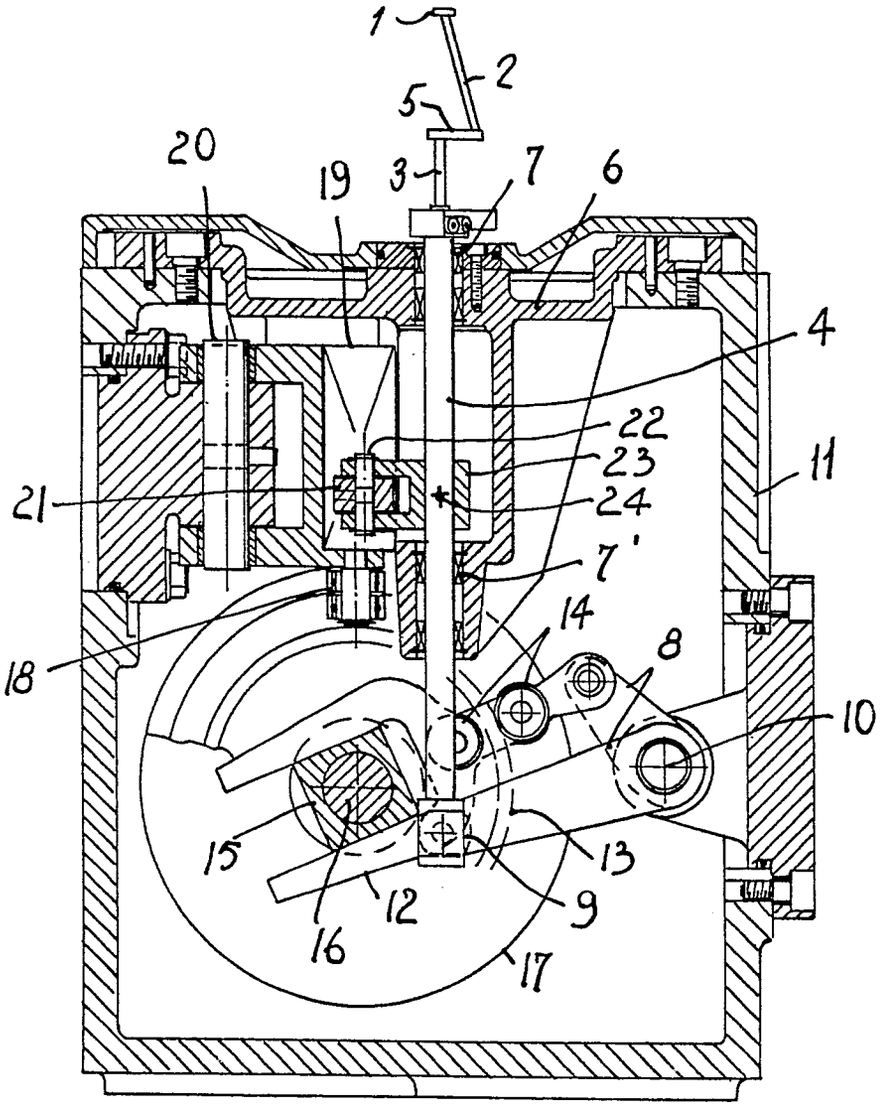

Fig. 3

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EUROPEAN SEARCH REPORT

0154911

Application number

EP 85 10 2363

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	GB-A-1 056 830 (O.HANSEL) * Page 2, line 25 - page 3, line 5; figures *	1,2	B 65 B 11/54
A	GB-A- 702 155 (FORGROVE) * Page 2, line 4 - line 107; figures *	1,2	
A	GB-A- 710 500 (ROSE BROTHERS) * Page 2, line 20 - page 3, line 28; figures *	1	

TECHNICAL FIELDS SEARCHED (Int. Cl.4)

B 65 B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	12-06-1985	JAGUSIAK A.H.G.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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